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Varazdin Development and Entrepreneurship Agency and **University North**
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Faculty of Management University of Warsaw
Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat

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83rd International Scientific Conference on Economic and Social Development – "Green Marketing"

Book of Proceedings

Editors:
Ljerka Luic, Ivana Martincevic, Vesna Sesar

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Ljerka Luic, University North, Croatia
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IMPACT OF COVID 19 ON RAKUTEN BUSINESS RESULT

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ABSTRACT

Purpose - the aim of this paper is to analyse the business efficiency of the Rakuten platform at the beginning and during the Covid 19 crisis. Methodology / Design - research and analysis are based on secondary research published in Annual Report Corporation as well as in other relevant scientific sources. The research is divided into three basic parts that can be individually compared with the results of research on other platforms in the pandemic period. The results - the results of the research proved the strong impact of the Covid 19 pandemic on the overall business result. The analysis of financial items, as a quantitative part of the research, needs to be compared with the results that the platform achieves in the development of business activities in order to obtain a complete picture of the business. Conclusion - the platform has achieved negative financial results in the last two years, but the number of users is still growing, which leaves room for financial recovery. In addition, the platform develops new technologies and business models from which it expects revenue in the future.

Keywords: *hybrid platform, multi-sided platform, online retail, platform economy, Rakuten*

1. INTRODUCTION

Rakuten was founded in 1997, as an online store. Very soon after its founding, the Rakuten Ichiba electronic platform took over the market leadership from its competitors. The company levered the Japanese hospitality to build a reliable corporate culture and shaped an outstanding service that focuses on encouraging long-term relationships between merchants and customers (Willenborg 2016). Rakuten Ichiba platform in Japan is a market leader in several different digital service sectors from banking to travel thus making it one of the most innovative companies in the world: it was mentioned, for example, by Forbes as one of the world's most innovative companies in 2013 (Hänninen, Smedlund 2019). The platform diversified the business model and took advantage of the effects of digital business transformation (Lozić 2019). Tokyo-based Rakuten so dominates the e-commerce market in its home country that it's often called the Amazon of Japan. If it's not well-known in some other parts of the world, that's about to change (Helft 2017). Rakuten Group is a B-to-C platform, similar to Amazon, operating mainly in Japan but currently expanding. It offers a similar combination of retail and entertainment, while also creating online malls where sellers can create virtual shopfronts to attract customers. It is, however, a pure multi-sided platform, offering no own goods or logistics (Strategic direction 2018). The business model of the platform is organized as a classic platform economy (Parker et.al. 2016; Moazed, Johnson 2016) which uses the effects of the zero marginal cost model (Rifkin 2015). The business model is a combination of several different models of service commodification that are immanent to postmodern society (Lozić et.al. 2019).

The strategy of the platform is based on a combination of vendor creativity and technological algorithm, on the one hand, and the development of logistics and other forms of business activities, on the other hand. In this context, we can talk about a hybrid model of platform development and management. Rakuten is, besides Amazon, today's most diversified e-commerce company worldwide with businesses ranging from marketplaces, to accompanied internet services, online advertising, media content, in-house media devices, shipping and logistics, and payment and financing services (Schiliro 2013). As we approach our 25th anniversary, we have expanded our ecosystem beyond e-commerce to include a diverse portfolio of businesses centred on fintech and mobile (Annual Report 2020). In addition to Rakuten Ichiba, online shopping as the oldest business segment, the platform develops business in the segment of auctions, online golf booking, online travel booking, book sales, etc. The platform develops a special business segment within the financial sector by providing online banking, financing and credit card services. A modern system of contactless payment and payment by smartphones has been developed. The platform provides the services of Internet providers as well as broadband services, and has a special sector of sports business. The paper will investigate and analyse the impact of the Covid 19 pandemic on the platform's operations. The results of the research can serve as a comparison with other organizations in the platform economy model.

2. LITERATURE REVIEW

Rakuten started with its core business, an online shopping mall called Rakuten Ichiba, selling everything from consumer electronics and computers to fashion, home furnishings, sporting goods, etc. In Japan alone, more than 60 % of its population uses the marketplace accounting for an almost 30 % share of the overall 28.2 billion € e-commerce market in Japan (Willenborg 2016). Rakuten's vision is focused on disruptive innovation, reliance on knowledge, creativity and passion from around the world to meet ambitious goals and help build communities where people can follow their dreams and live in happiness (Annual Report 2020). With a different approach than its competitors, Rakuten Ichiba banks on a new strategy that uses a business-to-business-to-customer (B2B2C) model. The B2B2C model is a shop-based marketing place, focusing on the exchange between buyers and sellers rather than on being a shop or a collection of shops (Willenborg 2016). It also has a loyalty scheme, which rewards those who shop there with any purchases made across its ecosystem. It earns profit from membership fees and commission, as well as the sale of data, digital marketing, and sales consultancy services (Strategic direction). Rakuten concept is based on making connections between people based on areas of interest, which means that individuals as well as merchants can become curators, influential to other interested parties (Thau 2014). According to the organizational model, Rakuten is a multi-sided platform which makes it much less capital intensive, easier to scale, and more profitable than traditional retail. Uniquely, the new style of multi-sided platform retailers is able to focus entirely on creating lock-in of customers, leaving the suppliers using their platform to focus on the transactions of goods (Strategic direction). In the ten years since 2000, the corporation has made more than twenty strategic acquisitions. The M&A activities were accompanied with providing corporate venture capital to new acquired companies. This can be seen as a hybrid model between a Silicon Valley business cluster and a Japanese "keiretsu" system (Walter, Zhang 2012). Strategic takeovers and business diversification had a negative impact on the corporation's operations at the beginning of the crisis, but regular customers retained all the rights they had acquired in previous periods (Coldevey 2020). While both Rakuten Group and Amazon.com maintain tight control over their suppliers (banning those that do not conform to their quality criteria), they offer great freedom to those that wish to use their platform to sell quality good (Strategic direction). Our research found that the three leading platform marketplaces differ fundamentally in their business models.

The platforms from Alibaba and Rakuten are comprised of independent sellers, whereas Amazon combines sales from independent suppliers with its own inventory (Hänninen, Smedlund 2019). The value proposition of Rakuten Group is based on offering shopping as an entertainment, with its platform serving as a virtual shopping mall allowing suppliers to create their own storefront like in a physical mall. Rakuten is a pure platform, without vertical integration and in-house supply chain processes (Hänninen et.al. 2017). Rakuten.com is pretty much the best online shopping cashback website out there (Taylor 2022). On Rakuten, savings of up to 15% can be achieved by returning money after purchase (Rosen 2021). Over 90% of members use the benefits of collecting points, and the platform ranks first in Japan in terms of customer satisfaction with this type of reward (Annual Report). We recently introduced a new feature called Personalized Rewards that allows our merchants to pair their customer data with our first-party data to create targeted, hyper-personalized Cash Back offers. The affiliate marketing expertise of our sister company, Rakuten Advertising, makes this experience frictionless for both the consumer and our partners (Yu 2021). Rakuten Group offers over 70 services in Japan, and its mobile carrier business is a subscription service based on monthly fees that also generates high contact frequency with its users (Annual Report 2020). Rakuten TV has launched twenty-one new television channels in Spain, Italy and France (Sutton 2021). Rakuten TV is the first on demand and streaming platform in Europe combining TVOD, SVOD, AVOD and FAST services (Dziadul 2021). Data mining method also can be used to improve the accuracy. The result of this research acts as initial research for future large application development which is able to mine all Indonesia e-commerce site like google shopping (Simanjuntak et.al. 2015). Rakuten Ichiba is "based on the concept of not having internet savvy people run the business, but creating a platform that enables ordinary people skilled in retail to open their own online shop" This highly profitable business model focuses on a shop-centric rather than product-centric satisfying both consumers and merchants equally (Willenborg 2016). In April 2021, the name of the corporation was changed to Rakuten Group. There are two fundamental reasons for this. The first reason was business differentiation and procurement decentralization, and the second reason was the expansion of the ecosystem into the environment and the association with new companies (Annual Report 2020).

3. METHODOLGY AND RESEARCH QUESTIONS

The paper will use the Rakuten Corporate Report 2020 as the official report of the corporation on business results. In addition to the Annual Report, other scientific sources that are relevant to the research of the topic in the paper will be used. The analysis is based on the financial analysis of selected items from the profit and loss account as well as on the statistical analysis of the trend and the ANOVA model.

Research and analysis focuses on two fundamental research issues:

- Q1 - How the Covid 19 crisis is affecting the financial result of the platform.
- Q2 - How the Covid 19 crisis is affecting the trend in the number of members on the platform.

The first research question is aimed at analysing the impact of the Covid 19 pandemic on the platform's overall business results. The overall business of the platform will be analysed on the basis of selected financial items, but also as an overall trend in the number of users and technological development of the platform. The second research question is aimed at analysing the trend of the number of users in the context of financial performance, but also expectations of the trend of revenue and profit of the platform in the future. The results and commentary of the research are presented in the Conclusion chapter.

4. BUSINESS ANALYSIS

The Rakuten platform is organized as a hybrid model of the platform economy. It generates revenue from interactions in B2B and B2C models, as well as other service commodity models. As with other hybrid ecosystems in the platform model, services from Big-data processing, subscriptions to various services, services and the like are monetized. Most strikingly, it is the use of Big Data and technology solutions such as data analytics and cloud computing/storage that is making these new retail giants so powerful. It is through the accumulation and control of consumer data that they are able to control and profit from the markets within which they function (Strategic direction 2018). Research and analysis are divided into three basic segments. In the first part, the selected financial parameters from the profit and loss account will be analysed. The research includes financial analysis and interpretation of results and analysis by regression model of trends in order to determine the average values and trends in the analysed period. In the second part of the research, the trend of platform members is analysed. Statistical models of data processing as well as regression analysis are used in the analysis. In the third part, the ANOVA model will be used to determine the statistical significance and the significance of the correlation of the selected analysed variables.

4.1. Financial analysis

The analysis of the financial operations of the corporation covers a five-year period, i.e. the period from 2016 to 2020. In the analysed period, the corporation's revenues grew by 90.2%, from $ 7.193 billion to $ 13.682 billion. In the same period, cost revenue increased by 138.2%, which is above the increase in revenue. In the last two analysed periods, the cost of revenue was higher than total revenue. Gross profit decreased continuously in the analysed period and fell from 13.3% to 6.7%. Gross profit has been negative in the last two analysed periods. The increase in the cost of revenue above the increase in revenue indicates the strong impact of Covid 19 on the platform's operations as well as the overall financial result.

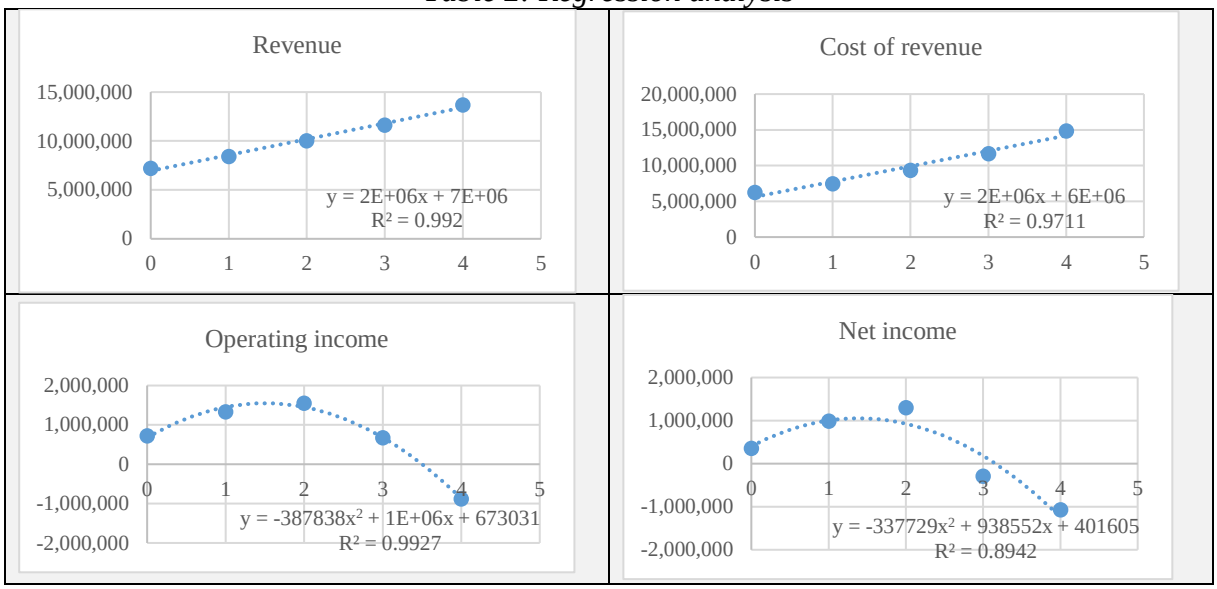
Table 1: Selected financial items (000; $)

	2016	2017	2018	2019	2020
Revenue	7.193.627	8.405.818	10.023.470	11.628.170	13.682.060
Cost of revenue	6.233.901	7.454.195	9.352.553	11.655.500	14.848.520
Gross Profit	959.726	951.623	670.917	-27.330	-1.166.460
%	13,3%	11,3%	6,7%	-	-
Operating income	717.388	1.329.161	1.550.869	669.250	-882.180
Net income	349.554	984.207	1.294.766	-293.370	-1.073.471
EBIT %	10,0%	15,8%	15,5%	5,8%	-

Source: own illustration

Operating income and net income grew in the first three analysed periods, and then began to fall sharply. At the beginning of the crisis, Covid 19 operating income fell by 56.8% compared to 2018. At the end of the analysed period, operating income was negative. Operating income grew from 10% to more than 15%, before falling to 5.8%, i.e. a negative result. Net income was similar, but at the beginning of the crisis Covid 19 was negative, and the following year the loss increased by 265.9%. The results of the research are shown in Table 1. Due to poor business results, the platform closed its online store in the USA. Rakuten bought Buy.com for $250 million back in 2010 in an attempt to expand its retail business out of its stronghold of Japan. Unfortunately, the evolving market, aggressive growth (and targeting of rivals) at Amazon and, likely, the choice to rebrand the once well-known site under the Rakuten name all led to declining business (Coldevey 2020). The Rakuten mobile network made $ 1.02 billion in losses in the first year of the Covid 19 crisis (Kapko 2022).

Table 2: Regression analysis



Source: own illustration

Revenue growth is explained by the linear regression equation y = 2E + 06x + 7E + 06. The average annual revenue growth was 19.63%, with a coefficient of determination $R^2 = 0.992$. The cost of revenue trend is explained by the linear regression equation y = 2E + 06x + 6E + 06. The average annual increase in Cost of revenue was 20.18%, which was higher than the average trend of revenue growth. The operating income trend is explained by the regression equation y = -387838x2 + 1E + 06x + 673031, with the coefficient of determination $R^2 = 0.9927$. Operating income was the highest in 2018, amounting to 15.5% of total revenue. The net income trend is explained by the regression equation y = -337729x2 + 938552x + 401605, with the coefficient of determination $R^2 = 0.8942$. The results of the research are shown in Table 2. The research confirmed the strong impact of the pandemic on the financial result of the platform. In addition, the platform began developing its own mobile telephony as well as the 5G network, which further impacted the financial result.

4.2. Number of user's analysis

The number of members of the Rakuten platform has been continuously growing in the analysed period. From 2014 to 2020, the number of members increased from 70.3 million to 119.8 million or 70.4%. Comparing with the selected financial period, from 2016 to 2020, the number of members increased by 36.9%. In the same period, revenues increased almost three times more than the increase in the number of members, which indicates increased consumption of existing members. The increase in the number of members is digressive and was the largest in the first analysed period, and the smallest in the last analysed period. At the beginning of the Covid 19 crisis, the trend in the number of members changed from digressive to progressive growth, after which the trend became digressive again. Digressive growth indicates the saturation of the number of members on the platform. The trend in the number of members is shown in Table 3.

Table following on the next page

Table 3: Number of Rakuten members (mill.)

2014	70,3	%
2015	78,8	12,1%
2016	87,5	11,0%
2017	95,2	8,8%
2018	102,6	7,8%
2019	111,4	8,6%
2020	119,8	7,5%

Source: own illustration (www.statista.com)

The trend of growth in the number of users over a period of seven years is explained by the linear regression equation y = 8.1714x + 70.571, with a coefficient of determination R^2 = 0.9995. The average annual increase in the number of members was 8.59%. In the analysed five-year period, comparable to the financial analysis of operations, the average annual increase in the number of members was 7.82%. The growth trend is digressive and lower by 12% than the growth of total revenues. The management of the platform relied on the loyalty of the members and their acceptance of the new mobile network that will be launched by the platform. In 2019, there were already 100 million members in Japan, and the platform expected the development of a mobile network within the ecosystem due to various forms of rewards developed by the platform in other sectors (Simms 2019).

4.3. ANOVA analysis

The platform achieves revenue growth and membership growth, but has a negative financial result. Growth in revenue and membership is no longer sufficient to cover operating costs. The development strategy is changing from an online sales platform to a hybrid form of the platform and an ecosystem development platform. Strategic acquisitions have shaped an ecosystem that is currently seen as the most diverse and encounters people in many everyday life situations. A constant focus on global expansion and untapped business and niche segments contributes to its overall success (Willenborg 2016). The development of the hybrid model increases demand and affects the growth of revenue outside the core business or online retail. The ANOVA model tested the impact of member growth on the platform's total revenue. A strong correlation was found between revenue growth and the number of members, i.e. Multiple R = 0.99756. The coefficient of determination or Adjusted R Square is 0.99375 (for arrays less than 30 frequencies), and Standard Error 203308.44. The results of the Significance F analysis indicate a large impact of the independent variable on total revenue, i.e. the P-value of the member's variable is 0.000136, at a significance level of 0.05, which means that the independent variable Members significantly affects the trend of total revenue. The ANOVA model also tested the impact of the trend in the number of members on the net profit of the platform. The results of the analysis showed a weak correlation between the trend in the number of users and net profit, i.e. Multiple R = 0.70256. The coefficient of determination Adjusted R Square = 0.32437 is not sufficient for accurate interpretation of the results, which indicates a large deviation from the mean regression values. Significance F = 0.18580, which indicates that there is no variable that significantly affects net profit, i.e. the value of P-value for the independent variable Members was 0.18580, at the level of significance of 0.05, which means that it does not significantly affect independent variable.

Table following on the next page

Table 4: Regression analysis

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,99765333							
R Square	0,99531216							
Adjusted R Square	0,99374955							
Standard Error	203308,444							
Observations	5							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	2,6328E+13	2,6328E+13	636,9536	0,000136414			
Residual	3	1,24003E+11	41334323577					
Total	4	2,6452E+13						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-10545963,2	826501,4923	-12,7597631	0,001039	-13176259,83	-7915666,59	-13176259,83	-7915666,59
Members	200702,732	7952,42159	25,23793912	0,000136	175394,5772	226010,8867	175394,5772	226010,8867

Source: own illustration

The results of the analysis with the ANOVA model prove a significant correlation between the increase in the number of users and the increase in total revenues. Also, the results of the analysis show a weak correlation between the trend of the number of users and net profit, i.e. the increase in the number of users does not significantly affect net profit. The growth in the number of users is digressive, and revenues during the crisis grew at a lower rate than the growth before the crisis. The platform invested in the diversification of activities, which resulted in an increase in costs that could not be offset by an increase in the number of users, i.e. the growth in the number of users did not affect the proportional growth of total revenues.

5. CONCLUSION

The results of the research proved that the crisis related to the Covid 19 pandemic significantly affected the overall financial result of the platform. Total revenues grew, but gross profit was negative already in the first year of the Covid 19 pandemic. The basic results of the research are contained in five points:

- Cost of revenue grew faster than revenue, and gross profit was negative.
- The Covid 19 global pandemic has significantly affected operating and net income platforms.
- In the analysed period, the revenues of the platform increased almost three times more than the number of members.
- At the beginning of the crisis, the growth trend of the number of members changed. The beginning of the crisis had a positive effect on the growth of the number of members, but the following year this growth returned to the standard model.
- Testing using the ANOVA method proves significant significance of the model, i.e. the increase in the number of members significantly affects the platform's revenues.

In the context of the first research question, it can be concluded that the crisis had a significant impact on the overall financial results. Total revenues grew steadily, but total costs grew faster than total revenues. Net profit was negative in the last two analysed periods and increased significantly in the last period. Total revenues grew by an average of 19.63% per year, but the cost of revenue grew by an average of 20.18%. Diversification of operations and alimony of income from hybrid forms of business was not enough to amortize the operating costs associated with the Covid 19 crisis. Business losses increased after Rakuten started introducing a new mobile network.

They ballooned to a loincloth-stretching 225 billion Japanese yen (US$2 billion) last year, more than doubling the 2020 figure, even though group revenues grew 15.5%, to nearly JPY1.7 trillion ($14.7 billion) (Morris 2022). In 2019, Mikitani invested $5.5 billion to launch a new telecom network and disrupt Japan's three-way mobile phone oligopoly: KKDI, NTT Docomo and Japanese billionaire Masayoshi Son's SoftBank by providing a cheaper and more flexible network called radio access network (RAN) (Leung 2021). The crisis caused by the pandemic has affected corporations differently in the platform economy model. Groupon operated with losses and they increased in the crisis (Lozić et.al. 2021), while eBay had a continuous growth of revenues and revenues grew during the Covid 19 pandemic (Lozić 2021). In the context of the second research question, the research results did not prove a stronger impact of the crisis on the trend in the number of users. Before the pandemic, the number of users grew digressively, and at the beginning of the 2019 crisis, this trend changed. In this context, it can be concluded that the crisis has had a positive effect on the trend in the number of users. However, in the following period the trend changed and returned to the digressive model as before the appearance of Covid 19. The change in the trend was short-lived, and the growth in the number of users in the last analysed period was the smallest. At the beginning of the pandemic, a new mobile network was developed on the platform, which attracted a new number of users of the Rakuten ecosystem, but the trend has stabilized recently. Brokerage houses expected losses in the next three years after the introduction of the new mobile network (Simms 2019), as evidenced by the results of financial analysis. The test results with the ANOVA model prove a significant statistical correlation between revenue and the number of users, i.e. a significant impact of the increase in the number of users on the increase in total revenue at the significance level of 0.05. However, from the results of the financial analysis it can be concluded that the operating costs associated with the Covid 19 crisis have also increased significantly. The results and analysis of the research can be the basis for future research related to the platform's operations.

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ENTREPRENEURIAL ACTIVITIES OF UNIVERSITIES – CASE OF SLOVAKIA

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ABSTRACT

The roles of universities have long been limited to research and education, but their role is increasingly understood in various areas. One such area is the entrepreneurial activity of universities. While in many countries, especially in the United States, this concept is close to universities, in the countries of the former socialist bloc, where universities were primarily focused on education, their activities towards entrepreneurship are still in their infancy. The aim of our article was to analyse the development and structure of income from entrepreneurial activities of universities in the context of overall university funding in the case study of the Slovak Republic. The article analyses the 10-year development of financial income of universities from business activities in Slovakia. The data were drawn from the financial statements of individual universities as well as their annual reports. These data were statistically evaluated by comparative analysis. The research results show that despite the relatively significant changes and support of business activities of universities by the government in the recent period, so far there is only an improvement in the available inputs needed for these activities but is not reflected in the financial income from these activities. The results point to the need for further changes and finances that would lead to higher commercialization of the institutions' own activities. The key activities on the part of the government can be considered taking into account existing business activities in the breakdown of direct subsidies and project support more strongly directed to the outputs of the commercialization of research, not only to finance inputs.

Keywords: *Entrepreneurship, Universities funding, Slovak Republic, Budget of universities, Higher Education*

1. INTRODUCTION

In the developed countries of Western Europe and the United States, the role of universities has long been perceived not only as a tool for education or research, but various theoretical concepts such as the triple helix model point to several other important tasks such as the role of universities in regional development. One such task is the entrepreneurial activity of universities. Developments show that universities have become increasingly entrepreneurial and are often key in building regional innovation systems (Etzkowitz and Zhou 2017). In socialism, universities in Central European countries have traditionally focused primarily on education and, to a lesser extent, research (Kwiek, 2012). Entrepreneurship was not a natural part not only of universities but also of the companies themselves. In addition, they did not have sufficient resources to allow them to decide more freely on their research and commercial activities. In addition, universities in the first decade of the transition period were largely left on their own, autonomous but severely underfunded, and engaged much more in teaching than in knowledge production (Kwiek, 2012). Over the last 10 years, mainly due to the impact of EU accession and the use of EU resources, as well as governments' efforts to integrate the Central European area into the European Research Area, a significant amount of funding has been channelled to support the entrepreneurial role of universities. The aim of our article is to analyse the development and structure of income from business activities of universities in the context of overall university funding in the case study of the Slovak Republic. In the first part of the article, we will deal with the theoretical basis of understanding the business university.

Subsequently, we will analyse how these starting points in practice translate into the actual results of universities on the case studies of universities in the Slovak Republic, which is often considered the worst in the evaluation of performance of universities in Central Europe (Kwiek, 2012).

2. THEORETHICAL BACKGROUND

It is no longer enough for universities to focus only on education and research to achieve economic growth and competitiveness of countries or regions. As the practical implications of research arise ever closer in time to the making of a discovery, it leads all actors (universities, companies, and governments at different levels) to explore ways for knowledge producing institutions to make a greater contribution to the economy (Etzkowicz and Zhou 2017). Several theoretical concepts have begun to emphasize these other roles for universities. One of these concepts was the triple helix model (Leydesdorff and Etzkowitz, 1998), which brought to the forefront the interconnection of the activities of universities, industry, and government, while the institutions in question must take on the roles of their partners in addition to their traditional tasks. Thus, universities should not only fulfill their traditional tasks, but also business tasks traditionally assigned to companies. "The capitalization of knowledge is the heart of this role for the university, linking universities to users of knowledge more tightly and establishing the university as an economic actor". (Etzkowitz and Zhou, 2017). As a result, the emerging role of a entrepreneurial university is dichotomous, focusing both innovation and entrepreneurship that contributes to innovation, competitiveness, and economic growth (Audretsch 2014). However, there is quite different views on what is entrepreneurial university. In its narrow interpretation, it is synonymous of commercialisation of intellectual property originated from university resources. In broad sense, it could be any commercial activities of universities. So in addition to the commercialization of our own research, we could include there activities as contract research, building our own institutions more involved in business activities such as science parks or incubators, practice counseling, spin off activities or even teaching entrepreneurial skills (Rothaermel et al. 2017; Pugh et al. 2018). In most developed countries of Western Europe or United States, more traditional entrepreneurial university functions such as technology transfer offices, spin offs or academic entrepreneurship are well explored and show the importance of these activities for economic and innovation activities of the region or state (Audretsch, 2014). In the countries of Central and Eastern Europe, where the transformation process of universities is still ongoing, these processes are often only in the beginning (Kwiek, 2012; Némethová and Glittová, 2021; Prokop et al. El 2018), whereas, due to the very different external conditions compared to Western countries, this process is considerably more complicated. There are differences in several respects. Perhaps most importantly, while these developed countries have innovation driven growth, in the case of Central and Eastern European countries it is more efficiency-driven growth (Kwiek, 2012). There is a large share of FDI in countries that does not make a primary effort to support research activities that are allocated in home countries (Ranga and Etzkowitz, 2011). Research has not been a priority in the transformation of universities either. Rather, they were pushed into a massive expansion of educational capacity, as the number of university students increased significantly in the first 10 years after the fall of socialism (Ranga and Etzkowitz, 2011). These conditions may thus limit the meaningfulness of supporting the business role of universities.

3. METHODOLOGY

Within the article, public universities with the status of a university in the Slovak Republic were analysed. During the entire research period (2010 to 2020), there were 17 such universities in Slovakia. We did not include in the evaluation directly state-funded universities such as the Slovak Medical University, which have a very special status and conditions.

At the same time, no private university in Slovakia has the status of a university. We obtained data for the analysis mainly from the financial statements of universities for the period 2010-2020, supplemented by data from their final reports. We then statistically evaluated these data. We focused mainly on the development of key financial indicators in relation to university business and the overall position of business in university financing.

4. RESULTS

During the period under review, the University of Slovakia began to focus more intensively on the areas of possible commercialization of its activities. Likewise, in an effort to move from an industrial society to a knowledge-based society, the government has begun to support the entrepreneurial roles of universities more intensively. Government supports and provides incentives for university that want to cooperate with industries, with the rationale that these synergetic outcomes can have can spill over effects on economy. Public subsidy or in its simplest form financial contributions from government has become a major source of financing R&D collaborations (Prokop et al. 2018). From the sources of cohesion policy alone, the government has invested more than 1 billion in supporting universities. More than a third of the resources went to activities aimed at supporting the entrepreneurial role of universities, such as supporting cooperation and joint research between companies and universities, building excellence centers or university science parks, or supporting technology transfer (Némethová and Glittová, 2021). This represents a significant increase over previous years. Many universities have also developed several institutional tools to support this task, such as business incubators, science parks and technology transfer centers. The patent activity of universities is also slowly improving. In the last 10 years, they have obtained 28 patents registered in the European Patent Office, 10 years before they were only 3. Despite the increase, compared to neighbouring countries, it is very small, even if we take into account the relative size of the countries (Némethová and Glittová, 2021). In the area of inputs for the fulfillment of entrepreneurial role, we can talk about a significant increase in the capacity of universities. However, if we look at the outputs, the trends are not so positive. In Table 1 we can see the overall development of different types of income of the universities over the last 10 years. Despite the growth of the total volume of revenues by more than 30%, the volume of revenues from business activities had a much more modest increase and even fell sharply during the pandemic crisis.

v th. EUR	2010	2012	2014	2016	2018	2020
Total revenues	600 395	656 581	696 699	733 289	749 252	792 154
Direct subsidies	451 426	493 783	540 581	570 477	579 517	644 699
Entrepreneurhip revenues	63 222	64 544	61 520	63 437	66 716	44 846

Table 1: University revenues in the years 2010 to 2020.
(Source: own calculations based on annual reports of universities)

However, despite the increase in resources, this is still a relatively small total of funding available to universities. In neighbouring Austria, for example, universities have € 6.5 billion a year at their disposal. Here, too, public resources dominate, but they are much more diversified. If we take the example of TU Wien, its budget was 392 mil. However, the direct subsidy represented a significantly smaller share (below 70%) than in the case of Slovak universities. At the same time, however, it received more than 90 million Euros from various foreign, especially European grants (tuwien.at).

Given that the increase in resources in Slovakia was primarily public resources, the share of income from business activities has decreased over the last 10 years and, conversely, the dependence of universities on direct subsidies has increased, as we can see in Figure 1.

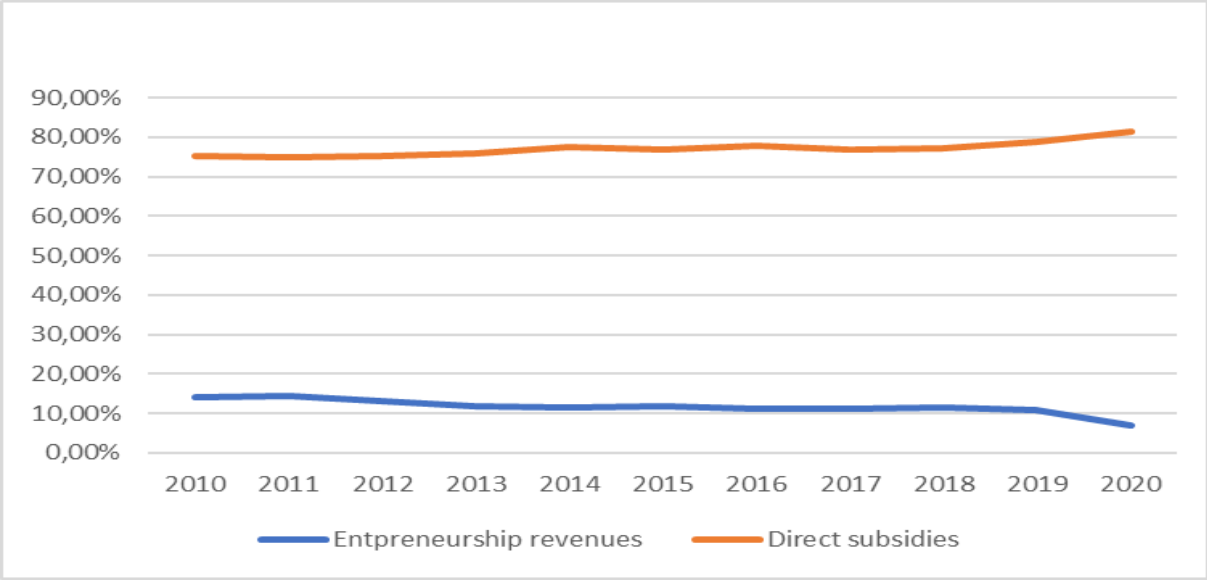

Figure 1: Growth of selected university indicators in% (2010- base year)
(Source: own calculations based on annual reports of universities)

Only Pavel Jozef Šafárik University and Comenius University fell below the 75% share of direct subsidies in total revenues. On the contrary, the worst results in this respect belong mainly to humanities-oriented universities, where in a large part of them this share is around 90%. Universities that had a lower share of direct subsidies also achieved a higher overall increase in their budgets over the last 10 years. For example, the mentioned Comenius University increased by more than 50%, Pavel Jozef Šafárik University by more than 82%, while the average increase was less than 32%). This suggests that the differences between the universities are in the overall control rather than in the set conditions. More efficient universities were able to increase their budgets from both public and business sources. If we take a closer look at the structure of entrepreneurial income, we find that income that is recorded as entrepreneurial is not largely focused on the commercialization of knowledge, as a fundamental aspect of entrepreneurial university, but the vast majority of income comes from student services such as accommodation and catering. These incomes do not require any active approach from universities, students often have no adequate option other than to use the services of the university. So from the point of view of a theoretical understanding of the role of entreprenueral university, we could not consider this as business income, even if such income is recorded in this way. Direct revenues from the commercialization of own research are zero or almost zero in all universities, even the most advanced ones, and despite the growing patent performance of universities. The entrepreneurial revenue related to research activities is thus dominated not by the commercialization of own research, but by contracted research for companies. However, even these revenue volumes are very low compared to subsidies. In technically oriented universities, they are around the level of 1 mil. Eur (Klasová et al. 2019). Experience from the Czech Republic suggests that contract research is carried out significantly more by technical, natural science and medical faculties (Tetrevova and Vlčková, 2019). This is similar in Slovakia. There could be several reasons why this situation is not improving. Several studies identify Hanová et al., 2016) different barriers related to unviersities entrepreneurship activities related to research (Hanová et al., 2016; Jarjabková et al. 2019), specially in the area

of cooperation with private companies or resources available for such activities. Except the ones common for most of the countries, there are laso some specificies. One of the problems for increasing revenues from research-oriented activities is the setting of direct subsidies by the government. This has shifted from dominant funding for education to a better balance between funding for research and education. However, the research funding itself is still based mainly on the publishing activities of universities, not on business activities leading to the commercialization of research or patenting. Universities are thus indirectly motivated to prefer other tasks. Another limiting factor holding back academic entrepreneurship is the administrative demands relating to the high level of bureaucracy in this country which is typical for post-communist countries (Tetrevová a Vlčková, 2019). Researchers often have personal contacts with companies and work with them outside the academic environment, as it is easier for them, so universities lose additional income. Government support has been significant in recent years, but largely focused on financing inputs (buildings, research infrastructure). However, there was a lack of focus on the outputs of these processes (such as patents, licencing etc.) as well as the provision of adequate support so that these outputs can be achieved (eg by ensuring the support of human resources at universities).

5. CONCLUSION

The research results show. that despite the relatively significant changes and support of business activities of universities by the government in the recent period, so far there is only an improvement in the available inputs needed for these activities but is not reflected in the financial income from these activities. On the contrary, universities have become increasingly dependent on direct government subsidies. The structure of business activities is also primarily focused on student services, not the commercialization of one's own knowledge. This points to the need for further changes and resources to help universities move to the level of entrepreneurial university that, according to theoretical concepts, is necessary to ensure the contribution of the university to the creation and distribution of knowledge and innovation. The key activities on the part of the government can be considered taking into account existing business activities in the breakdown of direct subsidies and project support more strongly directed to the outputs of the commercialization of research, not only to finance inputs.

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THE ACRONYM AS A BRAND NAME: WHY CHOOSE IT FOR THE NAMING OF THE BRAND AND WHY NOT CHOOSE IT IN ANY CASE?

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ABSTRACT

Initials are used extensively in branding to shorten long company names. Marketing literature often highlights the need for memorable and distinctive brand names that can convey meaning successfully and are also easy to pronounce. But how well do initials serve these purposes? Are they the right solution to name brands? As the paper shows, they do not serve the abovementioned purposes very well – actually, almost not at all. Yet, many companies use acronyms as brand names, and start-ups also often choose to use them. But what are the possible reasons and motivations for this? What are the pros and cons of using acronyms as brand names? When should brand owners use such brand names and when should they avoid this solution? It is worth examining this from a broader perspective. Therefore, in addition to discussing the relevant marketing and branding literature, the paper also presents several examples that shed light on the advantages and disadvantages of acronyms used in brand naming.

Keywords: *Brand name, brand naming, acronyms, initials, branding strategy, marketing strategy*

1. INTRODUCTION

The key role of the brand name is best illustrated by the fact that some authors argue that it is the most important marketing decision a company can make (Hillenbrand et al 2013; Kohli et al 2005; Robertson 1989; Ries – Ries 2009; Rivkin – Sutherland 2004; Papp-Váry 2020). Keller emphasised that the brand name is a fundamental brand asset that can play a critical role in creating customer-based brand equity (Keller 2003). Therefore, it is essential for marketers to have a good understanding of the principles that guide the creation of brand names. One of the essential characteristics of a good brand name is its memorability. The simplicity of a brand name helps brand recall, so it is important to use brand names that are easy to pronounce, spell, read and understand (Robertson, 1989). In addition, some authors argue that a brand name should be familiar and meaningful, i.e. it should be able to create a visual reference in the mind of the consumer (Athaide – Klink 2012; Keller et al 1998; Kohli et al 2005; Robertson 1989). Meaningful brand names convey relevant information, an important brand attribute or benefit about the product, and create a link between the brand and the product category (Keller et al 1998). Empirical studies show that people recall words that are rich in meaning more easily than words with low visuality. Furthermore, brand names that evoke strong, positive emotions are more easily recalled. Previous research also indicates that brand names should be distinctive (Robertson 1989). Charmesson (1985) considers the same to be the most important attribute of a brand name in terms of legal, memory and positioning benefits. A brand name can play a key role in conveying a set of positive, powerful and unique brand associations (Keller 2003), and meaningful brand names create immediate positive associations (Keller et al 1998, Kovács 2019).

Moreover, empirical studies also suggest that meaningful brand names are generally preferred by people over non-meaningful brand names and have higher overall liking rates (Kohli – Suri 2000). Even after repeated exposure, meaningless brand names may be perceived less favourably, although research shows that repeated exposure confers greater benefits to meaningless brand names (Kohli et al 2005). At this point, it is important to note that we can distinguish between names (personal names; vocabulary words; meaningless names) and initials. Initials usually denote the abbreviation of a name that is too long or too difficult to pronounce. Previous research has shown that initials are generally more difficult to pronounce and thus more difficult to remember (Robertson 1989). In addition, initials do not convey a message as they have no inherent meaning and as such, they are not particularly motivating or memorable (Keller et al 1998). Therefore, it is important to make the name of the organisation known before the company uses its initials to create an acronym, to ensure that consumers already have a reference for the brand name. Without this, an acronym-type brand name will be difficult to distinguish (del Río et al 2001; Petty 2008; Middleton 2004). Initial letters should also be avoided because our memory cannot store sets of letters lacking an obvious meaning without considerable effort, as discussed earlier. In fact, initial letters are usually meaningless, which is especially true for abbreviating and simple initials. There is certainly some benefit to initials as they make it easier for consumers to read and pronounce a long name. However, brands using initials need more time and support to build brand awareness and convey the desired associations (Keller et al 1998). Although the marketing literature – as can be seen from the above – makes quite many arguments against acronyms as brand names, their use in practice is still very widespread. In the following sections, we will discuss the possible reasons for this. We will look at the arguments for and against the use of acronyms. This will be supported by many examples so that a clear conclusion can be drawn at the end of the article: is it worth using acronyms or should we avoid them as much as possible?

2. WHY ACRONYMS ARISE AS BRAND NAMES

For several start-up companies, the idea of creating a name in the form of an acronym or abbreviation may emerge as a possibility. Entrepreneurs can see many big companies around them with such names, including BP, BBC, BMW, EY, HP, H&M, IBM, ING, KFC, MTV, PWC, RTL and many more. This is certainly true, but they fail to consider that these companies were not originally acronyms and still have their full names: British Petrol, British Broadcasting Corporation, Bayerische Motoren Werke, Ernst and Young, Hewlett-Packard, Hennes and Mauritz, International Business Machines, Internationale Nederlanden Groep, Kentucky Fried Chicken, Music Television, PricewaterhouseCoopers, Radio Télévision Luxembourg. But it is another thing – and usually not a good idea at all – to create an acronym at the birth of a brand. Let us examine the case of KMX, for example. Only a few people have heard about it, even though it was the Coca-Cola Company's original attack on Red Bull in the energy drink category (Ries -Ries 2002). Then they realised that it was not such a good name, and now prefer Burn as the brand name, which has had much greater (although not overwhelming) success. Similarly, when Royal Philips Electronics named one of its new companies NXP, people wondered what the hell those letters stood for, rather than buying its products (Ries – Ries 2009). But probably the funniest example is a British company that took the name ICL. Why this one? Because it uses one of the letters of IBM, one letter forwards and one letter backwards (Olins 2004). Then they wondered why they had not become as successful as IBM. As Rivkin and Sutherland point out (2004), the biggest mistake a company can make is to use acronyms like USG, SLM, SPX. This is also backed up by research: acronyms are remembered 40% less often than normal or made-up names (Rivkin – Sutherland 2004).

There are several reasons why they are so popular (with companies, not consumers, of course):

1) First of all, one of the first brands (or at least logos) was SPQR, which was often used by the Roman Empire.
2) Secondly, the world's best-known word, OK, is also an abbreviation. True, not many people know this, despite the fact that (once again): it is the most well-known word in the world. The abbreviation (first used in 1839 in Boston, Massachusetts) comes from the fact that it was used in connection with the checking of printed publications, stating that everything was perfect, i.e. "all correct". Of course, they made a joke of it, so it became "oll korrect" and "OK", which is still used today to indicate that something is alright.
3) Thirdly (and most importantly), acronyms are as attractive to most companies as candlelight is to a butterfly. The success of IBM is testimony to the effectiveness of acronyms made up of initials (Ries – Trout 1997). Then they continue: At least seemingly. On closer examination, this is a typical case of confusing cause with effect. International Business Machines became so rich and famous (cause) that everyone knew which company it was (effect) just by looking at the initials. It does not work the other way round. If you have a not-so-successful company and you christen it with an acronym made up of the initials of its name (cause), you cannot expect it to become rich and successful (effect).
4) Fourth: "What makes big companies commit corporate suicide? For example, the situation when top executives are so used to seeing the company's initials on internal letters and memos that they naturally think everyone knows good old VF." (Ries – Trout 1997, 84.) Nevertheless, a company has to be exceptionally well known to start using its initials successfully. The initials of GE recall the name General Electric in our minds. (Ries – Trout 1997, 85.)

It should be added that Al Ries and Jack Trout, who have just been quoted several times, are quite anti-acronym. But so are others: according to Kapferer (1985), companies should avoid the 'initials disease', one of the most serious 'diseases' of brand names. Watkins agrees, arguing that an acronym can only confuse consumers, or as he puts it, an acronym can cause "WTF confusion". (Watkins 2019) But it is not entirely true that an acronym cannot make a company successful, just let us look at Interbrand's ranking of the top 100 most valuable global brands (Interbrand 2022). There are several acronyms on the list: BMW, IBM, SAP, UPS, DHL and KFC among three-letter brands, and LMHV, IKEA and HSBC among four-letter brands. Of course, as Olins notes (2004, 110-111.), "it is almost perverse that the bank has chosen the name HSBC for itself. [...] What were they thinking when they chose the name? Perhaps they were thinking that if one can get by with a name like HSBC, one can certainly get by with anything. [...] The name HSBC sounds rather bad, but the truth is that the firm's strong, powerful and attractive appearance has, for some strange reason, made the inconvenience of the name seem unimportant." And what does HSBC stand for? Hong Kong and Shanghai Banking Corporation – all the more surprising because the company originated in Scotland. Or there is LVMH, which is less familiar to consumers in this form since it is a group of companies, which is an abbreviation of Louis Vuitton – Moët Hennessy. However, we are probably already familiar with the brands it produces in the wine and spirits sector: Moët & Chandon, Chateau d'Yquem, Henessy, Hine and Krug, among others. Its brands from the fashion and leather goods industry include Marc Jacobs from the US, Loewe from Spain, Kenzo from Japan, Givenchy from France and Thomas Pink from the UK. Its perfume and cosmetics companies, on the other hand, are almost exclusively French: Givenchy, Guerlain and Dior. Its most famous watch and jewellery manufacturer is TAG Heuer. Last but not least, the LVMH group also includes retailers such as Le Bon Marché and La Samaritaine (Olins 2004).

3. WHEN ACRONYMS CAN WORK

So can acronyms ever work? Well, in some cases, yes. But its limitations are broad. So let us look at these cases.

3.1. If the brand becomes so well-known that you can use the acronym after a while

"Once you've made it to the top and everyone knows you, you can use your initials without the slightest misunderstanding. Franklin Delano Roosevelt and John Fitzgerald Kennedy could only use their initials once they were famous. Not before." (Ries – Trout 1997, 83.) As we have already seen, the same is true of the often-cited example of IBM: it first became famous as International Business Machines and then started using just the name IBM. This, of course, was also influenced by another factor described in the next paragraph.

3.2. If the physical product bears the abbreviation itself

This is particularly the case for machinery and technical goods: since the surface area available for this purpose may be small, the abbreviation is displayed on the product, while the full name is displayed on the packaging or in communication (at least in the early days). For example, Hewlett-Packard put only the HP logo on its printers, monitors, etc. after a while. JVC was originally Victor Company of Japan, but it would have been difficult to put that on video players, hi-fi towers and so on – or, to be more precise, the letters would have been very small. The name of the watch brand Q&Q stands for quality and quantity. It is the same for motors and cars. Does Motorradwerk Zschopau (motorcycle factory in Zschopau) mean anything to you? But MZ probably does, since it is on the motorcycle's tank. What about Industrieverband Fahrzeugbau (Vehicle Industry Association)? Well, that is IFA. While the abbreviation may have been displayed on the vehicle, the full name had no chance. As was the case with Bayerische Motoren Werke, or BMW – even if they spelled out the full name in their first logos, they still had the BMW abbreviation next to it. However, it is important to note that while this solution works for vehicles and technical goods, it is less successful in other cases. There are exceptions, of course: in the case of the TGI Friday's restaurant chain, TGI marks the start of the weekend: Thank God It's Friday.

3.3. If consumers themselves start to shorten the name

We live in an age of abbreviations. People like to communicate as briefly as possible, especially in writing, but also orally. That is how Los Angeles becomes L.A. – because it is convenient and sounds good. But San Francisco does not become S.F. – because it is terrible, and there is a much better short name: Frisco. The same is true for companies. Two American giants that everyone knows are now known by their acronyms: GM (for General Motors) and GE (for General Electric). Federal Express, however, has not become FE, because it has two syllables (ef-ee) just like Fedex. Moreover, the latter also functions as a verb: to fedex. ‘To FE’, on the other hand, sounds rather strange. Moreover, the consumers’ suggestion to use the abbreviation Fedex was welcomed by Federal Express executives for several reasons. "Research has also shown that the word 'federal' carries a negative connotation in some countries, and in Asia, it is difficult to pronounce the »r« and »l« sounds." (Healey 2009, 89.)

3.4. If the full name of the brand would be unfortunate because it conveys something that the company no longer wants to emphasise

Indeed, there are examples of this. Take British Petroleum, which had problems with both words in its name. On the one hand, the company was becoming increasingly international and, on the other, the reception of the word British was very bad in the case of many former colonies. So it became Beyond Petroleum, which means ‘beyond crude oil’. As Olins points out (2004, p. 109), ‘the company wanted to be one of the leaders in the struggle for a liveable, habitable

environment'. To this end, it has agreements with a number of major universities to 'develop strategies and technical solutions for developing greener, cleaner energy sources'. The company's advertising, new logo, redesigned petrol stations, extensive research, the educational programmes built on it and its sponsorship of art performances are all designed to showcase the new BP brand. Yes, BP, because in the meantime they have realised that the word Petroleum is not necessarily a lucky choice either. Or there is the case of Kentucky Fried Chicken, officially KFC since 1991. The company wanted to get rid of the word 'fried' in the first place, since at one time (and even today) the word 'fried' was not associated with healthy eating (Morris 2004, 44). Of course, rumours also started that they had actually switched to KFC because the authorities had banned them from using the word chicken. Indeed, according to the critics, what is served in these fast-food restaurants is not chicken or at best 'Frankenstein chicken', some kind of a freak. As for the causes for using KFC, there was another reason besides the elimination of the word 'fried': the stock market abbreviation for shares was three letters, and they were preparing to enter it at that time. In the case of Lucky Goldstar, there was another reason to switch to LG, or more specifically LG Electronics. Presumably, it was because Lucky had previously been a household appliance brand, while Goldstar had been a consumer electronics brand not popular for its quality but for its low prices. However, they wanted to position LG higher up.

3.5. If the acronym is easy to pronounce, it can stand on its own

In the 1960s, a fascinating book on abbreviations was published. Abbreviations and Related Acronyms Associated with Defense, Aeronatics, Business and Radio-electronics was the full title, but the acronym version was even funnier: ABRACADABRA. Yes, acronyms can work quite well if the acronym is like a real brand name. That is, it is not a string of difficult-to-pronounce consonants next to each other, but a snappy, pleasant-sounding word with vowels. Some sources use the term acronym for this, meaning that it can be pronounced as a word without having to be spelled out – as opposed to, for example, an acronym consisting of consonants only. (Yadin 2002; Bloom 2000; Flowers 2020) Other authors, by contrast, do not distinguish between the two uses (Miller 2019; Middleton 2004). But let us look at the examples! First, there is IKEA – few people know that this is an acronym, but it is. It hides founder Ingvar Kamprad, who originates from the family farm Elmraryd in the municipality of Agunnaryd. That is how it becomes I.K.E.A. – but because it is pronounced well on its own, they never used the version with the full stops, just IKEA. Then there is NATO, which stands for North Atlantic Treaty Organization. NASA comes from the National Aeronautics and Space Administration. In the case of other organisations, the acronym also has a meaning: MADD stands for Mothers Against Drunk Driving, while CARE is an acronym for Committee for Aid and Rehabilitation in Europe. But it is not at all necessary for the acronym to have a meaning. If it sounds right, it can already be helpful. Although in the case of car manufacturers it is most common to name the brand after the founder or the first engineer, there are examples of abbreviations here too. But in these cases, care is taken to ensure that it stands on its own. Fabbrica Italiana Automobili Torino is none other than FIAT. But the word fiat also means: a moment. Alfa Romeo is half named after its owner, Nicola Romeo, but the first word is the abbreviation of Anonima Lombarda Fabrica Automobili. The SAAB brand stands for Svenska Aeroplan Aktiebolaget – yes, aircraft production because that was the company's main business in the beginning. But in other areas, too, such abbreviations are used: ASICS sportswear stands for "Anima sana in corpore sano", meaning "A healthy body in a healthy soul". Interestingly, the original Latin form of the phrase is "Mens sana in corpore sano", but the MSICS abbreviation is believed to have been inappropriate for the brand owners (Kovács 2019). FUBU hip-hop clothing was originally called For Urban Brother United, then For Us By Us, which was also used as a slogan.

BASF (although not very catchy) is certainly better than the company's full name: Badische Anilin- und Soda-Fabrik. Among the classic cameras, there is LOMO, which still has a large fan base today. Photographers who use it share their pictures on websites such as Lomography.com. Of course, they also know that it is the name of a former Soviet machine, short for Leningrad Optical Mechanical Association in Russian. Or there is SPAR. Many people shop here, but most do not know where the name comes from, or even think it comes from the German word for "save". But that is not quite the case. The company is originally Dutch, and its name was first DE SPAR, which stands for Door Eendrachtig Samenwerken Profiteren Allen Regelmatig, meaning a free association of independent wholesalers and retailers organised into a chain of stores. And the SPAR logo features a pine tree because that is what the word means in Dutch. Then there are some acronyms that are not really acronyms at all, as they do not even have to be written in all capital letters. They are more like acronyms created with the intention to make something that sounds good. For example, the National Biscuit Company, founded in 1898, realised as early as 1901 that Nabisco was a much better choice for a name. For the American Oil Company, Amoco is a clear and logical abbreviation. Qantas, short for Queensland and Northern Territories Air Service, also sounds good. The name of Sabena, another airline, includes the "initials" of Société Anonyme Belge d'Exploitation de la Navigation Aeriénne. Airbnb originally started as "Air bed and breakfast", as the owners rented out three inflatable beds. Well, the word ‘air’ remained, but ‘bed’ and ‘breakfast’ took on the form ’bnb’. Toshiba, one of the world's first, if not the world's first, consumer electronics company, started out as Tanaka Seizo-Sho in 1875, and five years later it entered a partnership with Hakunestu-Sha. The former was then renamed Tokyo Denki, the latter Shibaura Engineering Works. The merger of the two gave birth to the name Toshiba in 1939. Geico stands for Government Employees Insurance Company. Adidas comes from the name of the founder Adolf (Adi) Dassler. The name of Garmin, a GPS company, comes from the first name of founders Gary Buller and Min Kao.

3.6. If the acronym is provocative

This is actually very similar to the previous point: the abbreviation has a meaning on its own – in this case, a provocative meaning. The best known such company is French Connection U.K. The abbreviation has been “used in correspondence between the company's "London and Hong Kong offices" for decades. The parent company was abbreviated FCUK and the subsidiary FCHK. The use of the almost-swear acronym for marketing purposes was the idea of an advertising manager who recognised the potential of the situation. But what gave the mantra its wit was that it was much more than a provocative acronym. FCUK fashion was not just one of many witty T-shirt slogans; it became the company's new identity. Iain Webb, Elle's fashion director, recalls: »When I first saw it [the FCUK fashion logo] I was shocked that such a short advertising message could be so provocative. It perfectly expressed the culture-conscious tastes of modern youth.« Fashion followers took the opportunity to express a personal message through their brand choice. In four years, FCUK doubled its sales volume and tripled its profits,” writes Wipperfürth in his book (2005, p. 100).

4. WHEN ACRONYMS DO NOT WORK

Based on the above, there are quite a few arguments for a company to choose an acronym, but these are rather special situations. However, there are also many arguments against it:

1) There is no way of knowing what is behind the acronym. And it is safe to assume that when consumers see it, they will guess. What is USG? And SLM? And SPX?
2) While the former long name meant something (or someone), the abbreviation no longer does. Advertising agencies in particular fall into this trap. So J. Walter Thompson becomes JWT, Doyle Dane Bernbach becomes DDB, Foote, Cone & Belding becomes FCB, Young

& Rubicam becomes Y&R. But the client is confused: who is it working with, JWT, DDB, FCB or Y&R? It is strange that advertising agencies seem to fail to understand the importance of brand names.

3) Revenues are decreasing. When House and Garden, a magazine dedicated to home decorating and gardening, was renamed HG in 1987, subscribers began cancelling in droves, and in five years, the magazine was shut down. A decade later, the owner relaunched the magazine. And under what name? House and Garden (Rivkin-Sutherland 2004).
4) The same acronym means several things. There is MTV, for example. In Hungary, it can mean two brands, and both are TV channels: Music Television and Magyar Televízió (Hungarian Television). Or there is the example of the WWF: some people associate it with the World Wildlife Fund, but others do not associate it with animal protection at all, but with wrestling, with the World Wrestling Federation. Therefore, the former has sued the latter, which changed its acronym to WWE (which stands for World Wrestling Entertainment), emphasising that it is part of the entertainment industry.
5) The acronym sounds unfortunate. As Wiseman writes (2009), people whose initials are PIG, BUM and DIE die three years earlier than the average age. This could also be a lesson for brands. "For example, when General Aniline & Fillém changed its name to GAF, it did not take into account that gaf sounds the same in English as gaffe. The choice of the name GAF was really a big blunder." (Ries-Trout 1997, 90.)
6) The specific combination of letters takes on a different meaning. It is also possible for an abbreviation to gain a new meaning. For example, an ambulance service was called the AIDS Ambulance Service. The term was used to refer to the following words: attitude, integrity, dependability, and service. However, AIDS began to mean something else in people's minds and they thought that the ambulance service only transported people with the AIDS disease – and many people did not want to be treated together with people with AIDS. So the name had to be changed and the ambulance service became AME (Rivkin-Sutherland 2004).
7) People start making fun of the acronym. As a matter of fact, it is bound to happen anyway. Not necessarily because the consumer is unaware of the meaning of the acronym, but because there must be another, a funnier form of it.
    - FIAT: ”Fix It Again Tony” (referring to the fact that FIATs need to be serviced regularly)
    - IBM: ”I Blame Microsoft” or ”I Buy Macintosh”
    - SABENA: ”Such a Bad Experience, Never Again”
    - SAP: ”Sanduhr Anzeige Programm” (referring to the long wait when charging)

All in all, the situation is that an acronym is more of a bad choice than a good one, and is only recommended in exceptional cases. This is illustrated by the case of the brand name FYROM, which for many years was the official international name of a European country. It is no wonder that the country's leaders lobbied constantly in all forums to stop using it. And what did FYROM stand for? Former Yugoslav Republic of Macedonia. That is, Macedonia – but they were not allowed to communicate that name, mainly because of pressure from the Greeks: they say that the southern part of Macedonia is in Greece. But the more important argument is that the (brand) name Macedonia has a huge value: it is linked to Alexander the Great. And it makes a big difference which country Alexandros is historically associated with, or what country is visited by the tourists. So Macedonia had to use FYROM for a long time. In 2018, however, there was a change: an agreement was reached with Greece, and the Macedonian parliament voted to call the country North Macedonia. Which is, let us face it, certainly better than FYROM.

Or there is the brand name W&D, symbolizing the two founders: Wilsdorf and Davis. Of course, with that name, the brand probably does not ring much of a bell. It has not really made them famous. But they did become famous with the name they invented to conquer the global luxury market: Rolex.

5. CONCLUSION

After all the examples, it is worth summarising what is in favour of using an acronym and what is against it, or when it might be worth using it and when it might not. In addition to what has been discussed earlier, we draw on the study by Machado and Pichaki (2015) here, who conducted primary research in social media groups on branding, asking questions such as whether the use of initials in brand names, logos and corporate identity is functional or meaningless; whether respondents support the use of initials in branding; and what are the factors of success and failure in the choice of initials for brand names. The following emerged from the responses of the marketing and design professionals commenting:

When can you use acronyms successfully?

- Initials can greatly simplify very long or complicated company names; in this case, a pronounceable abbreviation is recommended;
- Initials can be an effective re-branding technique for established, well-known brands and companies;
- Initials are more flexible and can be better adapted to brand repositioning or brand extensions;
- Initials can be effective when they are part of a holistic branding approach, where they are used as an integral part of other brand elements;
- Initials are acceptable when they are used in combination with the actual name, in conjunction with a logo (when a visual symbol complements the brand name);
- Initials sometimes resemble real words (e.g. France Connection UK – FCUK) which carry meaning and can therefore be used to further develop marketing campaigns.

When to avoid acronyms:

- Initials are not easily recognisable if the brand they represent is not already known, as the mere use of letters does not convey associations (in this sense, initials are meaningless in themselves);
- Successful brand names and logos grab attention, arouse curiosity and contribute to brand awareness. Initials have difficulty serving these purposes;
- Memorable names and logos contribute to brand recall; significant doubt arises if initials are easy to remember;
- Brand names must be easy to pronounce and understand; initials do not facilitate these aspects;
- The repetitive use and pronunciation of initials can lead to brand inconsistency and controversy, as people forget that they are nothing more than literal abbreviations of the company name;
- Initials cannot reflect brand values and therefore cannot be used strategically in branding;
- Initials favour anonymity over identity (individual characteristics);
- Initials should be avoided in the case of start-ups;
- Logos with initials are often very similar and therefore considered ineffective in creating differentiated positioning;
- A separate graphic logo (or visual symbol) is considered more effective than a logo based on initials; the former is memorable, likeable, and able to convey meaning, symbolism and messages with high visual value, whereas abbreviations are not.

As can be seen above, marketers, branding, creative and design professionals themselves tend to argue that acronyms should be avoided. This makes it particularly surprising why many of them still choose acronyms when it comes to brand naming. Further research is needed to resolve this discrepancy, which may provide useful insights for both theorists and practitioners.

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INTERPERSONAL RELATIONS AND THE IMPORTANCE OF INTELLECTUAL CAPITAL AS A COMPETITIVE ADVANTAGE OF THE ORGANIZATION

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ABSTRACT

In the conditions of globalization, the availability of information from all parts of the world is almost unlimited and at the reach of everyone. Competition and the struggle for good employees is stronger than ever. Brain drain is a major threat to organizations and nations. An important task for organizations is to find new approaches to retaining and attracting competitive employees. One of the main criteria is to create a pleasant working environment and encourage quality and harmonious interpersonal relationships in organizations. For this reason, the focus of organizations is on creating interpersonal relationships through various joint events such as team building and a fair reward system. The paper analyzes the concepts of intellectual capital, interpersonal relations, socially responsible business. The paper shows how important interpersonal relationships are for employees in doing their job. How do organizations invest in intellectual capital? The results of the research, presented in this paper, show the level of informing the Croatian public about intellectual capital and the impact of interpersonal relationships on employee loyalty to stay in the organization.

Keywords: *Intellectual Capital, Interpersonal Relationships, Socially Responsible Business*

1. INTRODUCTION

Organizations today have the task of attracting, but even more so retaining the existing workforce. The existence of any organization, regardless of the size and the segment in which it operates in the market, has been called into question due to the growing flexicurity, proximity and openness of the labor market. Globalization and new technologies have enabled the rapid flow of information and easier identification of quality employees. Brain drain is a major threat not only to the state but also to organizations. Organizations have the task of finding new approaches to retain, but also attract competitive employees. One of the main criteria is to create a pleasant working environment and encourage quality and harmonious interpersonal relationships in organizations. The work environment greatly affects the motivation of employees, willingness to cooperate, and thus the success of the organization. It is impossible to look at human work without looking at the intellectual capital of each individual who works in this organization. The questions answered in the paper are: What is the importance / impact of interpersonal relationships in the workplace? How do organizations invest in intellectual capital? Accordingly, two hypotheses have been set:

- H1: The impact of interpersonal relationships is important to create an organization's competitive advantage
- H2: Organizations are aware of the importance of intellectual capital and invest in it.

The paper includes a theoretical part and a research part in which the analysis of the conducted online research is presented. The theoretical part of the paper uses methods of descriptive, comparative, deductive and synthetic analysis. In the research part of the paper, the authors conducted a survey in March 2022 by sending an online questionnaire to employed participants. In addition to the introduction and conclusion, the concept of intellectual capital is presented at the beginning. The third part of the paper deals with interpersonal relationships while the fourth one refferes to organizational structure and socially responsible business. The fifth , last part of the paper, refers to the data obtained from the analysis of the conducted online public opinion in Croatia. In conducting the research, an online questionnaire sent to 95 respondents was used as an instrument. The aim of the research was to find out how much the Croatian public is informed about intellectual capital, what is the impact of interpersonal relationships on employee loyalty to stay in the organization and how the organization achieves creation and good interpersonal relationships.

2. INTELLECTUAL CAPITAL

There is no single definition of intellectual capital. The emergence of intellectual capital is associated with the emergence of the New Economy when in 1991 Thomas A. Stewart published an expert article How Intellectual Capital Is Becoming America's Most Valuable Asset. According to Thomas Stewart, the definition of intellectual capital would be that "Intellectual capital is something you can't touch, but it makes you richer every day" (Juršić, 2020). In the literature related to intellectual capital, some authors believe that the roots of intellectual capital can be found in the work of Adam Smith, in the 1976 book The Wealth of Nations (HGK monografija, Kolaković). Kolaković states that the founder of intellectual capital was Frederich W. Taylor, who published the work in 1911:“The Principles of Scientific Management” (Kolaković, 2003). According to the authors Sundać and Fatur Krmpotić, intellectual capital refers to the ability of people to use information to solve complex problems and adapt to change by relying on knowledge that can be turned into value (Sundać, Škalamera-Alilović, Babić, 2016). Milović, Mustapić and Moslavac-Forjan believe that knowledge and information are products of the human intellect that represent intangible assets. By using them and sharing them with others, their value is achieved (Milović, Mustapić, Moslavac-Forjan, 2016). The intellectual capital components of any organization are useful for maintaining wealth based on knowledge, reliability, and value. Therefore, the authors recommend that organizations around the world must emphasize the development of intellectual capital components for the long-term survival of the value chain. They state that national and regional public policies must be reformed to include intellectual capital components in their economies (Ali, Hussin, Haddad, Al-Araj i Abed, 2021). In today's conditions, the knowledge and skills of employees and intellectual capital become the main competitive advantage and represent the first source of added value to the organization. The intellectual capital of an organization consists of various elements, such as knowledge, patents, business skills, information about customers and suppliers, processes. Peter Drucer wrote in the 1990s that we are entering a knowledge society, where knowledge is the basic economic source, and in his numerous researches he realized that modern organizations operate in a knowledge society. Therefore, in such conditions, the basic economic resource is no longer capital or labor but knowledge (Sundać, Fatur, 2004). The acquisition of knowledge and skills in an organization can be organized through formal or non-formal forms of learning and education. "Formal education is education that is conducted in various accredited educational institutions according to verified programs that provide recognized diplomas and qualifications. Non-formal education can be defined as organized teaching and learning that is more or less pedagogically and didactically designed, by which an individual acquires some knowledge or acquires skills and which meets additional or alternative learning needs.

Non-formal education most often expands and upgrades existing knowledge and skills acquired through formal education and adopts those knowledge and skills that were not encountered during formal education (Perin, Terihaj, 2019). Buterin and Katavić consider that knowledge is increasingly recognized as a basic economic resource and that knowledge management is a complex and dynamic process for which organizations must establish clear management goals that are unique to them. They agree with Zaied, Hussein and Hassan that some of the goals of knowledge management are:

- "enabling faster and better flow of information, improving the process of knowledge sharing in all business units,
- enabling better communication between employees in the organization and in the global system,
- enabling better and more efficient functioning of business processes ".

Also, only the systematic collection and use of knowledge in the organization creates intellectual capital. The mentioned capital is a new type of corporate assets that need to be managed responsibly with regard to the emergence and use of new technologies in solving increasingly complex problems in the organization's operations. (Buterin, Katavić, 2018)

3. INTERPERSONAL RELATIONS AND THEIR INFLUENCE ON BUSINESS

The Croatian Encyclopedia defines interpersonal relations as: “everyday relations and problems of human society, in which, in addition to situations of agreement between people, there are disagreement and conflict between individuals and social groups. The main reason for disagreement is the different perceptions of the same situation. " (Hrvatska enciklopedija, 2021) E. Mayo, the founder of the School of Human Relations, conducted experiments / research to improve productivity. The most famous experiment on changing lighting in the workplace is better known as the Hawthorne experiment, a study conducted at the Western Electric Company, which investigated the relationship between lighting conditions and employee productivity. Employees were divided into two groups. The first group of employees worked under the same lighting conditions, while the second group was gradually turned off. Research has shown that both groups of employees have increased their productivity (yestherapyhelps.com, 2022). After further research into the relationship between performance and other physical variables (those that produce fatigue and monotony), he found that work and job satisfaction depended heavily on the informal social pattern of the workgroup, while physical conditions or financial incentives had little motivational value. People will be formed into working groups and this can be used to manage for the benefit of the organization. In conclusion, it has been shown that human labor also depends on social issues and content (Hernaus, 2016). Interpersonal relationships are one of the main factors of satisfaction when choosing an organization and staying in it. The key to interpersonal relationships is in communication. Communication among employees is key to achieving business goals. It is a business communication that connects different segments of the organization: sales and consumption, logistics but also human resources (Bolfek, Milković, Lukavac, 2017). Interpersonal relationships are affected by the level of knowledge, experience and skills of employees. The first scientist who scientifically try to define the knowledge, experience and skills of employees was Frederick Taylor, who published his work in 1911:“The Principles of Scientific Management”. (Kolaković, 2003) Taylor is credited with introducing the concept of scientific work organization or scientific management. He considered it necessary to observe the work of an individual employee in order to discover how it is possible to increase the efficiency of production. According to him, it was important to separate the executive functions of production from the creative and thought.

He contributed to a clearer understanding of the principles of standardization of work and the system of incentives and rewards for employees (Hrvatska enciklopedija mrežno izdanje, 2022). Information, ie their processing, plays a key role in decision-making in the organization. In order for information to contribute to the decision-making process, Dess and Picken in Sundać, Škalamera-Alilović, Babić, state that a "culture of awareness of the business environment" must be built. It can be achieved by directing five elements:

1) Priority - the priority of the organization must be the collection and sharing of information about the business environment
2) Participation - builds on the first element and applies to all employees in the collection and sharing of information, especially those who communicate with customers, suppliers and competitors
3) Focus - the information that the organization collects must be relevant and relevant to the organization
4) Process - the organization must have established internal processes by which information will be transmitted and delivered in a fast, accurate and responsible manner to those who need it
5) Motivation - it is important that employees are motivated to participate in contributing to the betterment of the organization. In doing so, the organization can use incentives, rewards, motivational speeches. (Sundać, Škalamera-Alilović, Babić, 2016)

In order for five principles to work, workplace relationships need to be at a high level. In 2019, during the 10th Regional Virtual Career and Knowledge Days, the MojPosao portal conducted a survey to determine the situation on the labor market in Croatia and the region. The research, in which about 4.000 respondents participated (over 1.000 participants from Croatia), included partner portals from the region Posao.ba, Infostud.rs and Vrabotuvanje.com.mk. According to the obtained data, of the respondents from Croatia, 51% of employed and 43% of unemployed persons joined the survey, while 6% of respondents are studying. The research showed that 2/3 (69%) of Croats pointed out good interpersonal relations as the most important factor when choosing a job. In second place is the amount of salary (62%), and in third place is working hours. This showed that the most important factor in choosing a job is interpersonal relationships. (MojPosao.hr, 2019) Authors Trancă and Neagoe believe that positive language is a key element in the development of interpersonal relationships, especially in the practice of helping professionals (Trancă, Neagoe, 2018).

3.1. Creating good interpersonal relations

Team building also contributes to creating good interpersonal relationships, because nowadays managers are becoming aware that it is more important and productive to have competent employees who are well connected and cooperate well than those who will do their part independently, although competently. Team building enables more open communication among employees, contributes to a better working atmosphere. During team building, employees are exposed to new experiences and ideas, which often highlight creative individuals, whose creativity was unknown until then, but important in the business environment, build healthier business relationships and open opportunities for joint problem solving and create better mutual trust resulting in better productivity.

4. ORGANIZATIONAL STRUCTURE AND SOCIALLY RESPONSIBLE BUSINESS

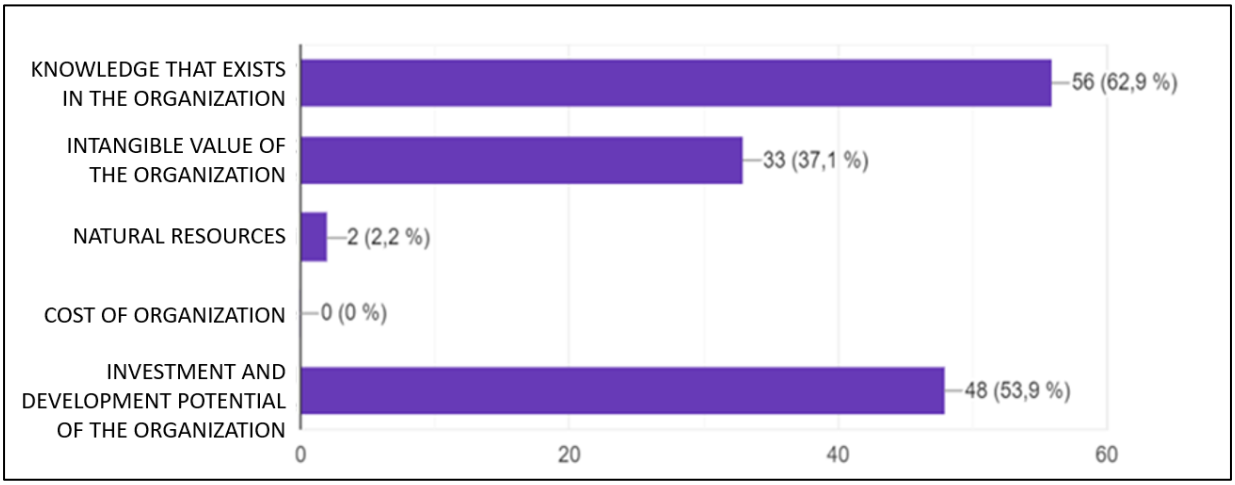
Corporate Social Responsibility (CSR) is a business concept in which organizations, on the basis of voluntary action without legal pressure, strive to operate in accordance with the needs of the society in which they operate. It relates to the way it is produced, the resources it uses, the way it uses them, how the organization's actions affect the environment, how it treats its

employees and how it affects the community in which it operates (Vrdoljak, Raguž, Hazdovac, 2014). It is characteristic of each organization separately and there is no single method of applying CSR in organizations because each organization is characterized by different business conditions, circumstances and environment. For this reason, each organization should create its own CSR implementation strategy in accordance with its own business processes, business culture, way of doing business and the environment in which it operates (Glumac, 2018). "The most effective is the CSR that is set strategically so that its implementation benefits both the organization and the society in whose interest it is implemented. That is why strategic initiatives should be led by the organization's management or executive director, in order to create corporate sustainability and lasting values for the organization." (Matešić, Pavlović, Bartoluci, 2015) It is a model of corporate community, according to which the organization is defined as a socio-economic system in which goods are achieved through the cooperation of stakeholders in order to achieve competitive advantage. This is achieved by incorporating CSR into the corporate governance system in a way that leadership is guided by the pursuit of value creation, commitment to learning, innovation, partnerships, the introduction of performance monitoring and reporting (Matešić, Pavlović, Bartoluci, 2015). Glumac states that employees: "are considered the main asset of the organization because they achieve results and represent the organization in the market. For this reason, he states that neglecting their expectations and needs can lead to unstable business and / or poor business and a negative reputation. It follows that the relationship between the organization and its employees has an impact on the relationship between the organization and the client. This will largely depend on the impression the organization leaves on the client regarding the relationship it has with its employees. Clients' trust in the organization is seen through CSR activities through which the organization seeks to improve working conditions in order to increase the satisfaction of its employees and thus consequently affect the competitiveness of the organization in the market in which it operates. (Glumac, 2018)

5. ANALYSIS OF CONDUCTED RESEARCH

The second part of the paper refers to the research conducted on informing the Croatian public about intellectual capital, ie the desire for training and the impact of interpersonal relationships on employee loyalty to stay in the organization. The online questionnaire was divided into five sections, which sought to investigate how individuals are aware of the intellectual capital they possess, whether they are willing to further education, how many employers are willing to contribute to the development of intellectual capital. The first set of questions referred to general questions about the individual accessing the questionnaire, the second set of questions related to information related to participants' willingness to improve and acquire new knowledge, the third set of questions related to the importance of interpersonal relationships for employment or stay or change of employer and work environments. The fourth and fifth set of questions referred to what extent interpersonal relationships contribute to the trust and loyalty of the organization in which they are employed and how the organization achieves and creates good interpersonal relationships. The questionnaire was completed by 92 respondents, of whom 76.9% were women and 23.1% were men. Most respondents belong to the good group of 46-65 years (65.2%), most of whom work in the public sector (53.9%). Most 60% of respondents have been working in the organization for more than 10 years. The majority of respondents, 58.9%, have a university degree. The second set of questions related to issues on education and intellectual capital. In the last year, 56.7% of respondents have been educated. Of the total number of respondents, 27% go to training several times a year, while on the other hand 25.8% go once a year or 22.5% do not go at all, and 24.7% go to training once every five years.

Respondents most often cited the desire to acquire new knowledge and skills, the need for work, the development of their own abilities and talents, the possibility of advancement, the monitoring of trends and innovations in their field, personal progress, exchange of experiences. When it comes to knowledge of the term intellectual capital, respondents, 62.9% of them pointed out that it is knowledge that exists within the organization, 53.9% of investments and development potential of the organization, 37.1% intangible value of the organization. It can be seen from Picture 1 that none of the respondents consider intellectual capital to be a cost, which confirms the thesis about the importance of intellectual capital. It is also a positive result that a small number of respondents, 2.2% of them believe that intellectual capital is a natural resource. The results of the answer to this question show a very good understanding of the concept of intellectual capital.



Picture 1: Question 10: Can you state what in your opinion is intellectual capital? (multiple answers possible)
(Source: Authors)

A number of 46.6% of respondents think that the organization in which they work pays enough attention to employees and the development of intellectual capital, while 53.4% think the opposite. When it comes to trainings, half of the respondents stated that they have been to trainings in the last year, 75.5% of them decided on trainings independently and 24.5% of them were educated by the decision of the employer. Also, half of the respondents believe that the organization in which they are employed pays enough attention to employees and intellectual capital development, which suggests that there is still a lot of room for intellectual capital development and investment in employee training and care. The second hypothesis (*H2:* Organizations are aware of the importance of intellectual capital and invest in it) is not fully confirmed since the research results show that organizations are aware of the importance of intellectual capital, but still do not invest enough. The third set of questions, which referred to the competitiveness of the organization, showed that 48.9% of respondents believe that the organization in which they work is more competitive than others. Respondents cited: quality and knowledge, market speed, modernization, tradition and human potential, no competition, intellectual capital, employee care, customer satisfaction, large number of highly educated employees, gives better chances for advancement, has a competitive advantage and business heritage, the possibility of employee training, continuous work on improvements, a positive approach to customers. Contrary to the above, the results of the second half of respondents are worried, since 51.1% believe that the organization in which they work is not more competitive than others. The reasons given were: negative staff selection and poor management, bad image of the organization, sluggishness and bureaucracy, appointments according to unprofessional

criteria, lack of continuous training of all individuals, knowledge is not valued and valued. As one of the parameters of the organization's competitiveness, the authors asked a question related to monitoring customer satisfaction, to which 65.2% answered that they monitor their satisfaction, while the remaining 34.8% said they do not monitor. As methods for monitoring customer satisfaction, respondents stated: surveys, cooperation, customer care, price and quality, adaptation to customer requirements, through research, through quality systems, direct contact with customers, thanks, complaints, remarks. The fourth set of questions relates to interpersonal relationships and communication among employees. When asked with whom they take a break from work, 61.1% of respondents answered that they take a break with colleagues, while only 1% of respondents spend their free time after work with colleagues. When it comes to mood in the workplace, 90.9% of respondents answered that they are in a good mood at work. 60% of respondents have a good business relationship with colleagues, 38.8% have an excellent business relationship with colleagues, while 1.2% of respondents have no business relationship with colleagues at all. 52.2% of respondents have a correct business relationship with the boss, 34.4% have an extremely good relationship, while 13.3% communicate with the boss only when necessary. A number of 60.9% respondents believe that their superiors are an example of good practice when it comes to encouraging good interpersonal relationships, and 30.1% of them consider their superiors to be a bad example. Examples of good practice were: socializing, teamwork, easy communication and support, fully open and fair business relationship, socializing outside of work, sensitivity to private issues, the ability to talk, team building, good interpersonal relationships, caring for employees in many ways, rewards for work done. As negative examples, respondents stated: no communication, lack of understanding of operations and scope of work, hierarchy is rigid, superiors at a higher hierarchical level do not know what subordinates do and do not show interest in it, which creates a bad business climate and dissatisfaction with various institutions and basic information, poor management, no one communicates with anyone at work, no socializing at work or outside, insufficient encouragement and creating a climate that would contribute to colleagues being more interconnected, tolerant and intimate as the job requires, insufficient flow of information , bad relationships and intolerance are encouraged. The last set of questions referred to the creation of interpersonal relationships, relationship with colleagues, exchange of information between colleagues, feedback on work, communication with superiors. When asked on what the relationship with colleagues is based on, 62.2% of respondents stated that it is mutual respect, 32.2% that it is trust, 2.2% competition and 3.3% distrust. Communication with superiors and colleagues is open to 86.7% of respondents in which they can express their opinion without being criticized and 13.3% of respondents do not dare to express their opinion due to criticism, so they consider such communication closed. As positive examples of open communication, respondents stated: freedom of opinion, openness, daily communication, acceptance of proposals for improvement, consultations, open door policy, everything is correct, democratic management of society, good team, critically discussed topics, fair atmosphere, they can always talk openly about problems and be heard, opinions are respected, problems are solved together. As negative examples of communication, respondents most often stated: there is no independence in making any decision, every initiative is attacked and criticized, everything I do requires a mistake to criticize, there is no answer to the proposal and everything goes as before, no communication, mostly they solve things when too many problems have already accumulated, opinion is not respected, initiative is not valued, there are no clear criteria for possible progress. When asked what kind of information exchange is in the organization, 52.2% of respondents answered that it is continuous, open and fast, 40% that it is periodic and selected, and 7.8% that it is rare. 35.6% of respondents receive feedback on their work regularly, 35.6% only if they request it and 28.9% of respondents do not receive feedback on their work.

The analysis of the last two sets of questions showed the importance that interpersonal relationships have on the competitiveness of the organization. The answers given by the respondents in the research clearly confirm the hypothesis (*H1: The impact of interpersonal relationships is important for creating competitive advantage of the organization*) that the impact of interpersonal relationships on creating competitive advantage of the organization is significant and that good success depends on good interpersonal relationships. The analysis shows that in most organizations, superiors are aware of the importance of interpersonal relationships and are an example of good practice. On the other hand, the analysis also showed the need to invest in interpersonal relationships and their development as well as the importance of awareness of the influence that superiors have in their creation and providing examples of good practice.

6. CONCLUSION

With adequate knowledge management, organizations ensure their survival in the market, increase profitability and the ability to react quickly to changes in the environment. Although there are various theories about knowledge management, it still represents an insufficiently researched branch of science. The development of an organization is influenced by interpersonal relationships. Employees are social beings, not just a group of individuals, who act as a group in the workplace. However, cooperation sometimes needs to be stimulated (for example, the selection of collaborators). It is important to point out that individual problems in the workplace have their roots in social problems, because the private life that takes place at home significantly affects work productivity and feelings and work can not just be separated from each other because man is not a robot. Work is not just a means of making money - it is the price we have to pay to have money and it can also be a source of human pleasure. Money is just one of the means of stimulating employees. Disharmonious relations within the work environment are often the reasons for numerous strikes, not just low wages. Employee satisfaction feelings at work have a big impact on work productivity. Mental fatigue, unlike physical fatigue, is more detrimental to productivity. It is necessary to allow employees to say what is bothering them. Work and leisure cannot be completely separated. The work environment has a big impact on employees - from the look of the ambiance (whether cold colors, minimal decoration or warm colors, plants in offices, photos of loved ones or pets at the desk), but also very important employee relationship. It is easier and more pleasant to work with cheerful and optimistic associates who are sociable, cheerful, enthusiastic and ambitious because such an environment will encourage us to work together and we will want to work more and better to achieve success but also to achieve common results for the organization in which we operate. Given the small sample of respondents who responded to the survey, there is a limitation in the results of the survey that can provide concrete data, but the analysis of the sample showed that the involvement of employers in the "lower ranks" of the organization they lead. Knowing the names of your employees is the most important characteristic of knowing and caring for employees, because everyone's name is most important to everyone. This does not make the employee feel like a "number", which contributes to better work and a sense of belonging. Those employers who take into account the needs and respect employees achieve higher productivity than those who do not, which means that it should be in the interest of employers to have a humane attitude towards employees because it would lead to higher productivity, ie higher profits and lower the number of conflicts between levels. The analysis showed that organizations that have implemented knowledge management with the use of adequate tools are more successful than the competition and make higher profits and increase business performance at lower cost. From the above, the conclusion is that it is no longer questionable whether organizations need to manage knowledge, but that it is important to find an adequate way to implement it and how to implement it in their business.

The results of the research should encourage managers in senior and senior positions in organizations and decision makers to invest in the knowledge and skills of their employees as well as in the importance of interpersonal relationships and work atmosphere and thus the competitiveness of the organization.

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GREEN PUBLIC PROCUREMENT

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ABSTRACT

The public procurement system is based on ensuring transparent and non-discriminatory participation of all interested parties, for which the contracting authority is responsible. Public procurement is known for a set of rules, procedures and principles that must be strictly adhered to by both contracting authorities and all interested economic operators. In this, the contracting authority is the one that determines the type of public procurement procedure, specifies, and conducts the procurement of works, goods or services. Green public procurement is mentioned as one of the terms that is important because it is through it that contracting authorities seek to order goods, services or works that have less impact on the environment during their life cycle, but with the same basic function and quality that would otherwise be ordered. Green public procurement is a voluntary instrument that encourages environmental protection and sustainable consumption as well as production, and its importance is emphasized in international and European strategic documents. The main goal of this paper is to present the concept of green public procurement, its importance and benefits, key determinants and benchmarks of this type of goods, works or services and to compare the current application of public procurement procedures that included the selection of "green" products and services as just one part of sustainable public procurement.

Keywords: *public procurement, green public procurement, environmental protection, sustainable public procurement*

1. INTRODUCTION

Public procurement is a core activity of all types of development policy implementation (Shakya, 2019). Public procurement as a generator of demand is an extremely important tool for achieving alternations through social relations, environmental aspects, but also through the economic system. A significant part of the state budget is used through the public procurement system, and in this way, it accounts for a large part of state spending (Čusek-Slunjski, Munđar, 2017). Public procurement is one of the significant parts of any business (Thai, 2001). Therefore, it is important to say that the conduct of public procurement is strictly regulated by law, which contracting authorities must apply and follow, all with the aim of optimal spending of money in an economical and efficient way. Economic and legal points of view are the main parts that must be taken care of by all participants in the public procurement procedure, in other words, contracting authorities and all interested economic entities. Given that every public procurement procedure requires the use of certain financial resources, initially in the form of estimated value, and in order to ultimately obtain properly delivered services, goods or works, it is crucial to orient and meet economic standards. On the other hand, of equal importance are the legal frameworks and standards with which contracting authorities must be familiar and

monitor on a daily basis all new regulations and rules that legally bind them. It is important to say that through the public procurement system all economic needs are described and documented within the individual procedure, and conditions are legally prescribed to prevent and avoid possible behavior contrary to prescribed norms (Ciglević, 2016). Public procurement also seeks answers to three key questions, namely: what is ordered, why and for whom. Although, depending on the type of procedure, the public procurement procedure begins on the day of sending the invitation to tender or the day of sending the invitation to submit initial bids to the contracting authority, it is preceded by a number of different activities (Raguž, Blažević, 2017). It starts from defining what is ordered, as the basic and main question of whether it is a matter of procurement of goods, works or services, as well as clear characteristics of what goods should be delivered, and what kind of works or services. It often happens that the clients only after the published documentation and after the inquiries of interested parties realize that they have described the goods, works or services in the wrong or unsatisfactory way (Ciglević, 2016). Precisely because of the above, clients are preceded by a detailed market analysis. The same method precedes when goods, works or services whose specifications correspond to "green public procurement" are included in the procedure. If the contracting authorities set as primary goals the efficient disposal of available financial resources, obtaining the best possible goods, works or services and at the lowest possible price as defined by the Public Procurement Act according to the criterion of the most economically advantageous bid, social and environmental aspects can be set as secondary goals, in other words, the environmental aspect can be set through the application of green public procurement as only one part of the sustainable public procurement system.

2. GPP PROCEDURE

Significant consumers who spend about 15 trillion kunas every year, which is about 17% of the GDP of the European Union, are public administration bodies, in other words, contracting authorities. Through the purchasing power they possess, they can have a significant impact on sustainable consumption and production (GPP, 2015). Green Public Procurement (GPP) is defined as a procedure in which public administration bodies procure goods, works and services that have a lower impact on the environment during their lifetime than goods, works and services with the same basic function that they would otherwise order. (National Action Plan for Green Public Procurement, 2015). Contracting authorities identify tenders that are more environmentally friendly through techniques such as life-cycle costs, specifying sustainable production processes and the use of criteria for the award of environmental contracts (A handbook on green public procurement, 2016). Some of the main benefits of green public procurement are a cleaner and healthier environment, an increase of the quality of citizens' lives, a positive impact on launching innovations that provide additional incentives for industry to develop green products and services, financial savings, especially when looking at costs throughout the life cycle of the contract, not just the purchase price, reduction of utility bills through the purchase of products that consume less energy or save water. By reducing the content of harmful substances in purchased products, waste disposal costs can be reduced as well. (Leonardis, 2011). Although contracting authorities achieve numerous advantages and benefits with the application of green public procurement, there are also a number of technical challenges in the implementation itself. One of these challenges is the lack of clear definitions of how contracting authorities sometimes do not know exactly how socially and environmentally acceptable works, goods or services should look like and how to include such requirements in public procurement procedures in general. Therefore, many clients use the so-called eco-labels in defining criteria. The next challenge refers to "the purchase price only" attitude, where the key challenge in the public sector is to change the way people behave within the departments that decide on the purchase of a product or service.

These departments most often make decisions about purchasing products and services based on the purchase price, not considering the total cost over the life of the product or service. Another technical challenge comes through integration into governance systems, and it talks about how decentralized organizations require effective governance systems, in order to ensure consistent implementation of environmental and social initiatives (Ciglević, 2016).

2.1. Strategic framework of the PPL in the Republic of Croatia

All definitions, interpretations, steps and information on green public procurement come from various strategic documents. Green public procurement is increasingly highlighted in international and European strategic documents as an important instrument whose application would influence the "greening" of the market and encourage the development of eco-innovation. The Republic of Croatia, as one of the members of the European Union, is like any other Member State obliged, according to European legislation, to determine to what extent and in what way it will include the PPL criteria in public procurement procedures. Precisely because of this, the members have been invited to develop national action plans, in order to obtain a framework for the integration of PPL benchmarks into individual public procurement procedures (A handbook on green public procurement, 2011). In accordance with the obligations assumed by the Republic of Croatia, numerous legal regulations and documents regulating the area of the PPL have been adopted. The National Action Plan for Green Public Procurement for the period from 2015 to 2017 with a view to 2020 was adopted at the session of the Government of the Republic of Croatia in August 2015 and is one of the most important documents adopted by the Republic of Croatia in connection with the PPL. The goal of the action plan was to include some of the criteria of the Public Procurement Act in 50% of public procurement procedures by 2020, and the plan is primarily intended for public procurement entities according to the Public Procurement Act. It can also serve as an incentive for the introduction of green benchmarks in simple procurement procedures as well as an incentive for the private sector in Croatia to introduce the practice of green public procurement in their business. The report for the period from 2015 to 2017 on the implementation of the National Action Plan of the PPL provides an overview analysis of the implemented measures and activities in the three-year period of validity of the National Action Plan of the PPL. At the session of the Government of the Republic of Croatia in May 2021, the Decision on Green Public Procurement in Central Public Procurement Procedures (NN 49/2021) is significant. With this decision, the Government of the Republic of Croatia demonstrates its commitment to climate policy and the policy of the circular economy. The Ministry of Economy and Sustainable Development has emphasized the importance and role of promoting sustainable development and integrating environmental protection and climate change policies and measures into all sectoral policies, and promoting sustainable consumption and production policies to reduce resource consumption, greenhouse gas emissions and pollutants as well as waste reduction, and at the same time is the coordinator for the EU Ecolabel[1] and EMAS[2] eco-labels and for green public procurement. Waste management plan of the Republic of Croatia for the period 2017-2022 was also adopted in January 2017, which cites green and sustainable public procurement as one of the measures to prevent waste.

[1] The official eco-label of the European Union, which labels "green" products and services, in other words, those that have a less adverse impact on the environment during the life cycle compared to similar products and services. The EU Ecolabel is proof that a product or service meets high environmental standards. (Ministry of Economy and Sustainable Development, European Union Environmental Protection Label - EU Ecolabel, https://mingor.gov.hr/o-ministarstvu-1065/djelokrug/uprava-za-klimatske-aktivnosti-1879/eko-oznake/znak- environmental-protection-of-the-european-union-eu-ecolabel / 1420)

[2] Environmental management and independent assessment system is intended for all legal entities and natural persons-craftsmen, in other words, all public and private organizations that perform a certain economic or service activity with a certain impact on the environment in order to assess the impact of their activity on the environment and improve it. (Ministry of Economy and Sustainable Development, EMAS, https://mingor.gov.hr/o-ministarstvu-1065/djelokrug/uprava-za-klimatske-aktivnosti-1879/eko-oznake/emas-1422/1422)

The latest Public Procurement Act (LPP 2016) states one of the most important changes, and that is the obligation to use the ENP[3] criteria as the only criterion for the selection of bids. This enables the inclusion of PPT criteria in public procurement procedures, which achieves multiple positive effects ranging from environmental, social to financial (PPT, https://zelenanabava.hr/hr-politika/)

2.2. PPL Benchmark

The concept of green public procurement is based on the establishment of precise, clear, verifiable environmental criteria for goods, works or services. Benchmarks for the PPL are professional and technical indicators of environmental impact over the life cycle of certain groups of products and services (Ciglević, 2016). Benchmarks have been developed for those product or service groups that are largely procured in public procurement procedures. Likewise, these same products or services have a significant impact on the environment. The benchmarks were developed by the European Commission (EC) with the Joint Research Center (JRC) and with representatives of EU Member States. The criteria are not subject to the legislative procedure but are adopted by the PPL Advisory Group (the EC's advisory body on general matters of the PPL, which is made up of representatives of the Member States). All benchmarks are refined and updated depending on changes in the market and changes in European legislation (Čusek-Slunjski, Munđar, 2017). All benchmarks are designed to be included directly in the tender dossier and contain information on verification methods. So far, benchmarks for 21 product and service groups have been developed and are available on the European Commission's website in 23 official languages (European Commission, https://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm). The main prerequisites for the creation and development of green benchmarks are technical reports available for each product group indicating the area, technical characteristics, key environmental impacts during production, stages of use and end of the product life cycle, existing technologies, related legislation, market availability and cost considerations (Ciglević, 2016). The benchmarks for each group of products and services have two levels (National Action Plan for Green Public Procurement, 2015):

1) Basic criteria - applicable to each contracting authority in the Member States, containing basic environmental items whose implementation would have a positive impact on the environment. The benchmarks have been selected and designed in a way that does not jeopardize significant cost increases and increased administration. These criteria can be applied with minimal impact on cost or verification process.
2) Comprehensive benchmarks - are applicable to all contracting authorities who are interested in purchasing the best and most advanced products that are currently available on the market. Compared to products that have the same or similar functions, these benchmarks require some cost increase and additional administration. These benchmarks strive to achieve the best available environmental output.

In order for the procurement procedure to be considered “green” according to the instructions from the National Action Plan (2015-2017), all basic criteria for the priority product or service to be procured should be included in the procurement documentation. National Action Plan I has identified priority groups of products and services most suitable for the implementation of green benchmarks, such as printing and copying paper, motor vehicles, office and IT equipment, electricity, telecommunications and mobile telephony services and cleaning

[3] The most economically advantageous tender as a concept implies that the contracting authority measures and compares the economic advantage of an individual tender and compares it with selected criteria related to the subject of procurement that serve to identify the "best" tender. (Ministry of the Economy, Entrepreneurship and Crafts (2017) Guideline No. 2 Criteria for selecting the most economically advantageous tender, http://www.javnanabava.hr/userdocsimages/Smjernice_01-ENP.pdf)

services. These priority groups are the results of the analysis of the practice of other EU Member States and the consideration of indicators of high representation in the total procurement of goods and services in the Republic of Croatia according to data from the Electronic Public Procurement Notice of the Republic of Croatia. The National Action Plan II is awaited for the next period, which should present and adopt new priority groups (Čusek-Slunjski, Munđar, 2017).

3. SUSTAINABLE PUBLIC PROCUREMENT AND PPL

In their procurement decisions, public authorities in Europe implement not only green public procurement, but also sustainable public procurement, thus covering different criteria. Sustainable public procurement consists of several segments, and green public procurement is only part of the environmental aspect within sustainable public procurement. In addition, green public procurement has been supported by a number of EU policies as one of the initiators for sustainable development (Rainville, 2016). Sustainable public procurement has also been developed through practical attempts to introduce elements of sustainable development into public procurement procedures (Fisher, 2013). Sustainable public procurement is a process in which organizations meet their needs for goods, works or services whose application will work for the benefit of society and the economy while minimizing damage to the environment (Shakya, 2019). Another definition of sustainable public procurement is a procedure in which contracting authorities procure goods, works or services taking into account economic aspects: quality, availability, functionality, best value for money criteria, environmental aspects: "green public procurement" in terms of the environmental effects that a product or service has during its existence or provision, social aspects: effects on poverty eradication, equality in the distribution of resources, working conditions and human rights (Šikić, Turudić, 2017). In accordance with the above, sustainable public procurement consists of the so-called "three pillars", which relate to economic development, social development and environmental protection (UNEP, 2011). Since the primary goal of any public procurement procedure must be the best value for money and rational spending of budget funds, the goals of sustainable development are characterized as secondary goals of sustainable public procurement procedures. By meeting these secondary objectives, sustainable public procurement can contribute directly to contract performance (for example, when a tenderer reduces carbon emissions related to the production or delivery of a product or service or employs members of vulnerable groups), or indirectly by encouraging economic operators to change their business practices. (Semple, 2015). However, as with any other concept, the implementation of the principle of sustainable public procurement encounters some criticisms and problems in practice. One of the main objections is how sustainable public procurement further complicates the public procurement process, which is inherently complex and not at all easy to implement, makes it more efficient to spend budget funds and makes public procurement procedures more expensive. Another objection to this concept is the fear that sustainable public procurement could lead to differential treatment of domestic and foreign bidders in tender specifications (for example, emphasizing the importance of recycled content in paper procurement, and knowing that domestic producers mainly produce paper by recycling, foreign bidders who use mostly non - recycled raw materials in paper production may be disadvantaged). Also, emphasizing certificates of sustainable business as one of the conditions for joining the tender may have a discriminatory effect on bidders who do not have such certificates, as reliance on eco-labels for products can have the same effect (Šikić, Turudić, 2017). All the above situations and current complaints could lead to a violation of the main principles defined by law in the field of public procurement. Overall, all the principles of sustainable development are becoming increasingly important and will become over time a determinant without which organizations and ultimately every state will not be able to operate.

Therefore, sustainable development has been observed as one enormous project, a long-term process, and a concept of balanced development in the future.

4. CONCLUSION

Sustainable development is generally a project of the future. In recent years, environmental protection has been one of the main topics of the modern economy. The promotion of activities for environmental protection and business aimed at sustainable development is represented in all areas, so great emphasis is placed on green and sustainable public procurement. In recent years, there has been a growing political commitment to promoting green public procurement internationally. The most important thing for any public procurement procedure is the preparatory phase, regardless of whether green public procurement will be included in the procedure. When choosing a procedure, the contracting authority should be prepared and consider at what stages the environmental criteria can be applied. Green public procurement through which more efficient and less harmful goods, work or services are procured, has significant support in the policies of the European Union, but also of the Republic of Croatia. If authorities or contracting authorities decide to purchase goods, works or services with a lower environmental impact, they will greatly contribute to local, regional, national, and international sustainability goals. Although there are certain prejudices and objections about the possible problems and consequences that may arise through green public procurement, the successful practice of European countries nevertheless changes such an attitude and opinion. The potential benefits of implementing green and sustainable public procurement are known both locally and globally. By including various criteria with an emphasis on the environmental aspect represented in this paper as a condition in public procurement procedures, states can significantly encourage responsible business and improve the well-being of their citizens. The representation of green public procurement is already evident in numerous concluded contracts. Further investment, development and promotion of this concept should result in even greater and better implementation.

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INTERDEPENDENGCE OF STAKEHOLDERS IN A TOURIST DESTINATION ACCORDING TO "ZERO" ENVIRONMENTAL IMPACT

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ABSTRACT

The sharp increase in tourism in the Republic of Croatia has resulted in the emergence of mass tourism that has negative effects on the natural, social and cultural environment. As a reaction to mass tourism, there was a need to apply the principles of sustainable tourism. Today, due to the rising economic standard of citizens of developed countries, the trend of traveling throughout the year is growing, and the travel period in the pre- and post-season is becoming increasingly popular. Tourists are increasingly environmentally aware, and seek authentic experiences, contact and connection with the local community, and appreciate the ecological preservation and cleanliness of the environment, and the delivery of integrated tourism products involved a larger number of stakeholders to achieve consistency of green marketing goals. The main goal of the paper is to point out the need to apply a systematic approach to stakeholder involvement in achieving sustainability of the tourist destination.

Keywords: *green marketing, tourism, sustainable development, stakeholders, stakeholder interconnection*

1. INTRODUCTION

The issue of environmental responsibility in all branches of the economy, as well as in all spheres of life, is becoming an unavoidable topic today. However, we often witness activities and behaviors that are exactly the opposite of what is considered environmentally friendly, and often some actions are presented as environmentally responsible, although they are not. Such situations are especially noticeable in tourism, given that destinations that present themselves as ecological are very popular, it is expected that destinations, and hotels that emphasize environmental responsibility will be more sought after and visited. Also, there are more and more European Union funds that provide support for environmentally responsible projects, so this is one reason why what is not environmentally responsible is declared as environmentally responsible tourism. How environmental sustainability is viewed in the short term, and how it is not an existential issue, and environmentally responsible behavior often reduces economic benefits (also, observed in a shorter period of time) raises the question of whether environmental responsibility in tourism in Croatia is really at the level of which is presented or is just a "marketing trick" that has the function of attracting as many tourists. On the other hand, there are hotels on the Adriatic coast that are part of well-known hotel chains, so it can be expected that all hotels in a chain have the same strategy in terms of sustainable development and environmental responsibility.

Therefore, the aim of this paper is to consider and point out various aspects of environmental sustainability in the hotel industry, but also in tourism, in which the hotel industry is an integral part, and the main goal of the paper is to point out the positive and negative consequences of insufficient application of green marketing in sustainable tourism development in Croatian.

2. ECOLOGICAL PROBLEMS IN TOURISM

Life in modern society is based on the principles of a market economy, aimed at achieving the highest possible profit in all industries, including tourism. In the desire to make as much money as possible, attention is often not paid to the negative effects that can result from such an approach. Intensive development of tourism and constant increase in the number of tourists inevitably leads to potentially negative effects on the environment. Namely, the expansion of tourism and tourist movement has led to the degradation of many tourist destinations. The increase in the number of tourists imposes the need for the construction of new tourist facilities (hotels, restaurants, accommodation facilities) whose expansion requires the improvement of the infrastructure of the tourist destination, and its careful planning. Capacity building is accompanied by disturbance of the natural environment and the creation of various types of waste. The need to build different facilities that are necessary for the functioning of a tourist destination can lead to a destination that has the potential to be ecological, loses ecological features. Awareness of the importance of the environment for tourism development has long existed. In the 1980s, nature protection movements emerged that insisted on the implementation of tourism development responsibilities. Thus, (Wearing & Neil, 2013) define ecotourism as a type of tourism that involves traveling to relatively untouched and unpolluted nature in order to study and enjoy the landscape, its flora and fauna, but also cultural heritage. Sustainable development is impossible without the involvement of all actors in tourism development and it has the task of uniting economic, social and environmental policies to meet the needs of current tourists, domicile population, nature needs, and which will not jeopardize the ability of future generations to meet tourism needs and / or needs. life in the destination. A sustainable tourist destination is an integral tourist resource where all components of a sustainable tourist destination are interconnected. No component of a sustainable tourist destination can function independently (Vuković, 2018: 138):

- the unity of natural and anthropogenic values, and the protection of cultural and natural resources affects the positioning of a sustainable tourist destination in the global tourism market. Evaluating natural, anthropogenic and ethno-professional values are the basis for planning sustainable development in tourism.
- Diversity and authenticity of the tourist offer - Diversity and authenticity in a sustainable tourist destination can be included through various forms of tourist offer. The diversity and authenticity of the tourist offer can be observed through three basic categories: the diversity and authenticity of the destination space, the diversity and authenticity of the event, the diversity and authenticity of tourism. During his life, a person has free time that he wants to spend in a way that satisfies some of his inner needs: to acquire new knowledge, creative creativity, hobbies, learning about the traditions and way of life of the domicile population. The diversity and authenticity of a sustainable tourist destination offers consumers in tourism the opportunity to develop their own creativity and personality through programs of diversity and authenticity.
- comfort, ie available accommodation and food capacities today must be better and of better quality than living and eating at home.
- availability and propulsiveness of a sustainable tourist destination - built infrastructure and communication are one of the most important factors as they shorten the time spent from the place of tourist demand to the place of tourist offer, which reduces the total cost of tourism.

- The kindness and hospitality of the domicile population creates a sense of comfort and contributes to the creation of greater satisfaction..

3. THE ROLE AND IMPORTANCE OF GREEN MARKETING IN SUSTAINABLE DEVELOPMENT

The first way in which marketing can achieve the sustainability of tourism in the Republic of Croatia within its function is green marketing. It is clear from the model of sustainable development that green marketing, ie one that focuses on environmental issues, is actually part of sustainable marketing. Implementing a green marketing strategy very often involves focusing on specific individual activities such as promoting green products and characteristics, or designing less environmentally invasive products. However, the modern understanding of green marketing implies avoiding the use of one-off environmental initiatives solely for the purpose of public relations and creating projects that are multidisciplinary from a macro perspective (Kilbourne, 1998). Green marketing is defined as the study of all efforts related to the consumption, production, distribution, promotion and packaging of products, in a way that is sensitive and consistent with environmental concerns. (Dahlstrom, 2010: p. 6) The American Marketing Association (AMA.org Dictionary, 2014) calls green marketing both the marketing of environmentally safe products and the marketing of products designed to reduce negative effects on the physical environment or improve its quality. . As an illustration of the development of definitions of green / sustainable / environmental marketing from the 1970s to the present, it is worth noting three important definitions (selected from Dangelico and Vocalelli, 2017: 1268, Kotler and Armstrong, 2012: 582): "green marketing is a holistic process responsible for identification , anticipating and meeting the needs of consumers and society in a profitable and sustainable way "(Peattie, 1995); "Marketing products that are considered environmentally safe" (AMA, 2012); "Sustainable marketing calls for socially and environmentally responsible activities that meet the needs of consumers and businesses, while protecting the environment and strengthening the ability of future generations to meet their needs" (Kotler and Armstrong, 2012). In any case, in theory it is holistic an integrated approach, which, when properly applied, seeks to reconcile the satisfaction of consumer needs and the requirements of reducing environmental degradation. Otmann (2008) listed five simple rules of green marketing with the aim of capitalizing on market opportunities:

- Think and act holistically - it is no longer enough to focus only on functional benefits;
- Take advantage of the opportunities that green marketing provides in the form of involving consumers on an emotional level, while building brand value;
- The way one communicates is a critical element of success (and helps to avoid "green washing");
- Eco-innovations are new ways to improve sales results;
- Strive for "zero" environmental impact.

As the popularity of environmental care grows, so does the demand for green products, which is a clear motivation for companies to start thinking strategically about green marketing. In addition, Chen (2010) cites five other reasons why companies should develop green marketing: aligning with environmental pressures, creating a comparative advantage, improving corporate image, seeking new markets or opportunities, and expanding production value. Green marketing can be applied at three levels: tactical, quasi-strategic, and strategic (Polonsky and Rosenberger, 2001). Therefore, it is clear that due to the tactical and quasi-strategic approach to environmentally oriented initiatives, there is skepticism and consumer distrust. Strategic "greening" presupposes a strategic approach and coordinated efforts of the company to integrate environmental problems into all its functional parts. Green marketing is the subject of many controversies due to which consumers lose confidence in the sincerity of the company's

intentions to be responsible through this function, so the authors emphasize that it must be complemented by the activities of other components of sustainable marketing. As a good example of a company that implements green marketing at the strategic level, Toyota can serve with its hybrid car Prius (Financial Times, 2014). Toyota has established an eco-technology development division, not in response to legal and regulatory requirements, but to set the direction for the entire industry and thus gain a unique competitive advantage. In the very beginnings of the Prius market, the results were not enchanting, but with a combination of rising fuel prices, reduced production costs, and thus product prices and the development of the image of a desirable and trendy car, sales results surprised the entire market. Many attribute their success to understanding the needs of green consumers who sought not just an "economical vehicle" but a kind of revolution in which they could participate, and Toyota delivered them not a car but a very bold statement of a certain lifestyle. Although strategic greening is the "right" dimension of green marketing, an effective approach to modern marketing is significantly different from reducing the harmful effects of products and companies because it involves integrated transformational change, which creates value for individuals and societies as well as the natural environment. it is impossible to imagine the sustainable development of tourism in the Republic of Croatia.

3.1. The importance of green marketing for tourists

Marketing as we follow and know it today was created by a radical change in the company's focus on the development of production and products according to consumer desires and needs, and the focus in the problem is the consumer in tourism. The initiative to raise awareness of the problem of "unsustainable" development of the Planet, which came from the institutional level, introduced changes in the behavior of market segments, ie tourists whose concerns about environmental protection and sustainable development began to change their behavior. Thus, sustainable business has received another new motive, which comes from the market, in the form of demand for more sustainable solutions. Many tourism companies look at "sustainable tourism consumers" solely through their profitability, but this should by no means be the case with sustainable marketing. It is necessary to understand and know how consumers in tourism think and decide, and to fit this into the overall intentions of more responsible business. Kilbourne and Carlson (2008) emphasize that the key to the problem of consumption is the anthropometric value system at the core of the Western dominant social paradigm and argue that all micro-changes in consumption patterns are doomed if the environment and society are a radical resource. don't change. The reason for the relatively benevolent understanding of contemporary problems of society and the environment on the part of consumers lies in the fact that they perceive them as something that is far in the future and therefore should not be too worrying at the moment. Therefore, they often do not incorporate future outcomes and consequences into the present decision-making process (Polonsky, 2011). In developing its programs, sustainable marketing must look for ways to offer solutions to consumers that are sustainable, but because of this problem not necessarily communicated as a major differentiation advantage because it does not guarantee recognition by consumers. With the development of responsible versions of the marketing approach, the concepts of green and ethical consumerism have developed, a form of consumption in which the consumer in tourism takes into account not only their own good, but also social and environmental values, ideals and ideologies (Uusitalo and Oksanen, 2004). Accordingly, ethical consumerism is a buying behavior that reflects concerns about unethical and unfair global trends such as child labor, underpaid work, human rights violations, etc., while green consumerism refers to concerns about environmental issues. Sustainability-oriented consumer research in tourism includes different concepts of sustainable purchasing behavior and consumption, and it bears different names.

Thus, research finds names such as: green, greener, sustainable, pro-ecological, pro-social, environmentally conscious, altruistic, ecological, ethical or alternative consumption. Research questions and topics in this area can be divided into four different groups (Wells et al., 2011):

- Profiling consumers in tourism with regard to sustainability concerns in order to create meaningful market segments (Straughan and Roberts, 1999),
- Profiling types of consumers in tourism in order to understand how they can be motivated for more sustainable consumption (Jacskon, 2005),
- Testing the acceptability of premium prices for more sustainable products (Laroche, Bergon and Barbaro-Forleo, 2001),
- The goal of determining the background of frequent and significant discrepancies between the expressed will of consumers in tourism to make their consumption more sustainable and their actual behavior in relation to the perceived value of the destination (Vuković, 2018).

Looking through history, the impact on the environment has largely been a byproduct of human need for physical comfort, mobility, entertainment, power, status, personal safety, maintaining tradition and the like, so people have created technologies and organizations to fulfill such desires. Only recently, according to Stern (2000), has there been a change in which environmental concerns have become a relevant influence in decision-making and consumers in tourism behave desirable in order to have a positive impact on the environment. Such behavior, according to the author, can be intent-oriented, where the focus is on the attitudes and motives of consumers in tourism to improve the environment, and it is explored to understand how they can be changed; or it can be oriented to the impact which is then reduced to environmental activism, non-activist behavior in the public sector and the like. The impact of a particular behavior can be differentiated from its intention associated with that behavior, which is extremely important in considering this area. It would be intuitive to conclude that clear intentions and attitudes result in consistent behavior, however this is not the case in case of environmental concerns, more precisely the results of the conducted studies are inconsistent. For example, Simmons and Widmar (1990) demonstrated a statistically significant positive association between environmental care and waste recycling while Schlagemilch et al (1996) suggested a very weak association between attitudes and behaviors in environmental care issues, while Vining and Ebreo (1990)) did not find any connection. Inconsistencies in results are interpreted differently by different authors. Carrigan et al (2011) point out that most studies aimed at exploring the gap between attitudes and behavior are deprived of respect for the social context, social processes, and structures in which behavior occurs. Consumption is a social activity that reflects social life and status. For example, being an ethical consumer is much easier if you live in an area full of "ethical, fair trade" retailers, organic resellers and various social assistance initiatives, than if you live in an uninhabited area, scarce in all segments of content. In the latter, even very strong intentions will not result in behavior. Kollmus and Ageyman (2002) have very thoroughly analyzed the different models and factors that define the gap between intentions and behaviors in environmental care. They came to the conclusion that there is no single model that adequately explains the reason why people who have a strong concern and intention to protect the environment, do not achieve this by their behavior. Analyzing existing published studies to determine why environmental and social values may have a weak impact on purchasing decisions, Young et al (2010) concluded that the reasons lie in brand strength, culture, demographics, financial strength, habits, lack of information, lifestyle, personality or trade-off of ethical factors. Another relevant phenomenon that occurs in consumers in tourism, and is related to sustainable and responsible products, is the ambivalence of consumers and tourists - having both positive and negative impressions. Chang (2011) suggests two possible explanations; because they can have both positive and negative perceptions of green products at the same time, and / or because their negative perceptions can

independently predict ambivalent attitudes. The research concluded that negative perceptions, such as skepticism that is significant in ambivalent attitudes, have a statistically significant impact on attitudes about green products. This conclusion suggests that tourists, for example, due to skepticism about the real impact of green products, or the fact that their contribution is minor in relation to the size of the problem, due to such an attitude, even having awareness of the problem, do not respond to stimuli behavior that is consistent with sustainability (in this case ecology).

4. RESEARCH METHODOLOGY

The objectives of the paper are to deepen the understanding of stakeholder interests and the effects of stakeholder interests on the sustainability of forms of tourism denotated through the application of green tourism. According to the concept of sustainability in tourism, conflicts among stakeholders are the result of unequal power and inequality in the realization of interests in the development of tourism. In accordance with the above, the hypotheses of the paper are defined:

- **Hypothesis H1:** Green tourist destination marketing is unique in terms of sustainability.
- **Hypothesis H2**: Green and sustainable tourism preserves the atmosphere and integrity of the site and questions the appropriateness of tourism development in the destination.
- **Hypothesis H3:** Green marketing in tourism involves relevant stakeholders in destination development, benefits them and respects their sensitivity.

Modern scientific knowledge of sustainable tourism insists on tailor-made management, which respects the specifics of resources and space in which tourism takes place and respects the dynamic interests of different stakeholder groups, with the most vulnerable groups local community and tourists willing to compromise. The set hypotheses enable the structuring of existing knowledge about the complexity of stakeholder interests within the paradigm of sustainability and opens questions whose answers require a comprehensive review of the literature and further research on this topic. The research was conducted on an appropriate intentional sample consisting of representatives of local governments, tourist boards, employees in travel agencies, representatives of hotels, family farms, LAGs and local people who in accordance with business activities and life in the tourist destination recognized and respected aspects of sustainability. application of the concept, the relationship between stakeholders, the use of EU funds, green tourism, demographic policy, excessive investment in the destination and the establishment of a unique marketing model of management and implementation of sustainability based on elements of green marketing. The sample consisted of 326 respondents. Sample structure: representatives of local governments (3.99%), tourist boards (9.20%), employees in tourist boards (15.03%), representatives of hotels (23%), family farms (11.04%), LAG (14.11%), local population (23.63%). For the purpose of testing hypotheses, a survey was made and the Likert scale was used, which consists of 5 statements, and investigates whether respondents express a positive or negative attitude towards an object of attitude. Values were added to the statements. Grade (1) disagree at all, grade (2) disagree, grade (3) neither agree nor disagree, grade (4) agree, grade (5) completely agree. In order to test the set hypotheses, a non-parametric equality test of continuous probabilities used for the purpose of testing hypotheses was selected. In essence, the above is equivalent to setting the mean and standard deviation. The mean square deviation of numerical values from the arithmetic mean is small, which leads to the conclusion that the obtained results of the arithmetic mean represent small results. Before testing the research hypotheses of this doctoral thesis, it is necessary to test the level of reliability of measurement scales with the Cronbach Alpha coefficient. Crombah alpha less than 0.6 is considered unsatisfactory reliability and greater than 0.7 represents satisfactory reliability.

From table no.1. it can be seen that the Cronbach Alpha coefficient is 0.799, which means that the measuring scales used have a high level of reliability.

	N	Arithmetic middle	SD	Minimum – maksimum	Cronbach Alpha
The originality of green marketing	326	4,30	0,9	1 – 5	0,799
Destination integrity protection	326	4,27	0,9	1 – 5	
Connection with tradition	326	4,26	0,9	1 – 5	
Destination development control	326	4,98	0,1	1 – 5	
Involvement of all stakeholders in management	326	3,96	1,2	1 – 5	
Note: ratings are given on a Likert scale of 1 - 5 (1 - least important, 5 - most important) SD - standard deviation					

Table 1: Cronbach Alpha coefficient
(Source: *own research)*

In table no. 1. the Cronbach's Alpha coefficient is shown. The results of the Cronbach's Alpha coefficient were tested on five particles: "Green marketing strategies applied in the destination must be adapted to the destination, ie the originality of green marketing strategies must be taken into account during development", "Green marketing strategies have the function of protecting destination integrity", " Green marketing strategies are linked to the tradition of the destination "," Control of destination development is possible only in accordance with nature protection "," Involvement of all stakeholders is necessary in the management process "and show that Cronbach's Alpha coefficient is 799, which indicates high reliability of the measuring instrument. . The student's t test tested the difference in the assessment of knowledge of the role and importance of green marketing strategies in relation to whether they participated in destination management and whether respondents assess whether the destination or tourism companies have the potential to implement green marketing strategies. Significance levels were set at $\alpha = 0.05$. The T test shown in Table 2 has the task of determining the difference between the mean values of those who believe that they do not have the potential to develop green marketing strategies and those who believe that they have the potential to develop.

Table following on the next page

	Assessment of the role and importance of green marketing in the concept of sustainability						P*
	Arithmetic mean (standard deviation)		Difference	95% range reliability		t (df)	
	No potential	Have potential		From	To		
Green marketing synergy of economic benefits, care for the environment	3,16 (1,1)	3,82 (1,1)	-0,658	-1,0	-0,4	-4,2 (251)	<**0,001**
Green marketing - community involvement	3,64 (1,0)	4,27 (0,9)	-0,632	-0,9	-0,4	-4,8 (251)	<**0,001**
Offer local food prepared in the traditional way	3,79 (1,0)	4,34 (0,9)	-0,553	-0,8	-0,3	-4,3 (251)	<**0,001**
Offering local food prepared in the traditional way The use of renewable energy sources is a necessary element of sustainability	3,69 (1,0)	4,21 (0,9)	-0,523	-0,8	-0,3	-3,9 (251)	<**0,001**
Waste recycling reduces costs	3,49 (1,1)	4,13 (1,0)	-0,642	-0,9	-0,4	-4,6 (251)	<**0,001**
The use of rainwater contributes to sustainability	3,54 (1,1)	4,18 (1,0)	-0,640	-0,9	-0,4	-4,5 (251)	<**0,001**
Greening contributes to the harmony of staying in nature	3,42 (1,1)	4,12 (0,9)	-0,706	-1,0	-0,4	-5 (251)	<**0,001**
A quality-based tourist offer takes care of the environment	3,51 (1,1)	4,25 (0,9)	-0,740	-1,0	-0,5	-5,2 (251)	<**0,001**
Green tourism preserves the integrity of the site	3,51 (1,1)	4,10 (1,0)	-0,783	-1,1	-0,5	-5,4 (251)	<**0,001**
Green tourism takes care of future development	3,67 (1,0)	4,29 (0,9)	-0,619	-0,9	-0,4	-4,6 (251)	<**0,001**
Green tourism involves all stakeholders at the destination level	3,88 (1,1)	4,47 (0,8)	-0,587	-0,8	-0,3	-4,7 (251)	<**0,001**
Zeleni turizam donosi korist svim dionicima bez obzira na njihove međusobne konflikte	3,51 (1,2)	4,07 (1,0)	-0,756	-1,1	-0,5	-5,0 (251)	<**0,001**
Green tourism benefits all stakeholders regardless of their conflicts with each other	3,57 (1,0)	4,12 (1,0)	-0,556	-0,8	-0,3	-4,0 (251)	<**0,001**

Table 2: *T test for hypothesis testing*
(Source: *own research)*

The estimates shown in Table 2 suggest that the average values are higher for all respondents who estimate that the destination has the potential to develop and implement green marketing strategies to protect nature and the environment of the tourist destination, following the results: "Green marketing must ensure synergy of economic gain and care for the environment "(difference -0.658, 95% confidence range difference from -1.1 to -0.4, Student's t-test, p <0.001); "Green marketing ensures community involvement" (difference -0.632, 95% confidence range difference -0.9 to -0.4, Student's t-test, p <0.001); "Local food offer prepared in the traditional way" (difference -0.553, 95% confidence range difference from -0.8 to -03, Student's t-test, p <0.001); "Green tourism includes all stakeholders at the destination level" (difference -0.587, 95% confidence range difference -0.8 to -0.3), Student's t-test, p <0.001) In accordance with the presented results, it can be concluded that tourism is influenced by different individuals and groups that are stakeholders and at the same time affects them. Stakeholder theory derives from the literature of strategic management, and is applied in tourism to define who they are, what their role and interests are in relation to tourism development and to identify which effects of tourism need to be supported and eliminated. The link between stakeholder theory and the sustainability paradigm is reflected in tourism management. Stakeholders own and control various resources that are valorized in tourism, which creates their interdependence. Tourist resources are scarce. In order for future generations to be able to use them, tourism valorization needs to be managed taking into account the economic and socio-cultural needs of stakeholders and the need to protect the environment, ie by applying the concept of sustainability. Exploring the interests of stakeholders contributes to understanding their idea of the appropriate direction of tourism development, which gives management the opportunity to find ways and means to regulate and direct tourism. The management of a tourism organization or destination should be aware of the fact that it always has the opportunity and duty to manage tourism that benefits stakeholders. Given the benefits that green marketing has in the overall environment, in the future will be successful those tourist destinations that plan, organize, implement and control the marketing strategies of all stakeholders in the integrated tourism product. Tourists perceive the destination differently from the local population and in order to encourage more responsible tourist behavior, it is necessary to conduct green marketing activities that begin by informing tourists about local customs, local environment and ecology, as well as encouraging the arrival of those tourists who will respect the local tradition.

5. CONCLUSION

Green marketing in sustainable tourism is focused on the natural and socio-cultural environment of the destination and socially responsible business of all stakeholders involved in the delivery of integrated tourism products and ethical business. The future of sustainable tourism can be positively influenced by the implementation of green marketing, which will be based on making marketing decisions that are environmental, social and economic. Green marketing strategies represent a fundamental component in the development of sustainable tourist destinations. By implementing green marketing strategies based on sustainability goals, assessing, managing and controlling progress in achieving sustainability goals, tourist destinations are strengthening their capacities and becoming more competitive in the global tourism market. The implementation of green marketing activities and the effects of sustainable tourism are a permanent process that continuously monitors the changing environment of the tourist destination, which means that internal control is necessary so that the goals of green marketing activities can monitor environmental policy and legislation.

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BITCOIN AS A SUBSTITUTE FOR CURRENT CURRENCIES

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ABSTRACT

The purpose of this study is to examine the hypothesis whether Bitcoin, this decentralized digital currency, can become a successful alternative to other currencies that are currently consolidated in the market as well as regulated through legislation. For this purpose, we will use descriptive analysis based on standard deviation which is used to analyze Bitcoin volatility by calculating daily logarithmic returns as well as monthly logarithmic returns, expressed as a percentage. To test this hypothesis, a comparison is made between the volatility of Bitcoin with the volatility of gold and the euro currency, while the base currency for comparison is the US dollar, which is considered a global base currency.

Keywords: *Bitcoin, digital currency, virtual currency, cryptocurrency*

1. INTRODUCTION

The emergence of innovative digitized financial channels, instruments, systems and assets is transforming the world of money and finance at a rapid pace, creating new paradigms for financial transactions and creating alternative exchange channels. Although commerce and communication are now digital, something that has hardly changed over the years and the internet revolution is the broker of any trade, currency. Bitcoin, this decentralized digital cryptocurrency, without a central bank, is one of the most discussed phenomena in recent years. Bitcoin was launched in 2009 by Satoshi Nakamoto who is a nickname for an individual or a group of people. Although cryptocurrencies already represented a well-known concept as early as November 2008, Satoshi Nakamoto published a document "Bitcoin: an electronic peer-to-peer cash system". The peer-to-peer network described was a breakthrough because it did not rely on trust between agents but on IT advancements, making Bitcoin the first digital cryptocurrency decentralized in transaction execution, which operates without the mediation of the authorities. Rather, it relies on proof of computer-generated cryptographic work. Nakamoto has referred to Bitcoin as an electronic payment system, but over time many individuals have begun to call it a cryptocurrency or simple currency because of its features. Bitcoin introduced the world with new possibilities regarding the way payments are made, data management and most importantly, the concept of decentralization. Acceptance of this currency was relatively slow at first, although the media widely disseminated the idea of Bitcoin as a decentralized digital currency. Two of the new aspects that Bitcoin introduced are: the concept of non-oversight by any regulatory or governmental authority, allowing free market-value exchanges based on supply-demand, and the possibility of having a new electronic payment system without intermediaries, creating the advantage of being faster, cheaper and more secure through technology. Although, Bitcoin has benefits, there are also some obstacles in increasing its popularity and acceptance in the market. Currency is decentralized which means that it has no control by regulatory or governmental authorities and can therefore be linked to illegal activities. Given that Bitcoin is spreading widely, the possibility of increasing regulation is also expected to occur which destroys the idea of decentralization.

The high level of currency volatility and lack of trust from financial institutions also weakens users' trust in Bitcoin and makes it a dangerous instrument. The purpose of this paper is to examine the functions of Bitcoin as well as find a way to determine whether or not it is money from an economic perspective. To answer the research question, we must first analyze the functioning of Bitcoin and then understand how Bitcoin can manage to replace current currencies.

Research question: Is Bitcoin money?
Hypothesis:

- H0: Bitcoin is not money
- Ha: Bitcoin is money

2. LITERATURE REVIEW

There is a lot of feedback about Bitcoin and cryptocurrencies. Since the creation of Bitcoin, many people have argued that this could be the first global currency. Optimistic groups also claim that Bitcoin will radically change payments, the economy and even politics around the world. Dr. Garrick Hileman, an economics historian at Cambridge University, explained in an interview with CNN his optimistic views on Bitcoin and referred to it as nothing less than an economic miracle, which would inevitably shape the finance sector in the long run. Pessimistic groups, on the other hand, label Bitcoin a "hoax" and claim that Bitcoin will collapse inevitably and spectacularly, including Paul Krugman, a professor at Princeton University named important of 2015 (The Economist, 2015) .In 2013 Krugman wrote an article in the New York Times called 'Bitcoin is harmful', where he argues that Bitcoin can never be successful. Bitcoin is one of the most widely used virtual currencies in recent years worldwide. A virtual currency is an unregulated form of digital money which is not used or guaranteed by a central bank and which can act as a means of payment to carry out transactions. These transactions often do not incur any fees and do not involve banks. Recently, Bitcoin virtual currency has paved the way for a new generation of decentralized, peer-to-peer virtual currencies - often referred to as cryptocurrencies. Following the recent rise of this currency, a dozen virtual currencies have been introduced that have followed the path of Bitcoin. Virtual currencies can be purchased on an exchange platform using conventional currencies. Using this portfolio, consumers can send Bitcoins online to anyone who wants to accept them or convert them into conventionally denominated currencies (such as Euros, Pounds or Dollars). New Bitcoins have been created online using software-intensive software known as 'Bitcoin miners'. This program allows customers to "mine" (extract) small amounts of currency through the solution of deliberately complex algorithms. However, the increase in money supply is fixed so only small amounts are issued over a period of time.

2.1. Money, Currency and payment system

Currency is a generally accepted form of money which includes coins and banknotes issued by a government and circulating within an economy. Used as a medium of exchange for goods and services, currency is the basis for trade "(Investopedia, 2017). This definition is closely related to the definition of money as" an asset generally accepted as payment for goods and services or for the settlement of (Cecchetti, 2008). Bitcoinin, is known as a currency despite being decentralized but still can not be used as ordinary money. But to exchange money for goods or services, they must be included in a payment system, which is a system that allows the transfer of money between payers and payers through a mechanism based on paper money or electronic payments. (Businessdictionnary, 2017). Electronic payments can be made in several forms: credit card, debit card , electronic funds transfers which are part of bank money as well as e-money which is the payment method for Bitcoin.

2.2. Digital currencies, virtual, cryptocurrencies

Digital currency is a term that represents all non-physical currencies (a system that is not based on paper money) that have the same characteristics as other physical currencies, but that allow transactions and transfer of ownership immediately (Wikipedia, 2018). Digital currencies can be divided into two categories: virtual currencies and cryptocurrencies. For the purposes of this paper, the definition of the European Central Bank for virtual currencies will be used (2012): "A virtual currency is a type of unregulated, digital money, which is usually issued and controlled by its developers and used and accepted by members of a separate virtual community ". Cryptocurrency is a digital asset that also serves as a medium of exchange for conducting cryptography-based transactions. These assets can be considered as an alternative to the currencies of different countries. Most cryptocurrencies are basically a piece of software that allows users to perform transactions between them according to a decentralized model.

2.3. Is Bitcoin money?

Bitcoin is commonly referred to as a cryptocurrency or as a virtual currency, or as money for short, as perceived by its users and supporters. Blockchain technology has enabled bitcoin to be introduced into the system with the transformative ability to decentralize the payment process. But does this mean that digital currency will succeed in replacing traditional currencies to serve as an alternative form of money? To answer this question, let us first discuss the three functions of money: the exchange instrument, the measure of value, and the preservation of value.

- An **exchange tool** is an instrument that buyers give to sellers when they buy goods and services. For money to function as a medium of exchange, a government approval decree requires Bitcoin to introduce some new aspects in terms of use as a means of payment for goods and services. For the first time the concept of cryptocurrency appeared which does not need a regulatory authority. The possibility of a new payment system was created that avoids all intermediaries with the advantage of being faster, cheaper and more secure. But despite these innovations, Bitcoin has not yet reached a level of widespread use for many reasons, the most important of which is the non-acceptance as legal tender by Central Banks.
- **Value measurment** (ability to be used as a measure of the value of goods and services). Value measure is a numerical monetary unit of measurement of the market value of goods and services. In other words, it is something that can be used to announce prices and record debts. Bitcoin still does not seem to have reached this milestone to have goods and services that are measured in Bitcoin, as most items are priced only against the dollar or other traditional currencies. The extreme volatility of this cryptocurrency still poses a barrier for Bitcoin to be used as a measure of value.
- **Value conservation** is the ability to allow individuals to defer purchases of goods and services to a future date. Manufacturers of goods and services sell their products by converting them into money, which would later be used to buy goods and services from others. But money can also be used as a store of value, as one of the forms of wealth. As for Bitcoin whether it fulfills this function or not, we will test it.

3. METHODOLOGY AND EMPIRICAL APPROACH

The purpose of this paper is to examine the functions of Bitcoin as well as find a way to determine whether or not it is money from an economic perspective. The chosen way to get an answer is by testing one of the main functions of money, and precisely the function of preserving value. Is Bitcoin a stable currency, which manages to maintain its value in the future?

3.1. Methodology

The study is based on measuring stability or volatility by applying the standard deviation of daily logarithmic returns as well as monthly logarithmic returns expressed as a percentage. We have calculated the daily returns by taking the prices of two consecutive days. That's why we call it daily returns. Then, we apply a logarithm to the ratio between these two values which is a common way to measure changes in the financial industry. This value tells us whether the price of the currency has moved a lot or not from the previous day. While we have calculated the monthly returns by first considering the average monthly price for the respective month based on the prices of each day and then we act again the same as with the daily returns. Standard deviation is a method used to determine the amount of variation of a set of data values. A low standard deviation indicates that the data points tend to be close to the group average, while a high standard deviation indicates that the data points are scattered over a wider range of values. It explains the possibility that the value of a Bitcoin unit will remain stable over time. Value stability is important for the functioning of foreign exchange because without having a forecast for future value, users can not save money today for future purchases. We apply this standard deviation to the daily logarithmic returns calculated over a period of time, respectively for one year, and we have expressed the value in percentage. The standard deviation is calculated using the following formula:

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})}$$

Where:

- s is the standard deviation,
- n is the number of units of choice
- x_i are the values of the variable x (which in our case is the logarithmic daily / monthly return of a unit (Bitcoin, Euro, Gold) from January 1 to December 31 of the respective year, compared to one USD unit)
- $\bar{x}$ is the arithmetic mean of the variable for the given year

The variables taken in the study are the daily price of a unit of Bitcoin, Euro and Gold compared to a unit of USD for the period 2015 - 2018. This time period is justified as the period when Bitcoin became more popular, having a larger number of users. To test the hypothesis we make a comparison between the stability of Bitcoin with the stability of the euro currency as well as gold. Gold has been selected, as it is considered an asset that represents the ideal money for all those who do not like fiat coins. Fiat currencies is also included in the comparison as a real competitor of virtual currencies. The Euro currency has been selected as an important international currency. The base currency for comparison is the US dollar, which is considered a global base currency. The statistical program SPSS Statistic Subscription was used to analyze the data.

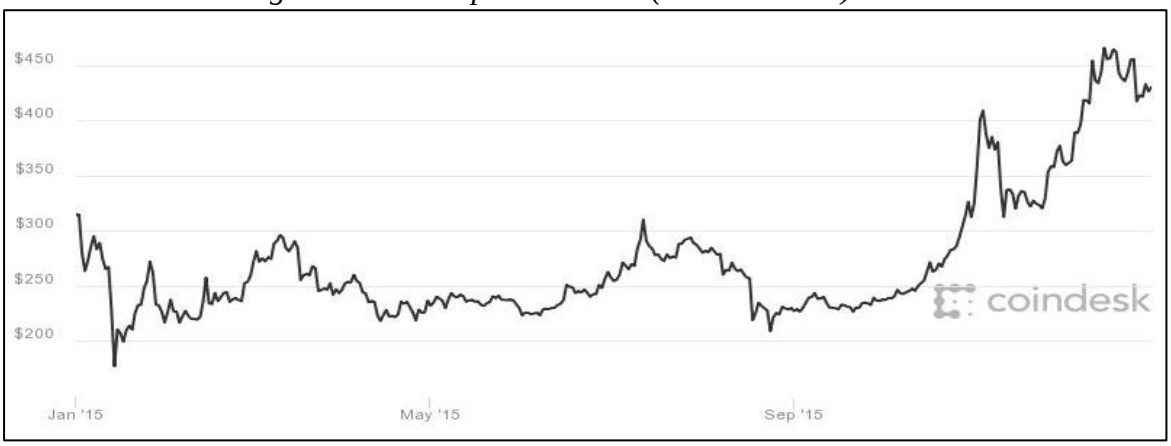
4. DATA ANALYSIS

In this section we will illustrate a descriptive analysis of the price of Bitcoin, for a period of time 2015-2018, where for each year based on the daily price for each day of the year, through the SPSS program we make an analysis, which includes the minimum, maximum , average and standard price deviation as well as daily and monthly returns during the year under review.

Table 1: Year 2015

Descriptive Analysis					
	N	Minimum	Maximum	Mean	Std. Deviation
Daily Return	365	-24.71%	17.16%	0.0812%	3.60852%
Daily Pricex_i	365	177.28	465.50	272.1783	59.35540
Monthly Return	12	-31.58%	27.44%	1.8380%	16.70295%
Average Monthly Price	12	233.497	424.523	271.779	57.995149

Figure 1: Bitcoin price in 2015 (USD / Bitcoin)

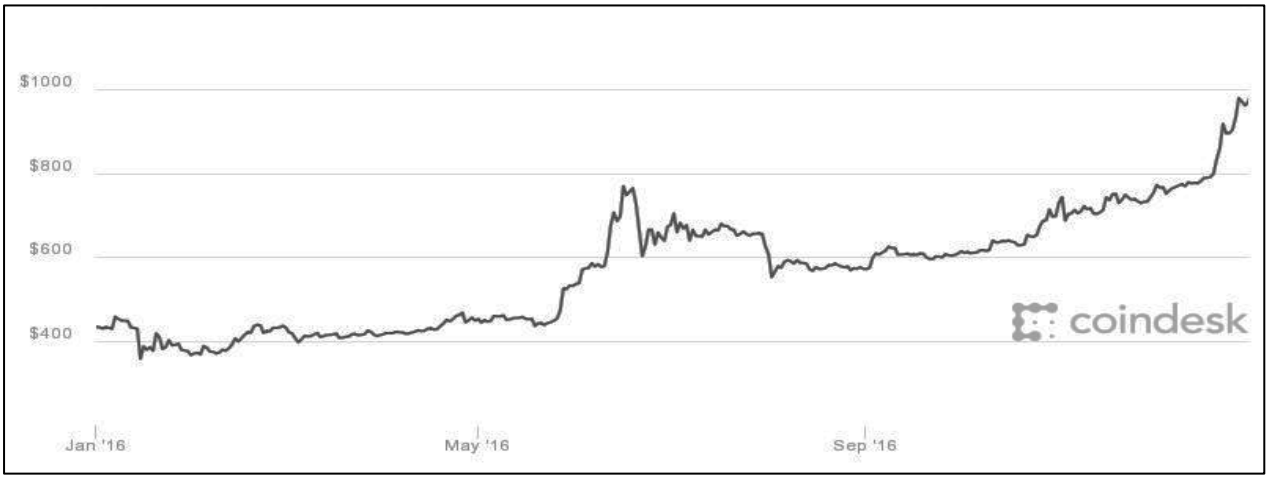


Source: Coindesk 2018

Table 2: Viti 2016

Analizë descriptive					
	N	Minimum	Maximum	Mean	Std. Deviation
Daily return	366	-18.05%	10.41%	0.2217%	2.53968%
Daily pricex_i	366	358.77	978.01	567.4683	138.82064
Monthly return	12	-13.36%	33.20%	5.5345%	11.17084%
Average monthly price	12	403.485	824.775	566.955	140.231

Figure 2: Price of Bitcoin 2016 (USD / Bitcoin)

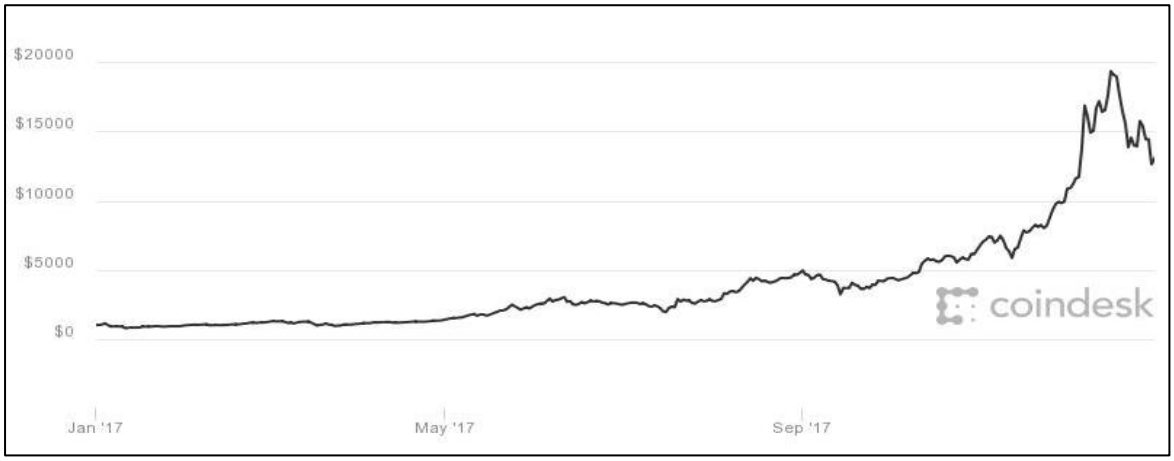


Source: Coindesk 2018

Table 3: Year 2017

Descriptive Analysis	N	Minimum	Maximum	Mean	Std. Deviation
Daily Return	365	-18.30%	22.64%	0.7291%	4.84596%
Daily Pricex_i	365	775.98	19343.04	3981.8808	3990.41383
Monthly Return	12	-4.79%	66.20%	24.2086%	21.14198%
Average Monthly Price	12	911.25	15065.27	3965.943	4057.003

Figure 3: Price of Bitcoin 2017 (USD / Bitcoin)

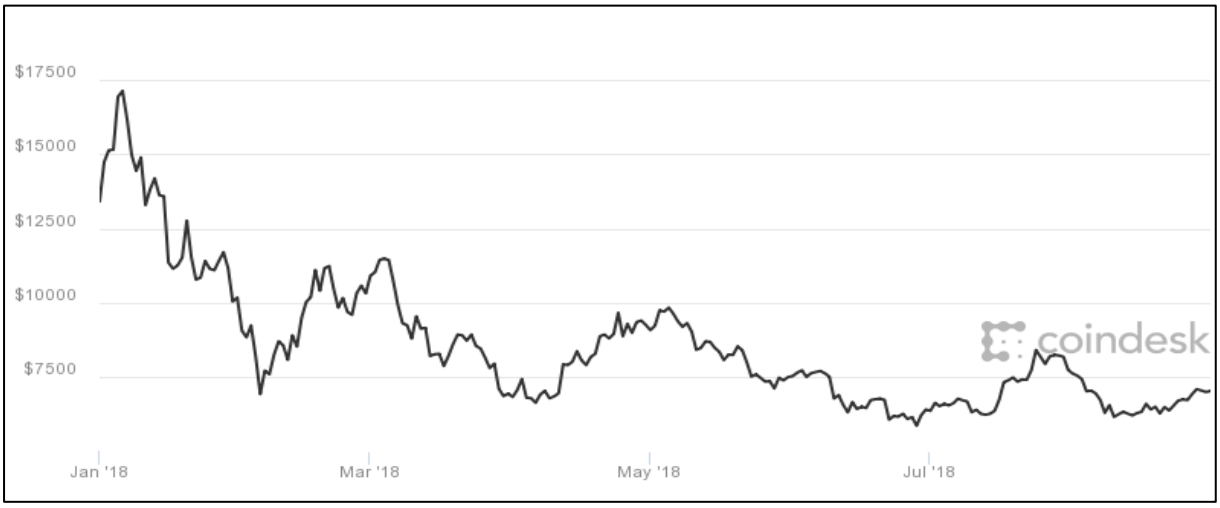


Source: Coindesk 2018

Table 4: Year 2018

Descriptive Analysis	N	Minimum	Maximum	Mean	Std. Deviation
Daily Return	243	-18.00%	13.17%	-0.2803%	4.68157%
Daily Pricex_i	243	5848.26	17135.84	8560.7810	2235.99843
Monthly Return	8	-31.98%	5.08%	-10.1700%	12.79429%
Average Monthly Price	8	6677.822	15065.278	9265.073	2891.761

Figure 4: Price of Bitcoin 2018 (USD / Bitcoin)



Source: Coindesk 2018

From the presented results we see that Bitcoin is incredibly volatile not only from year to year, but also from day to day. In the period under review, in the time frame of 4 years, we have an incredibly high price variation, from 177.28 Bitcoin / $ in 2015, reaches a maximum of 19343.04 $ / Bitcoin in December 2017 and then falls again at an incredibly fast pace, proving once again the extreme rising and falling values of this cryptocurrency. The highest volatility has resulted in recent years, namely in 2017 and 2018, where the standard deviation reaches very significant values up to $ 3990 / Bitcoin or 4.84596%, which means that the price per day can fluctuate by $ 3990 from the average price over the year.

4.1. Results of comparing the volatility of Bitcoin with the currencies Euro and Gold

From the calculations we arrive at these results.

Table 5: Results

Standard Deviation %								
	Year 2015		**Year 2016**		**Year 2017**		**Year 2018**	
	Daily Return	Monthly Return	Daily Return	Monthly Return	Daily Return	Monthly Return	Daily Return	Monthly Return
Euro	0.75%	2.81%	0.51%	1.50%	0.45%	1.59%	0.46%	1.97%
Gold	0.88%	3.11%	1.01%	4.32%	0.68%	2.41%	0.54%	2.76%
Bitcoin	3.60%	16.70%	2.54%	11.17%	4.85%	21.14%	4.68%	12.79%

The price volatility of the Euro appears to be very low, with a standard deviation of 0.4-0.75% maximum from day to day, which in absolute value translates into a change of 0.02-0.05 $ / € and the maximum volatility is presented in the year 2015 in a change from the average value of 2.81% from month to month. Approximate values for peace and gold, where the standard deviation for daily returns in the years under review has reached up to 0.88%. From the results we can clearly see that Bitcoin is an incredibly volatile cryptocurrency compared to the consolidated currencies taken in comparison. The daily volatility of Bitcoin is higher than the monthly volatility of the Euro and Gold reaching approximately a standard deviation of 5% for daily returns and 21% for monthly returns. With such volatility we can say that it fails to perform the function as a store of value. Too high a change in price makes users unsure whether they will get richer and richer or poorer using Bitcoin as money. As for the future, it is still uncertain.

5. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this paper was to answer the main question posed: whether Bitcoin, this decentralized digital currency, can become a successful alternative to other currencies that are currently consolidated in the market as well as regulated through legislation. Comparing the characteristics of Bitcoin with the definitions used for money we conclude that although Bitcoin is widely reported as money, it does not meet the criteria of the definitions used to be money. Bitcoin cannot be used as an exchange tool because it has not yet reached a level of widespread acceptance and use for many reasons. Bitcoin can not be considered as a measure of value, because it still does not seem to have managed to have goods and services which are measured with Bitcoin, as most items are priced only against the dollar or other traditional currencies.

From the results of the analysis to test the function of Bitcoin as a store of value, it has been proven that using Bitcoin is more risky than the cases when we use other types of assets due to high volatility from day to day. But despite the volatility, Bitcoin already behaves similarly to fiat currencies in China, the US, Japan and some European Union countries. If it follows a downward trend in volatility, it can reach and become a functional alternative to fiat currencies, at least in some countries. It remains the choice of everyone based on the risk they are willing to take, to use Bitcoin as an alternative to money or not as long as this currency is not banned in their state. What we can say is that, nowadays, since cryptocurrencies are still not perceived as fiat currencies trust around Bitcoin has the biggest impact on its price and spread. It is important to note that the more people believe in the success of Bitcoin and the more money they are willing to invest in it, the more the value of this cryptocurrency grows.

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HYDROGEN UTILISATION AS A KEY FACTOR FOR ACHIEVING ENERGY SYSTEM DECARBONISATION

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ABSTRACT

In addition to renewable energy sources, large-scale production and utilisation of hydrogen are key prerequisites for the "green" energy system that should be implemented in the EU by 2050. The paper describes the role of hydrogen used as an energy carrier and presents different types of hydrogen with respect to its origin. A review of the EU's regulation relevant for decarbonisation and hydrogen utilisation is given in the paper. The Croatian Hydrogen Strategy until 2050 adopted by the Croatian Parliament on 25 March 2022 is described. Furthermore, the European Hydrogen Backbone, which is of crucial importance for future hydrogen supply in Europe, is elaborated. A complete realisation of the EU's plan of an intensive hydrogen utilisation, with the achieved cost-effectiveness of the renewable hydrogen production, implies that the hydrogen network could become the most relevant gas network in the future.

Keywords: *Croatian Hydrogen Strategy, decarbonisation, hydrogen, hydrogen infrastructure, natural gas, renewable energy sources*

1. INTRODUCTION

The gradual heating of Earth's surface, oceans and atmosphere (global warming) is a consequence of greenhouse gases (primarily carbon dioxide) predominantly emitted by human activities. The European Union (EU) strives to act as a leader in achieving the goals of reducing greenhouse gas emissions set by the Paris Agreement – a legally binding international treaty on climate change (2015). The Paris Agreement was adopted by 196 parties in Paris on 12 December 2015. It includes commitments from all countries to reduce their emissions and work together with the aim of limiting global warming well below 2 °C, preferably to 1.5 °C. The Paris Agreement was reached because the stance that it is necessary to take decisive actions against evident global warming and rapid climate change had finally prevailed (Banovac, 2018). Since the start of the Industrial Revolution, the emissions of carbon dioxide have risen due to energy transformations, among other causes. Therefore, in the context of global energy policy the goal of creating "green" energy system as a crucial component of the decarbonised economy of the future is of utmost importance. According to Banovac et al. (2017), the future global energy strategy should utilise resources in a reasonable manner in order to ensure the long-term goals, which are of the interest for the whole society, rather than short-term economic goals. Renewable energy sources and wide-scale hydrogen production & utilisation are crucial for achieving the EU's goal of becoming climate-neutral by 2050. Targeting the 2050 climate-neutrality, on 8 July 2020 the European Commission adopted a document titled "A hydrogen strategy for a climate-neutral Europe" (hereafter: The hydrogen strategy) presenting its vision of hydrogen as a factor in the implementation of successful decarbonisation of various sectors by 2050. Although The hydrogen strategy relates to a longer period, relatively fast actions are envisioned: installing at least 6 GW of renewable hydrogen electrolysers in the EU by 2024 and 40 GW by 2030.

Furthermore, on 19 May 2021 the European Parliament adopted the Resolution on a European strategy for energy system integration, which focuses on the concept of an efficient integrated system that connects energy sources and infrastructure necessary to support decarbonisation. Both aforementioned documents are aimed at decarbonising the European energy system. Used as a fuel, hydrogen burns completely clean, i.e. without harmful emissions. It is possible to store it in large quantities for a longer period. Therefore, with the stored amounts of hydrogen (energy) it is possible to handle seasonal fluctuations in demand. Hydrogen can be transported by pipeline, lorry or ship. Furthermore, a diversified hydrogen production is possible in those locations where it is the most efficient. The share of hydrogen in the EU's energy mix is currently around 2% (95% of which is produced using fossil fuels) (A European Strategy for Hydrogen, 2021). However, less than 1% of the produced hydrogen is used as an energy carrier. This will change completely because renewable energy could account for up to 100% of the EU's energy mix in 2050 (of which hydrogen could account for a share of up to 20% overall). In fact, wide-scale hydrogen production and utilisation is the *sine qua non* for achieving a deep decarbonisation of the EU's energy sector.

2. HYDROGEN CHARACTERISTICS

The use of renewable energy sources, hydrogen and biogas (as a neutral carbon footprint fuel) is crucial for the decarbonisation of the energy system. It is estimated that, with enough investment, hydrogen could abate up to 37% of energy-related greenhouse gas emissions (Global Gas Report, 2020). Hydrogen is obtained in various ways and can be used:

- in its pure form (i.e., as pure hydrogen) – as it is the case with its recent global consumption, which takes place mainly in the oil refineries and in the synthesis of ammonia in the production of fertilizers,
- blended with natural gas (and biomethane) – which is an advantage since existing pipelines, gas storage facilities and gas appliances can be used (note: some TSOs across the EU Member States have already been experimenting with blending small amounts of green hydrogen),
- via gaseous or liquid derivatives (synthetic methane, synthetic diesel, methanol, ammonia).

Hydrogen is 3.8x less dense than natural gas and travels faster through a pipeline than natural gas (Stegher, 2021). It can be used as a raw material with numerous industrial applications, as a fuel in industrial and chemical processes, maritime, air and heavy road transport as well as for thermal applications and stored energy aimed to use for balancing the energy system. However, the widespread use of hydrogen in the context of decarbonisation of the energy system will not necessarily be easy. This means that in practice various restrictions (of a technical nature or those resulting from regulations) may arise. It is possible to repurpose existing gas pipelines for long-distance transport of renewable hydrogen, build a separate system for renewable hydrogen or use hydrogen blended with natural gas (with the possibility of different ratios in the mixture of hydrogen and natural gas). Nevertheless, a functional hydrogen market and official categorisation of hydrogen types have yet to be established. Therefore, a future EU's hydrogen regulation should also prescribe harmonised terminology to be used in all Member States, with definitions of all types of hydrogen and a harmonised use of classification for low-carbon hydrogen and renewable hydrogen. Due to the lack of an official categorisation, hydrogen is typically categorised according to its origin into grey hydrogen, blue hydrogen and green hydrogen (Figure 1). Despite the different names and different production methods, the chemical composition (H_2) and properties of the derived hydrogen remain the same. It should be accentuated that the colour coding used in the classification does not reflect the actual colour (or other properties) of the product, only the production process used to obtain the hydrogen.

Notwithstanding the potential confusions that may arise from using a colour-coded classification of hydrogen, it is still widely used in the hydrogen industry and by mass media and will, therefore, be further elaborated.

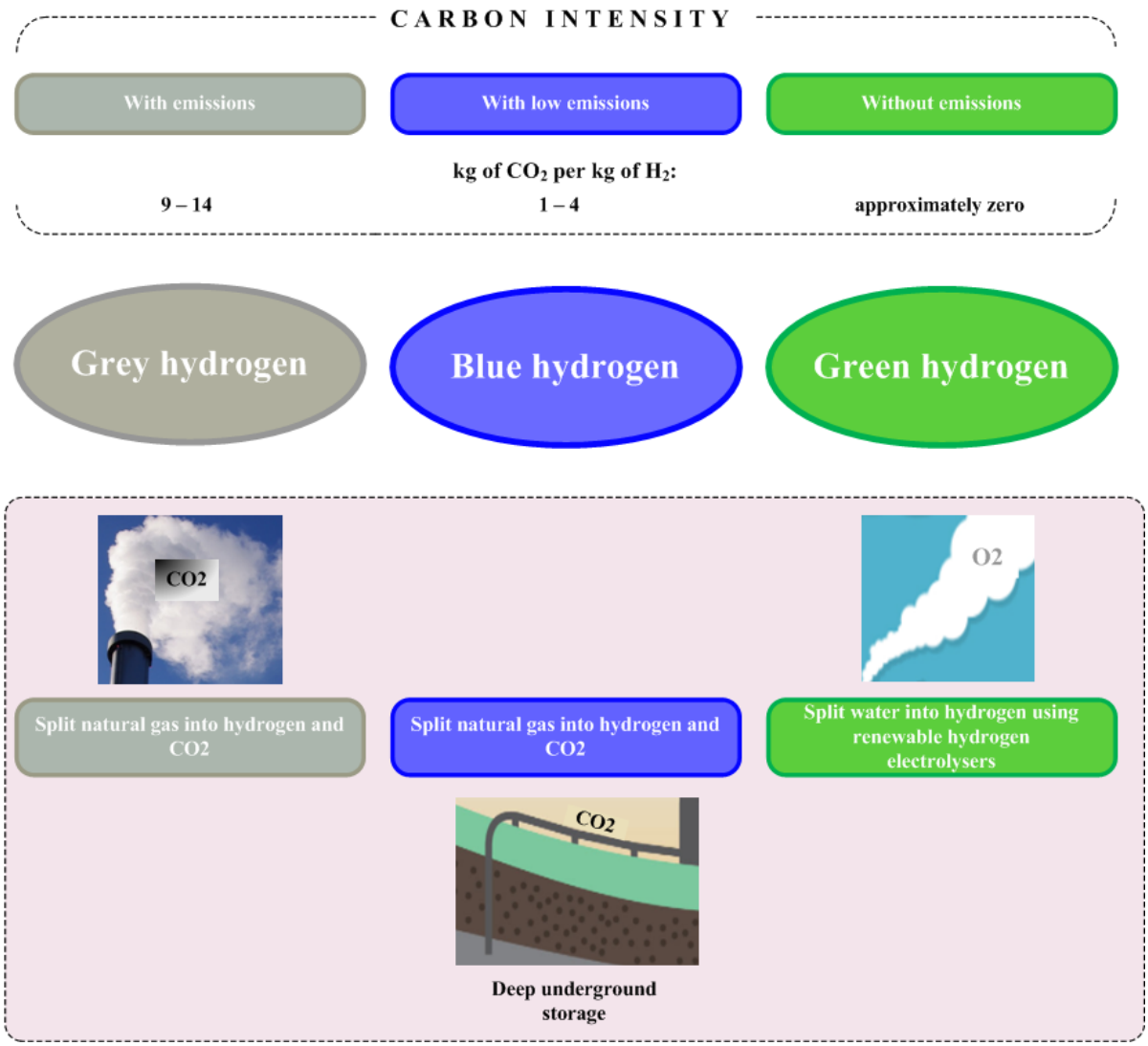

Figure 1: Types of hydrogen marked based on the different methods of its production

Grey hydrogen is produced in one of the high-temperature technological processes using fossil fuels, but the carbon dioxide emissions produced in the process are neither captured nor stored. Blue hydrogen (common alternative name: low-carbon hydrogen) is derived from natural gas through the process of steam methane reforming (SMR). The carbon dioxide emissions produced in the process are captured and stored underground using the Carbon capture, utilisation and storage technology (CCUS). Although blue hydrogen has been promoted as an acceptable low-emission energy option, it was called into question by a recent study in which the lifecycle greenhouse gas emissions of blue hydrogen accounting for emissions of both carbon dioxide and unburned fugitive methane is examined (Howarth and Jacobson, 2021): "Perhaps surprisingly, the greenhouse gas footprint of blue hydrogen is more than 20% greater than burning natural gas or coal for heat and some 60% greater than burning diesel oil for heat, again with our default assumptions". This claim certainly implies the need for further research on blue hydrogen. Green hydrogen is obtained by electrolysis of water using electricity produced from renewable sources.

This type of hydrogen is also called renewable hydrogen, which is carbon neutral because the greenhouse gas emissions in the process are approximately equal to zero. Green hydrogen has the biggest decarbonisation potential – it matches the EU's climate neutrality goal completely. The colour coding used in the classification is more nuanced than mentioned previously (for instance, brown hydrogen produced from coal is also used).

3. THE EU'S LEGISLATION RELATED TO DECARBONISATION AND HYDROGEN UTILISATION

After December 2019 when the European Green Deal was presented, the European Commission launched new significant initiatives, despite the COVID-19 crisis that has limited many activities worldwide. To support a clear hydrogen production, on 8 July 2020 the European Commission presented the aforementioned hydrogen strategy, in parallel with an EU strategy for energy system integration. The EU strategy for energy system integration focuses on the model of an integrated energy system that connects energy sources and infrastructure to support decarbonisation, while ensuring clean energy for citizens, strengthening the competitiveness of the European economy and creating new jobs. Furthermore, the European Parliament adopted on 19 May 2021 the Resolution on a European Strategy for Hydrogen. Aiming for clean hydrogen production, this Resolution emphasizes that the transition to a climate-neutral energy system should be planned carefully, taking into consideration that existing starting points and infrastructure differ across the Member States that should be flexible when designing support measures including State aid measures. The aforementioned 'clean hydrogen production' refers to hydrogen produced by electrolysis of water using "green" electricity (i.e. renewable hydrogen) or to hydrogen produced by biogas reform or biochemical conversion of biomass provided the process is carried out in accordance with the requirements regarding sustainability. The EU strives to use clean alternative fuels opting for the gradual reduction of the use of fossil fuels to zero and ensuring industry competitiveness. Renewable hydrogen has untapped potential to be such an alternative. The renewable hydrogen sector is estimated to have the potential to create 10,300 jobs for every billion euros invested (with additional jobs in the renewables sector). Nevertheless, even within the concept of decarbonisation, the use of natural gas with the application of CCUS technology, biogas and low-carbon hydrogen could be acceptable in the transition period. The Resolution on a European Strategy for Hydrogen emphasizes that there is a discrepancy between the different definitions of pure hydrogen used by different actors and that the distinction between renewable hydrogen and low-carbon hydrogen must be clear. In addition, the use of two names for the same category of hydrogen ("renewable" and "clean") should be avoided. In this regard, it is emphasized that the term 'renewable hydrogen' is a science-based option for that category of hydrogen. The European Parliament believes that the classification of different forms of hydrogen should be determined according to a science-based assessment (stepping away from the usual colour-coded approach) and emphasizes the urgent need for standards and certification at the level of the EU as well as at the global level. In the context of considering the characteristics of the future hydrogen market, the question of the competitiveness of renewable hydrogen also arises. The Resolution on a European Strategy for Hydrogen stresses that renewable hydrogen, which is crucial for energy transition, could become competitive before 2030, "provided that the necessary investments and an adequate regulatory framework are in place and renewable energy is competitive". The European Parliament urges the Commission to help those involved to pool their know-how and investments. Furthermore, the importance of hydrogen valleys in different regions across the EU and their important role in initiating the production and application of renewable hydrogen was emphasized. Figure 2 shows the EU's regulation relevant to the decarbonisation and hydrogen utilisation.

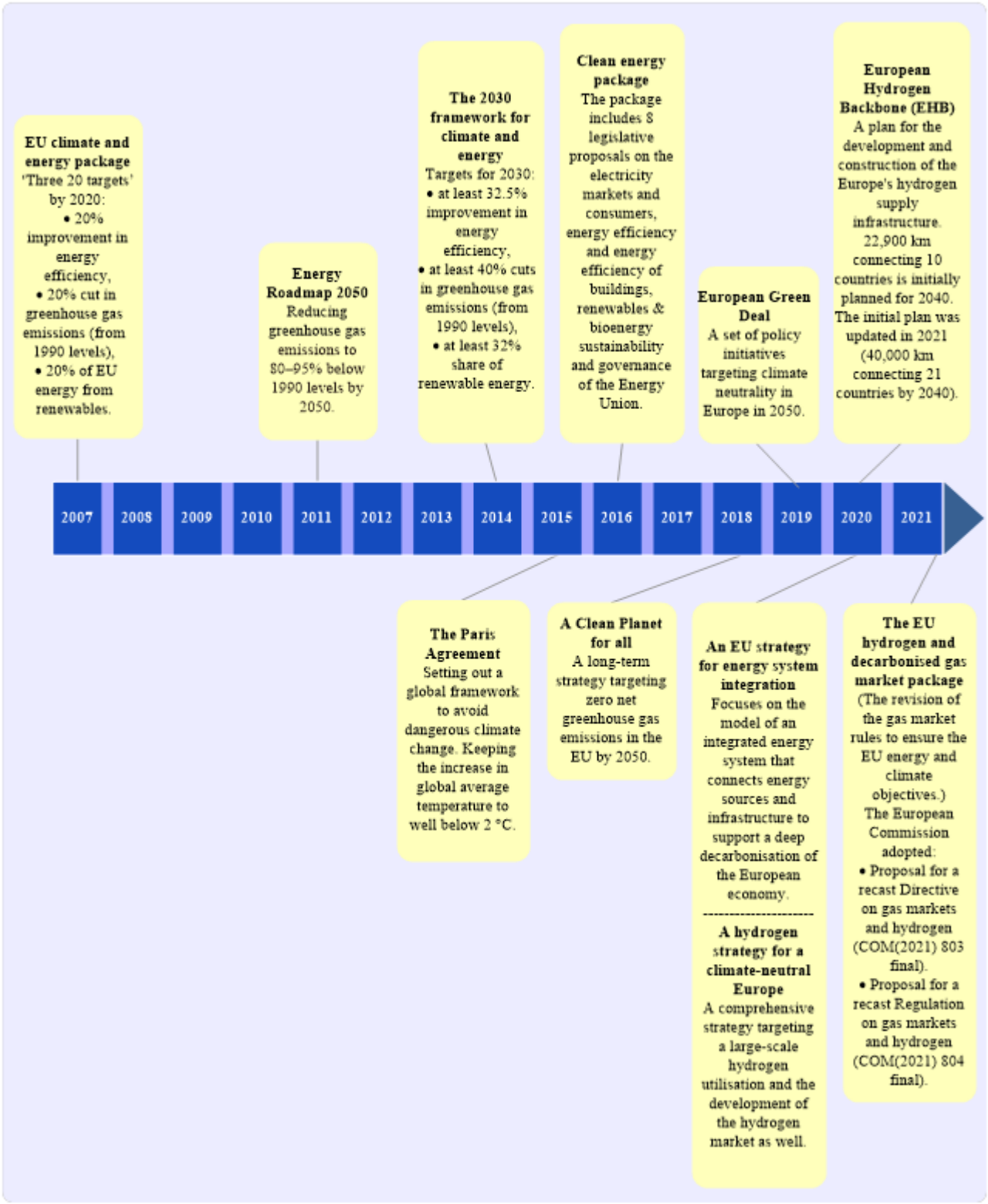

Figure 2: The EU's regulation relevant to the decarbonisation and hydrogen utilisation

The EU aims for a significant use of renewable hydrogen, which also has a broader international dimension. As a matter of fact, it is possible to diversify the supply and establish stable and secure supply chains of hydrogen by the joint action of the EU and neighbouring countries/regions. For instance, North Africa, which is close to Europe, could export cost-competitive hydrogen to Europe due to its significant potential for green electricity generation.

There is a growing interest in using renewable hydrogen. Therefore, various development programs have been established in many countries. For instance, the US and China as countries with leading economies invest significantly into research of future hydrogen use. In the EU, several Member States (France, the Netherlands, Germany, Portugal and Spain) already have national hydrogen strategies, and the other member states could have them soon (Asset Study, 2020). A cost-effective energy transition implies consideration of possibilities for repurposing the existing gas infrastructure, with the construction of new hydrogen infrastructure. After 2030, it is possible that there will be a decline in natural gas demand at the level of the EU. This factor could influence repurposing the existing gas infrastructure into the infrastructure necessary for significant cross-border hydrogen transport. The EU will treat the hydrogen infrastructure as a part of its infrastructure planning activities. These activities can also be carried out in the frame of monitoring the implementation of the Ten-Year Network Development Plans (TYNDPs) and the revision of the trans-European energy network. Finally, the idea of creating a liquid hydrogen market, in which hydrogen would be traded as a commodity, is imposed, with the possibility of easy entry of new entrants into such a market. To achieve this, the hydrogen infrastructures, managed by the neutral network operators, should be available to all without exception. In addition, it will be necessary to define a market model, and to adopt the rules for connecting electrolysers to the network as well as the rules for third party access (TPA). The gradual development of the hydrogen ecosystem in Europe is envisioned, taking into account the existing differences in different sectors and regions. A hydrogen strategy for a climate-neutral Europe describes three phases related to the development of the hydrogen ecosystem in Europe (Table 1).

Phases	Period	Main related facts
First phase	from 2020 up to 2024	At least 6 GW of renewable hydrogen electrolysers and the production of up to 1 million tonnes of renewable hydrogen are planned in the EU with the purpose of decarbonisation of the existing hydrogen production. In the first phase, manufacturing of electrolysers should be increased, including large ones (up to 100 MW).
Second phase	from 2025 to 2030	Hydrogen should become a factor in an integrated energy system. By 2030, the EU should install at least 40 GW of renewable hydrogen electrolysers and achieve the production of up to 10 million tonnes of renewable hydrogen. It is assumed that during the second phase, renewable hydrogen will gradually become cost-competitive with other forms of hydrogen production. Renewable hydrogen will play a role in balancing the electricity system based on renewable sources (converting electricity into hydrogen where electricity from renewable sources is cheap and plentiful, and providing flexibility to the system). Hydrogen will be used for both daily and seasonal energy storage and will provide reserves and temporary reserves, all with the impact on increasing security of supply.
Third phase	from 2030 onwards and towards 2050	From 2030 onwards and towards 2050, technologies for renewable hydrogen production should reach maturity and start being applied widely in sectors where alternatives to decarbonisation are not possible or are less cost-effective. A large increase in the production of renewable electricity is planned in the long-lasting third phase. Approximately 25% of that energy could be used to produce renewable hydrogen by 2050.

Table 1: Development of the hydrogen ecosystem in Europe

To achieve a large-scale hydrogen utilisation and ensure that the entire hydrogen supply chain meets the needs of the future European economy, more research will need to be carried out, and many innovations will need to be applied. A comprehensive model of hydrogen utilisation does not exist. Methodologies for assessing the impact of hydrogen technologies and their value chains on the environment will need to be developed, and the corresponding lifecycle greenhouse gas emissions will need to be analysed. A hydrogen strategy for a climate-neutral Europe emphasizes that hydrogen is crucial for achieving the EU's carbon neutrality by 2050. However, hydrogen has only a small share in the EU's energy mix nowadays. That is why it should be used to a much greater extent in the near future. Since hydrogen is still mostly produced from fossil fuels, decarbonisation of the existing hydrogen production should be carried out.

4. CROATIAN HYDROGEN STRATEGY

The Energy Development Strategy of the Republic of Croatia until 2030 with a view to 2050 emphasizes that hydrogen should be considered as an important fuel of the future and that new hydrogen production technologies will play an important role in achieving energy transition.

4.1. The Decision on initiating the procedure for drafting the Croatian Hydrogen Strategy

At the 45th session, held on 25 February 2021, the Government of the Republic of Croatia adopted the Decision on initiating the procedure for drafting the Croatian Hydrogen Strategy from 2021 to 2050 (hereafter: Decision). The Government of the Republic of Croatia adopted the Decision based on Article 38 (3) of the Act on the System of Strategic Planning and Development Management of the Republic of Croatia (Official Gazette, 123/17) and Article 6 (4) of the Regulation on guidelines for drafting strategic planning acts of national importance and importance for local and regional self-government units (Official Gazette, 89/18). The Decision instructs the Ministry of Economy and Sustainable Development to draft the Croatian Hydrogen Strategy. In the Decision, the Government of the Republic of Croatia stipulates that the Croatian Hydrogen Strategy will prescribe a national vision of the development, research, production, infrastructure and use of hydrogen and the hydrogen economy, taking into account the goal of climate neutrality from the European Green Deal as well as the national goals related to the development of infrastructure for alternative fuels. Furthermore, the Decision states that the goals of the Croatian Hydrogen Strategy are hydrogen production decarbonisation and the use of hydrogen as a substitute for fossil fuels. According to the Decision, the Minister of Economy and Sustainable Development should appoint an expert working group to draft the Croatian Hydrogen Strategy, and the Ministry of Economy and Sustainable Development should prepare a communication strategy and communication action plan for the strategic planning act with the aim of an appropriate informing, communication, and visibility of the policy planning process.

4.2. The Croatian Hydrogen Strategy until 2050

Obeying the aforementioned governmental decision, the Ministry of Economy and Sustainable Development prepared the Draft Proposal of the Croatian Hydrogen Strategy, which was in public discussion in February 2022. The Croatian Gas Association (further: CGA) gave suggestions for a draft improvement on 23 February 2022 (Journal PLIN, vol. 22. No. 1, 2022).

The CGA advocates for a moderate and sustainable energy transition with a significant share of hydrogen in the energy mix, assuming the Croatian Hydrogen Strategy should:

- be economically relevant and financially viable,

- outline a stimulating framework for the development of hydrogen economy in the coming years as well as to intensify the activities of potential stakeholders such as energy companies, investors and project developers, including initiatives and innovations in the segments of research, development and education.

Finally, on 25 March 2022 the Croatian Parliament adopted the Croatian Hydrogen Strategy until 2050 (Official Gazette, 40/22), thereby classifying the Republic of Croatia in the group of EU member states that have national hydrogen strategies. The strategy contains the following main segments that determine the guidelines for the development of a hydrogen-based economy in the Republic of Croatia: vision of the development of the hydrogen-based economy; development potential and opportunities for hydrogen utilisation; strategic goals for the development of hydrogen utilisation in the economy; implementation; implementation monitoring, reporting and evaluation; financing; concluding remarks. Taking into consideration the contents of the Croatian Hydrogen Strategy until 2050, it should be pointed out that this strategy document is primarily oriented towards green hydrogen (i.e. renewable hydrogen). Despite the fact that this document adequately describes the current situation and trends in a global hydrogen economy as well as in the hydrogen production – transport – storage – usage chain, the following important remarks should be pointed out:

- In addition to renewables and hydrogen, natural gas will play an important role in the energy transition process. Hydrogen and natural gas (with the implementation of the CCS technology intended for CO_2 removal) should not be viewed as competitive, but as complementary energy sources in the energy transition process. Hydrogen and natural gas should be observed integrally because the first step will be hydrogen blended with natural gas and then transporting this mixture through pipelines, with a future conversion of the existing gas pipelines to transport hydrogen, and transforming gas companies into energy companies, which will imply high costs. Therefore, it is realistic to expect that natural gas and hydrogen will go “hand in hand" in the following years. Croatia belongs to a small group of the EU’s member states that produce natural gas, which is a clear Croatian comparative advantage. This fact should have been emphasized in the introductory part of the Croatian Hydrogen Strategy.
- The safety of hydrogen use is also not emphasized enough in the document. The flammability range of hydrogen (the range of concentrations in the air between the lower and the upper flammability limits) is wider compared to other common fuels (methane, propane, petrol). Since the issue of security is extremely important in all segments of the hydrogen chain, it will be necessary to develop security regulations/standards at the EU level, in which Croatia should actively participate and introduce them into the energy system. Therefore, the document should have covered a chapter on planned activities related to the safety issues of hydrogen use and the process of adopting the necessary regulations and standards.

5. EUROPEAN HYDROGEN BACKBONE

Taking into consideration the importance of gas infrastructure for the European energy transition, a group of eleven gas infrastructure companies (Enagás, Energinet, Fluxys Belgium, Gasunie, GRTgaz, NET4GAS, OGE, ONTRAS, Snam, Swedegas and Teréga) published in July 2020 a document titled ‘European Hydrogen Backbone’ (Wang et al., 2020). In this document, the group proposed a plan for the development and construction of the hydrogen transport infrastructure across Europe (hereafter: EHB) (Pavlović and Banovac, 2020). The plan envisions connecting ten countries (Germany, France, Italy, Spain, the Netherlands, Belgium, Czech Republic, Denmark, Sweden, Switzerland) by the hydrogen network. The purpose of the EHB is to transport hydrogen produced using “green” electricity (from wind and solar power

plants) and hydrogen imported from territories outside the EU. Realisation of a full hydrogen potential will depend on the development of well-connected hydrogen markets in the future, which is conditioned by a developed transport infrastructure (adequate capacities of newly built hydrogen networks as well as significant capacities of existing gas networks repurposed for hydrogen transport). In addition, the adoption of a comprehensive regulation for hydrogen is a prerequisite for significant use of hydrogen and the establishment of an efficient hydrogen market. According to the initial EHB plan, a mature EHB could be created by 2040, with repurposed gas pipelines of significant capacity (commonly used for gas transport over longer distances) as a backbone of the system. Furthermore, the initial document states that a dedicated EHB (2040 layout) requires an estimated total investment of €27-64 billion based on using 75% of repurposed natural gas pipelines connected by 25% new pipeline stretches. Considering that retrofitted infrastructure represents only around 50% of the total investment, there is no doubt about the value of using existing pipelines. The entire EHB project would be implemented gradually. As early as 2030, the pipeline network could have a total length of 6,800 km, connecting the hydrogen valleys (H2 valleys, abbreviated H2Vs) and would consist mainly of the repurposed gas pipelines. It is planned that consumers from central Europe be connected around 2035 to the regions with abundant potential for producing renewable hydrogen (including the solar and wind power plants in the South of France as well as the offshore wind farms in Denmark). Finally, a fully functional EHB with a total length of 22,900 km is planned for 2040, with the possibility of further extending the system depending on developments in the hydrogen market. It should be emphasized that the EHB concept is conceived as an open initiative. Therefore, the initial group invited other gas infrastructure companies from Europe and neighbouring regions to join the initiative. New members joined the initiative causing the updated EHB that should connect 21 countries by 2040. Since the extended EHB plan of April 2021 (Wang et al., 2021) significantly increased the planned total length of hydrogen pipeline infrastructure, the total investment costs required to build the EHB are higher. Creating the EHB has an estimated investment cost of €43 to €81 billion (Gas for Climate / Priorities for the EU hydrogen legislation, 2021). The expanded plan states that the EHB will contain 69% of the repurposed existing gas infrastructure and 31% of the newly built, with a lower investment per kilometer of pipeline planned than was the case in the initial EHB plan from July 2020. The expanded plan envisions that most of the EHB's infrastructure will consist of smaller pipelines (24 or 36 inches), while the initial plan included only a cost estimate for 48-inch pipelines. The conversion of smaller pipelines is cheaper, which reduces total investment costs. Furthermore, the construction of the EHB is accelerated by the expanded plan in which it is planned that the EHB, connecting the emerging hydrogen valleys, will have a total length of 11,600 km by 2030, which is significantly more than in the initial plan (6,800 km).

6. NECESSARY INVESTMENTS

Among the Group of Twenty (G20) and the European Union, 11 countries have policies that support investment in hydrogen technologies in place and 9 countries have national roadmaps for hydrogen energy (IEA Report: The Future of Hydrogen, 2019). Large investments are needed to ensure sectoral adaptation to the intensive use of hydrogen. Cumulative investments in hydrogen would amount to €180-470 billion in the EU by 2050 (A hydrogen strategy for a climate-neutral Europe, 2020). Up to 2030, investments in electrolysers could range between €24 and €42 billion. Investments of €65 billion will be needed for hydrogen transport, distribution and storage, and hydrogen refuelling stations. The EU's programmes and financing instruments, such as the Recovery and Resilience Facility, Horizon Europe, the Connecting Europe Facility, InvestEU, including the new strategic EU investment window, the European Regional Development Fund, the Cohesion Fund, the Just Transition Fund and the ETS Innovation Fund can foster the cohesive development of a hydrogen economy across the EU

signifiable. Public-private partnerships (local and regional) also have an important role in that sense. A more detailed explanation of the EU's programmes and financing instruments is interesting but is outside the scope of this paper. Realistically, with the EU's declared support for investment in the "hydrogen economy", the dynamics and realized level of investment will also depend on the real costs of hydrogen production. The cost of renewable and low-carbon hydrogen is 2.5 to 5.5 €/kg, and the cost of producing hydrogen from fossil fuels is about 1.5 €/kg, "whereas the current electricity mix in most Member States would produce electricity-based hydrogen with higher emissions than fossil-based hydrogen" (A European Strategy for Hydrogen, 2021). Furthermore, the BNP Paribas study (2020) shows that renewable hydrogen could become competitive with natural gas by 2040, with an assumed gas price of 15 €/MWh and at the EUA price of 100 €/t (European Union Allowance – EUA means the tradable unit under the European Union Emissions Trading Scheme – EU ETS). The study considered scenarios for gas prices of 10 €/MWh and 15 €/MWh because it was assumed that the decarbonisation of the EU's energy system would cause a decrease in gas demand, so a price of 20 €/MWh seems unlikely.

7. CONCLUSION

Following the agenda of the Paris Agreement, the EU aims to be 'climate-neutral' by 2050. By adopting several strategic documents in the last few years, the EU gave an impetus to achieving a climate-neutrality across Europe as well. Within such a concept, in addition to renewable energy sources, innovations and expecting development and use of new technologies, hydrogen represents the energy of the future that can make a significant contribution to decarbonisation. As a matter of fact, a deep decarbonisation of the energy system is not possible without a large-scale hydrogen usage. With the implementation of hydrogen investment plans related to the construction of hydrogen pipeline networks that will connect demand and supply in a cost-effective way, with taking into consideration the trade on the hydrogen market and hydrogen import, the creation of a comprehensive EU hydrogen regulation is a prerequisite for successful development of a future European hydrogen infrastructure and a liquid pan-European hydrogen market. Taking the aforementioned into account, it is possible that fossil fuels will not be a part of the EU's energy mix in the not-too-distant future. However, in a certain (transitional) period, natural gas will continue to be used in Europe as the fossil fuel with the lowest CO_2 emissions. This will likely be the case until 2050, with the assumption that natural gas could be of great importance in the context of security of supply by 2040. This will also be affected by the fact that hydrogen blended with natural gas can reduce emissions of gases that affect global warming and cause climate change. Hydrogen, biogas, and natural gas with the implementation of CCUS technology could play a significant role during the transformation process of the global energy system with the aim of its decarbonisation.

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EVIDENCE ON PRE-PANDEMIC OUTBOUND TOURISM DEMAND DETERMINANTS IN OECD COUNTRIES

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ABSTRACT

This paper examines how origin country socio-economic factors determine outbound tourism demand. The analysis is performed within a panel of 32 Organisation for Economic Co-operation and Development (OECD) countries throughout the 2010–2019 period. The dynamic panel data estimation technique is employed. Besides the income and price as mostly present pull factors of outbound tourism demand in empirical research, this paper analyses the effects of former outbound tourism demand and the socio-economic uncertainty on outbound tourism demand. The international departures and expenditures proved to be positively affected by the net income level, while the loss in international competitiveness has negative effects on the number of departures, while, consequently, expenditures are rising. A particular implication of the results would be that regardless the rise in the economic uncertainty in the origin country, its tourism departure levels show growth persistence, while the expenditure levels drop. This shows that the influence of previous tourism experience is higher than the influence of negative expectations in the economy. This could be of unambiguous importance for origin country's policy makers and domestic tourism development as well as for destinations that seek new tourism source markets.

Keywords: *tourism demand, expectations, net national income, price competiveness, propensity to travel*

1. INTRODUCTION

The effect of COVID-19 pandemic highlighted the weight of tourism in the global economy and proved its established important role in driving global, national and local socio-economic development through its contribution to employment, infrastructure development, and export revenues (Peeters et al., 2018). In 2020, almost 90 percent of worldwide countries exhibited sharp contraction in economic activity and the world economy shrank by about 3 percent (WB, 2022) in comparison to 2019, while the imposed restrictions on international mobility incited the drop in the number of international tourists by 73%, the worst year-drop ever on record for tourism (UNWTO, 2022a). As a result, according to WTTC (2022), the tourism sector underwent losses of almost USD 4.8 trillion, with its global contribution to GDP declining by 50.4% compared to 2019 to reach only USD 4.7 trillion in 2020, which is relative to a 3.3% GDP decline of the global economy. In 2020, 62 million jobs in tourism sector were lost, leaving just 272 million employed across the tourism sector globally. Although the short-term outlook for global tourism economy is mixed due to an uncertainty regarding the economic and other shockwaves in 2020s, over the long-term period the sector is predicted to continue its pre-pandemic growth path in all tourist regions (OECD, 2020). This is reasonable to expect since tourism is prone to be more vulnerable in comparison to other economic activities during the periods of external tremors, while after the crisis it is prone to recover faster. This was particularly evidenced during the global financial crisis in 2008 and 2009, when international tourism arrivals and receipts decreased relatively more in comparison to global GDP decrease in 2009 but rebounded quicker, already in 2010 (UNWTO, 2011). Consequently, tourism practitioners and experts hold a positive attitude towards the tourism industries' recovery after COVID-19 pandemic (Zhong, Sun, Law & Li, 2022).

This is supported by the growth trends in international tourism demand already in the 2021 and 2022. The data on international tourist arrivals show that global tourism has experienced a mild 4% upturn in 2021, with 15 million more international tourist arrivals than in 2020 but remained 72% below the levels of the pre-pandemic year 2019 (UNWTO, 2022a). Based on the latest available data provided by UNWTO (2022b), the global international tourist arrivals more than doubled (+130%) in January 2022 compared to 2021. This evidence on international tourism recovery trends shows that international tourism demand recovers quickly after the crisis. Pascariu, Ibănescu, Nijkamp & Kourtit (2021) identified tourism activities as very sensitive to the onset of economic or other types of crisis, while Celini and Cuccia (2015) proved that the tourism industries' after-shock recovery level is higher in comparison to the most of traditional economic sectors (agriculture, industry, or commerce). According to OECD (2020) significant socio-economic, political, environmental and technological trends remain to affect the tourism sector. In order to predict and discuss the recovery levels of international tourism demand the notion of its determinants is important. According to Seo, Park and Boo (2010) outbound tourism demand represents potential inbound tourism demand in other countries. The tourism demand literature is biased towards studies that analyse inbound tourism demand while neglecting outbound tourism, mostly due to the economic benefits added from inbound tourism receipts as against the capital leakage that is incurred from outbound tourism (Balcilar, Aghazadeh & Ike, 2021). However, the push drivers of tourism demand define international tourisms' recovery and growth abilities since they are the essential factors in the first stage of tourism-decision process (Candela & Figini, 2012). This is the stage when the budgeting of the personal income and decision about international travel within the population of origin country is conducted. Hence, when tourism demand's first stage of decision process is concerned push factors in the origin country are prior to pull factors in a destination. According to OECD (2020) forward-looking public policies are needed to shape the development of sustainable and competitive tourism destinations. This is imperative since tourism sector plays important role in the global economic growth and development (Balcilar et al., 2014; Eugenio-Martín, Morales & Scarpa, 2004; Roudi, Arasli & Akadiri, 2019; Sequeira & Nunes, 2011). Having this in mind, the aim of this paper is to discuss and analyse the socio-economic determinants of outbound tourism demand in OECD countries, the largest global source market of outbound tourism. Resulting from the previously presented issues this paper adds value to the existing empirical literature in several ways. Firstly, by introducing the element of expectations and forgoing level of outbound tourism as push factors of international tourism, the paper investigates the broader effects of socio-economic outbound tourism demand determinants, in addition to commonly used income and prices in the empirical literature. Secondly, by analysing the effects of population's propensity to travel and economic certainty in the environment on tourism demand, the paper provides new insights about the push factors of outbound tourism for OECD countries. Thirdly, regarding the mixed results on the influence of prices and expectations on tourism, this model expanded the analysis by implementing two different outbound tourism demand indicators (number of departures and international tourism expenditures) to embrace the socio-economic scope of origin market and capture the relevant effects of those push factors. Additionally, by employing the panel data analysis a vibrant and more in depth picture of the relationships between the variables is interpreted, especially as they move through time. The reminder of the paper is organized as follows. The short literature review is presented in the second chapter while the third chapter elaborates the sample size, data and the research model. The fourth chapter offers the discussion on the results of the empirical research, while the fifth chapter concludes the research and provides policy and further research implications.

2. LITERATURE REVIEW

Newly, there have been many studies on the topics of tourism development, tourism demand, and tourism-led growth hypothesis, which is due to the increasing significance of tourism as an essential source of revenues and foreign exchange earnings (Balcilar, Aghazadeh & Ike, 2021). International tourism involves outbound and inbound tourism demand. Their evolution since the 1960s led to a broad literature body on diverse aspects of tourism demand drivers, mostly related to the tourist origin country, tourist visiting country, and distance and modes of travel from the origin country to the destination (Lim, 1997; Ahmed, 2015). International tourism demand is a complex area of research itself. Concisely, for a certain country, it can be defined as the sum of goods and services that satisfy tourist needs and comprise of outbound and inbound tourism demand (Šimundić, 2017). International tourism demand is influenced by numerous elements which are, based on a comprehensive literature review, commonly divided into the pull and push factors (Pivčević, Kuliš & Šerić, 2016). In the field of tourism demand, there has been plenty of empirical research about its determinants. For example, Ahmed (2015) offered an analysis that included 400 empirical research papers on tourism demand in the period 1960-2014. Šimundić (2015, 2017) introduced the novelty regarding the empirical investigation of tourism demand determinant based only on one group of factors, i.e. push factors in origin country. Kuliš (2015) and Pivčević, Kuliš and Šerić (2016) followed Šimundić (2015, 2017) and empirically analysed the pull factors of tourism demand in the receptive region. However, in tourism demand literature, as noticed by Balcilar, Aghazadeh and Ike (2021), there is a favorable bias for research in analysing inbound tourism demand while a better understanding of the determinants of outbound tourism is neglected. Similar conclusion is derived from Rudež, Paliska and Sedmak (2022), who stated that studies on outbound tourism demand are not rapidly developing as is the case with research on inbound tourism demand. The empirical studies that analyze the determinants of outbound and inbound tourism demand, known as push and pull factors, respectively, are found to be important in order to create a vibrant destination development strategy based on the recognized drivers of outbound and inbound tourism demand. In addition, it is of high importance to identify the pull factors of tourism demand at the panel level with the purpose of policy formulation at the macroeconomic level (Balcilar, Aghazadeh & Ike, 2021). Rosselló-Nadal and He (2020) state that in accordance with the tourism economics theory, the most included explanatory variables of outbound tourism demand in empirical studies have been income and prices. Erjavec and Devčić (2022) state that the most critical push determinants of tourism demand are: the tourists' income, prices, and exchange rates. Besides them, they see the accommodation capacity of the receptive region and trade openness as very important explanatory variables of tourism demand. Dogru, Bulut and Sirakaya-Turk (2021) noticed that many papers investigated the effects of climate change, terrorism, immigration, trade policies, tariffs, and visa requirements affecting tourism demand. Below are some examples of recent research about determinants of outbound tourism demand. Šimundić (2017) performed a panel analysis for 25 European countries for the period 2002-2015. Her results showed that the reached level of economic development, word of mouth, and erstwhile tourism activities positively affect the present outbound tourism in origin market. In contrast, there is a negative effect if the rise in the household saving rate occured a year earlier, as well as the negative effects of the fall in origin market competitiveness on outbound tourism. Gržinić, Šergo and Floričić (2017) investigated the wealth factors that affect outbound tourism intensity in Europe, on the panel data level, for 31 countries, during 1995-2014. They concluded that income, saving, stock trading, real effective exchange rate, fuel price, and recession dummy variable are Euroepan outbound tourism's explanatory variables. More recently, Rudež, Paliska and Sedmak (2022) conducted panel data models during 17 year period for 35 OECD country. Their results showed that income in the country of origin, the real effective exchange rate, trade openness, tourism export per tourist arrival, the country's political stability, the persistence of

habits, and two dummy variables are all statistically significant outbound tourism demand determinants. Balcilar, Aghazadeh and Ike (2021) also examined push determinants within a panel of 32 OECD countries from 1995 to 2016. They found the existence of a long-run relationship between international tourism expenditure per adult, gross domestic product per adult, effective exchange rates adjusted relative prices, and employment to adult population ratio. In contrast, employment failed to be a significant determinant of long-run emitive tourism demand in OECD countries.

3. SAMPLE, DATA, AND MODEL SPECIFICATION

The stimulus for studying the outbound determinants of tourism demand in OECD countries lies in the importance of OECD countries in the global tourism market. According to OECD (2020), its member countries play a prominent role in the international tourism economy, accounting for more than half (56.9%) of total global arrivals, global travel receipts (61.1%), and global travel expenditures (50.5%) in 2018. The list of 38 OECD member countries for which data were collected is shown in Table 1.

No	Country Name	No	Country Name	No	Country Name	No	Country Name
1	Australia	**11**	Finland	**21**	Korea, Rep.	**30**	Portugal
2	Austria	**12**	France	**22**	Latvia	**31**	Slovak Republic
3	Belgium	**13**	Germany	**23**	Lithuania	**32**	Slovenia
4	Canada	**14**	Greece	**24**	Luxembourg	**33**	Spain
5	Chile	**15**	Hungary	**25**	Mexico	**34**	Sweden
6	Colombia	**16**	Iceland	**26**	Netherlands	**35**	Switzerland
7	Costa Rica	**17**	Ireland	**27**	New Zealand	**36**	Turkey
8	Czech Republic	**18**	Israel	**28**	Norway	**37**	United Kingdom
9	Denmark	**19**	Italy	**29**	Poland	**38**	United States
10	Estonia	**20**	Japan	**-**	-	**-**	-

Table 1: List of countries included in the sample

The dependent variable in this paper is outbound tourism demand. In tourism literature, the most commonly used indicators to measure tourism demand are tourist arrivals (from an inbound perspective) or departures (from an outbound perspective), tourist overnights and tourist receipts (both inbound perspective) or expenditures (outbound perspective), and the length of stay (Song, Li, Witt & Fei, 2010; Ahmed, 2015; Rudež, 2018). In this paper, outbound tourism demand is measured from two perspectives: the quantity (number of departures) and the value (expenditures) perspective, as suggested by Martins, Gan and Ferreira-Lopes (2017). Finally, the aggregate number of tourism departures and expenditures are estimated relative to the domestic populations to get per capita indicators, commonly used as measures of tourism demand in empirical research (Song et al., 2010). Thus, two different indicators to capture *outbound tourism demand* used in this paper are *tourist expenditures per capita* and *tourist departures per capita*. The leading independent variables that affect outbound tourism demand are *income, exchange rate, and savings* (Šimundić, 2017). *The income* in the country of origin is considered among the most important explanatory variables of tourism demand (Dogru, Bulut & Sirakaya-Turk, 2021; Rudež, Paliska & Sedmak, 2022). Its impact on international tourism demand is expected to be positive (Erjavec & Devčić, 2022). Balcilar, Aghazadeh and Ike (2021) pointed out that income in the literature on outbound tourism demand has mostly been measured by GDP, GDP per capita or average wages. However, following the novelty proposed by Šimundić (2017), in this study, instead of GDP, the variable used is *net national income* (NNI).

It is proxied by adjusted net national income per capita in current US$. Šimundić (2017) highlights the argumentation offered by Song, Witt and Li (2008) which states that if the purpose of analysis of international tourism demand determinants is to model motivational factors for any type of tourism, net national income is better measure than GDP. Accordingly, GDP would be measure that is more appropriate if only business trips determinants are analyzed. This paper considers all types of tourism, thus net national income is used as proxy for the income level in the origin country. To capture the size of an origin country it is expressed in per capita values (see Šimundić (2017) for details). Another critical determinant of outbound tourism demand is *the exchange rate*, which measures an origin country's price competitiveness, as suggested by Song, Witt and Li (2009). Ahmed (2015) explains how changes in the currency exchange rates can considerably impact country's tourist outflow, as well as visitors inflows. This study uses the *real effective exchange rate* (REER) as a proxy variable for price competitiveness. It represents a nominal effective exchange rate index adjusted for relative movements in national price or cost indicators of the home country, selected countries, and the euro area (WDI, 2022). In addition, Papatheodorou (2010) noticed that papers about international tourism demand often neglected *future economic activity expectations*. To solve this issue, Šimundić (2017) suggests employing *household saving rate* (HSR) as a proxy variable, indicated by the percentage of household net disposable income of an origin country. According to Bouis (2021) the rise in the household saving rates essentially reflects higher precautionary saving in an environment of heightened economic uncertainty, higher unemployment, and depressed valuations of real and financial assets, thus at the end reflecting negatively to the overall consumption level. A similar observation is offered by Rudež (2018), who points out Wang's (2014) conclusion, that savings and savings regimes significantly impact tourism consumption. While the positive effect of NNI on outbound tourism demand is undoubtedly expected, the effects of HSR and REER are ambiguous and not well-defined in the tourism demand empirical research and theory. If HSR rises this is the mirror to negative expectations in an economy but the effect on OTD can be negative or positive (Šimundić, 2017). Hence, the drop in the OTD when HSR rises could enlighten the luxury nature of tourism product for the countries included in the analysis, while the positive effect on OTD would prove that tourism is necessarily good and that once the person "becomes tourist" stays always a tourist. In addition, REER shows international (trade) competitiveness and its rise means the fall of the competitiveness for origin country and the drop in OTD (Šimundić, 2017). Nevertheless, the loss of the competitiveness can make tourists to stay homebased or even go out of the country, depending if the negative effect of the fall of origin country currency's value is outpaced by inelasticity of OTD on the change of prices in the origin country (see Song, Witt, Li, 2009). Thus, the expected sign is not clear for this variable as well. In addition, it is expected that the effects of lagged dependent demand are positive, thus confirming the positive impacts of the previous tourism experience on OTD level. Annual data for all variables except HSR were obtained from the World Bank's World Development Indicators database (WDI, 2022). The data for HSR was collected from National Accounts of OECD Countries (OECD, 2022). The period covered includes 11 years, from 2009, when the global economic crisis considerably impacted international tourism and caused the decline of international tourism demand, until 2019, which after a rebound in 2010, was the 10th consecutive year of sustained growth in international tourism (UNWTO, 2013, 2021). Table 2 summarizes all the variables, their labels, defined proxy variables, expected signs, and corresponding data sources.

Table following on the next page

Variable	Label	Indicator	Expected sign	Source
Outbound tourism demand, expenditure	OTDexp	International tourism, expenditures (current US$) divided by the total population		WDI
Outbound tourism demand, departures	OTDdep	International tourism, number of departures divided by the total population and then multiplied with 1,000,000		WDI
Net national income	NNI	Adjusted net national income per capita (current US$)	+	WDI
Household saving rate	HSR	Net household saving, percentage of households net disposable income	+ / -	OECD
Real effective exchange rate	REER	Real effective exchange rate index (2010 = 100)	+ / -	WDI

Table 2: List of countries included in the sample

The models are defined as follows:

$$OTDexp_{it} = \mu + \gamma OTDexp_{i,t-1} + \beta_1 NNI_{it} + \beta_2 HSR_{it} + \beta_3 REER_{it} + \beta_4 OPEN_{it} + \beta_5 HC_{it} + \alpha_i + \varepsilon_{it}$$

$$i = 1, 2, 3 \dots 37, 38; \quad t = 2009, 2010, \dots 2018, 2019 \qquad \textbf{(1)}$$

$$OTDdep_{it} = \mu + \gamma OTDdep_{i,t-1} + \beta_1 NNI_{it} + \beta_2 HSR_{it} + \beta_3 REER_{it} + \beta_4 OPEN_{it} + \beta_5 HC_{it} + \alpha_i + \varepsilon_{it}$$

$$i = 1, 2, 3 \dots 37, 38; \quad t = 2009, 2010, \dots 2018, 2019 \qquad \textbf{(2)}$$

where i=1, 2…, N counts for each country in the panel and t=1, 2…, T refers to the time period. Moreover, μ denotes for an intercept, γ is a parameter of lagged dependent variable and β_1, β_2, β_3, β_4, β_5 are the parameters of exogenous variables. It is assumed that ε_{it} are IID $(0,\sigma_\varepsilon^2)$. α_i represents unobservable individual-specific effect that is time invariant and it accounts for any individuals. Descriptive statistics of the data is presented in Table 3.

Variable	Mean	Std. dev.	Min	Max	N	n	T/T-bar
OTDexp	1026.322	1170.379	61.4191	7471.829	325	33	9.84848
OTDdep	1022.994	746.414	47.41894	4128.629	407	38	10.7105
NNI	29561.64	16965.09	4209.642	80639.39	415	38	10.9211
HSR	5.110117	5.649383	-17.2452	18.79845	379	35	10.8286
REER	98.85456	10.09506	69.41596	152.969	374	34	11

Table 3: Descriptive statistics
(Source: author's calculations using the data of WDI (2022) and OECD (2022))

4. METHODOLOGY, RESULTS, AND DISCUSSION

As Muštra, Šimundić and Kuliš (2017) explain, it is essential to confirm that there is no problem of multicollinearity among independent variables prior to model estimation. Therefore, a correlation matrix is computed because there is no specific test for multicollinearity in panels (Škrabić Perić, Rimac Smiljanić & Kežić, 2022). As the highest correlation coefficient among independent variables (NNI, HSR, REER) does not exceed the value of 0.5, it can be concluded that there is no possible problem of multicollinearity in subsequent model specifications (Baltagi, 2008).

Variable	OTDexp	OTDdep	NNI	HSR	REER
OTDexp	1.000				
OTDdep	0.6817*	1.000			
NNI	0.4914*	0.7692*	1.000		
HSR	0.1656*	0.1965*	0.3179*	1.000	
REER	0.0385	0.0589	0.1656*	0.0833	1.000

Table 4: Correlation matrix
(Source: author's calculations using the data of WDI (2022) and OECD (2022))

In this paper, the panel methodology is used to perform empirical research. According to Dogru, Bulut and Sirakaya-Turk (2021), panel data analysis has been the most predominant empirical technique employed in modeling tourism demand. Due to the combination of pooled-cross-sectional data and time-series data of the same units under examination, panel data provides the opportunity to capture information that could not be otherwise captured while having added benefits of the reduction of multicollinearity and increase in degrees of freedom (Wooldbridge, 2010, as cited in Dogru, Bulut and Sirakaya-Turk, 2021). Škrabić Perić, Šimundić, Muštra & Vugdelija (2021) perceived that in latest empirical papers, differenced generalized method of moments (GMM) (Arellano & Bond, 1991), and system GMM (Blundell & Bond, 1998) are most commonly performed. Škrabić Perić (2019) reasoned that the system GMM showed superior properties in simulation studies. So, using statistical software Stata 17.0, in this paper the model of determinants of outbound tourism demand is computed using a two-step Blundell and Bond GMM estimator, and the results are presented in the following tables. First, in Table 5, the results of the model of outbound tourism demand where OTDexp (expenditures) is a proxy dependent variable are presented.

Variable	Model 1a	Model 2a	Model 3a	Model 4a
L.OTDexp	0.789***	0.785***	0.802***	0.796***
	(0.00362)	(0.00381)	(0.00374)	(0.00441)
NNI	0.0171***	0.0183***	0.0162***	0.0176***
	(0.000545)	(0.000571)	(0.000637)	(0.000613)
HSR		-8.845***		-11.55***
		(1.109)		(1.077)
REER			3.502***	3.163***
			(0.605)	(0.522)
_cons	-267.3***	-252.3***	-613.5***	-556.0***
	(20.54)	(26.84)	(56.99)	(59.36)
Number of observations	292	268	266	252
Number of groups	33	31	30	29
Number of instruments	20	21	21	22
Sargan test (p-value)	0.1397	0.2709	0.1501	0.1599
AB2 test (p-value)	0.2502	0.2527	0.2497	0.2532
Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$				

Table 5: Empirical results of outbound tourism demand model (dependent variable: OTDexp)
(Source: author's calculations using the data of WDI (2022) and OECD (2022))

Secondly, in Table 6, the empirical results of the outbound tourism demand model where tourism OTDdep (departures) is the dependent variable are shown.

Variable	Model 1b	Model 2b	Model 3b	Model 4b
L.OTDdep	0.965***	0.968***	0.998***	0.995***
	(0.0146)	(0.0140)	(0.00607)	(0.00768)
NNI	0.00451***	0.00486***	0.00244***	0.00336***
	(0.000699)	(0.000728)	(0.000534)	(0.000590)
HSR		1.637**		4.049***
		(0.819)		(0.615)
REER			-0.668	-1.340***
			(0.570)	(0.511)
_cons	-77.54***	-99.09***	19.19	34.25
	(11.10)	(12.72)	(47.31)	(38.65)
Number of observations	367	334	327	304
Number of groups	38	35	34	32
Number of instruments	20	21	21	22
Sargan test (p-value)	0.2151	0.2823	0.0833	0.1393
AB2 test (p-value)	0.3507	0.3590	0.2481	0.2564
Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$				

Table 6: Empirical results of outbound tourism demand model (dependent variable: OTDdep) (Source: author's calculations using the data of WDI (2022) and OECD (2022))

Before discussing the results, it is vital to evaluate the results of the diagnostic tests. Accordingly, the validity of models (1a)-(4a) and (1b)-(4b) is confirmed. Firstly, the coefficient of lagged dependent variable is positive, less than 1, and statistically significant at the level of 1%, which confirms the dynamic nature of outbound tourism demand and confirms the proper usage of the dynamic panel model. Furthermore, the p-value of the Sargan test for over-identifying restrictions is higher than 0.05. This indicates there is no problem of endogeneity in any model specification. Moreover, the p-value of the AB2 test is greater than 0.05 in all cases, which confirms no existence of the problem of autocorrelation. To control for the robustness of the results we have performed four different models for each of two indicators of outbound tourism, i.e. departures and expenditures. Hence, we are introducing independent variables HSR and REER individually in the specific model where the only constant control variable was NNI, and finally we discuss the results of the fourth model since robustness of the results is confirmed. The empirical results confirm the positive effects of the NNI on international departures and expenditures, while the results for HSR and REER are diverse depending on the independent variable specification. When the outbound tourism proxy is international expenditure, than the model shows negative HSR effects on OTDexp and positive effects of REER on OTDexp. On the contrary, the opposite results are revealed in the model when the proxy for outbound tourism are departures. In this case, OTDdep shows to be positively related to the rise of HSR and negatively to the change in REER. Those mixed results are already present in the literature and elaborated in the literature review, while their explanations can be captured in the essence of tourism travel motivations and specific tourism demand variable used in the model of outbound tourism. Accordingly, when the price competitiveness of origin country drops, although the total departures fall, the expenditures rise since the departing tourist need more own currency for tourism costs in a destination (Song, Witt & Li, 2009; Ahmed, 2015). Furthermore, when the expectations and uncertainty in the origin country rises, and consumption drops, than the departures still rise, showing persistence of tourism travel, although the expenditures on travel and when abroad drop (Šimundić, 2017).

5. CONCLUSION

Tourism demand growth over time shows its persistence despite occasional shocks. This study indicates the socio-economic nature of outbound tourism and brings new insights to this stream of literature, and confirms that the present level of income, propensity to consume tourism product, economic environment and certainty together with the worth of the origin country's currency are significant determinants of outbound tourism demand. The level of development positively affects departures and expenditures, which is in line with the evidence that the OECD countries are largest tourism source market in the world. In addition, the presented evidences confirm that tourism product is no longer luxury good, as it was in the middle of 20th Century, available just for few, but that tourism product is nowadays normal good, available for larger pool of tourists and consumed by the growing number of tourists. Furthermore, the results reveal that although the uncertainty may rise, the number of people traveling still rising and only expenditures are reduced. On the contrary, if the national currency loses its worth, thus making tourism product abroad more expensive, the departures are reduced although the expenditures abroad rise, since the travellers need larger budget for the same tourism product. Hence, the outbound tourism demand is more sensitive on price change and price competitiveness that on the uncertainty in the environment. This has also been confirmed recently when the recovery of international tourism after COVID pandemic is concerned. Thus, the results of this study could be of large importance for tourism destination's policy makers especially when such information are used to plan economic activities or development strategies. In addition, origin countries could use the loss in price competitiveness and develop stronger domestic tourism to replace the external leakages for outbound tourism. There are some limitations of this study. The sample and the time period for the analysis could be enlarged, although the results are reasonable and as such consistent. The further research could include additional variables to test the same model or use the same models on larger sample size.

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IMPACT ASSESMENT OF DIGITAL SKILLS ON R&D INVESTMENT

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ABSTRACT

In nowdays society, especially in the world affected by the pandemic, the need to digitalize all aspects of the economy and society has grown tremendously in a relatively short period of time. Digital transformation, digital economy, digital intelligence and all other aspects of digital society are topical issues nowdays. In order for the digital transformation to be successful, one of the preconditions is the development of society's digital skills. Therefore, we are faced with a situation where digital skills are one of the basic skills sought in the modern society, supported by the fact that in recent years digitalisation is increasingly being measured by various indicators to more accurately identify society's development needs in digitalization. On the other hand, investing in research and development is mentioned in all strategic documents and plans as a basis for global competitiveness, business and growth. The digital economy is mentioned in the context of the innovation market and innovators, and as a bridge that should eliminate certain sore spots in social and economic interactions. In this regard, investment in research, development and innovation should increase in terms of R&D expenditure in GDP, which currently stands at around 1% in Croatia according to the World Bank collection. Numerous indicators have been developed on the state level, but also at the European and global level, that should measure the success of such ventures. From all this it is clear that digital skills and investment in research, development and innovation are imperatives for the European Union and the Republic of Croatia regarding the economic growth and development and achieving competitive advantage, and that their connection and continuous growth and development are both key to Croatia's success but also to the society as a whole. Given the interconnectedness and interdependence of these two concepts and the fact that all economic and social goals concern investment in research, development and innovation, and digitalization and digital skills at the same time, this study was conducted through a comparison of different data sets connected to these two terms, seeking to identify the level and source of their interdependence and suggest possible improvements.

Keywords: *digitalization, digital skills, R&D investment, business intelligence tools*

1. INTRODUCTION

In the last two decades, technology has been evolving at a rapid pace, and in the line with development of technology. Companies face numerous challenges on a daily basis that are forcing them to make changes. In order for companies and various organizations to keep up with the times and be competitive in the markets in which they are positioned, it is necessary to invest in research, development and innovation. (Satalkina, Steiner, 2020) According to Georgescu et al. (2021), digital transformation requires cultural change as digitalization is more about people than just technology.

In the near future it is expected that young entrepreneurs, representing the generation using the technology from their early age, will just need to work on improving their digital skills on their path of becoming digital entrepreneurs (Bejinaru, 2021). Babic (2019) states that, in order for people and employees to keep up with digital transformation nowdays, it is important for them to continuously improve their digital skills which are no longer regarded as only computer skills, but include a range of skills that extend from operational to cognitive, social and systemic skills, collectively referred to as digital literacy. This set of skills enables an individual to succeed in finding, evaluating and creating information, and they are considered a prerequisite for young people to successfully enter and stay in the labor market but also be active citizens of the knowledge society. Since the education system often does not sufficiently respond to the needs of the labor market for a development of digital skills, cooperation between academia and industry is necessary to adequately fulfill the needs to develop certain skillsets, but also to promote entrepreneurship from the earliest stages. In the process of creating innovation ecosystem, universities should play a huge role and their innovation ecosystem role should help their stakeholders and collaborating actors but also their policy-makers to act according to this role in various contexts. (Taxt et al., 2022) For companies, on the other hand, digital skills have proven to be one of the key factors for the development of innovations, and they believe that the current working population needs retraining in order to compensate for their lack in knowledge. According to Milenkova, Lendzhova (2021), developed digital skills of individuals are not only the main prerequisite for a successful integration in the labour market but also a condition to become a digital citizen. This tends to get challenging when considering different perspectives and especially in regard to gender digital gap. The ability to follow changes in terms of digitalization and improve their digital skills should ensure women's digital inclusion and diminish inequalities on many other fields as well (Mariscal et al., 2019). However, by restructuring business patterns in all industrial sectors, digitalization is becoming the result, but also the source of innovation, and entrepreneurs are no longer just drivers of change but also influential factors of digital transformation. According to available research, Satalkina and Steiner (2020) state that 96% of leaders in the business world consider digital skills to be key to innovative development and constant growth. The leading countries in Europe in terms of digital entrepreneurship are precisely the countries whose population's digital skills are most developed. Satalkina and Steiner (2020) maintain that this is greatly influenced by external system conditions such as institutional influence, new market trends and changes in competitive advantage, but also by social patterns such as digital trust and technology adoption. On the other hand, when talking about investing in R&D, the main issue is a lack of connection between departments and a manager's education about its importance. "Closeness to science" and awareness about its importance either by doing it or just understanding it are first steps companies should take when becoming aware of a contribution of basic research to innovation (Nagane, Sumikura, 2020). Once firms engage in R&D, their size and especially financial resources are the factors that mostly define their future engagement and performance in it. According to Perez-Alaniz et al. (2022), for larger-sized firms, a precondition to be engaged in process and product innovation are their financial resources, however, small-sized firms may consider R&I only as a counter-measure to when their performance in the market falls, and not as the opportunity to grow. Cahyadi and Magda (2021) state that there exists a positive and significant connection between digital readiness, innovation, and 4.0 competitiveness. The process of research and innovation is changing rapidly, while digital technologies enable science and innovation to become more collaborative, international and open to citizens. It is very important that Europe accepts these changes and thus strengthens its position as a lead for science, new ideas and sustainable investment in the future. (European Commission, 2016) That the Republic of Croatia is also moving in the direction of science, innovation and research is indicated by the "National Recovery and Resilience Plan of the Republic of Croatia" (2021),

which was created in accordance with guidelines and key documents of the European Union. Its measures are focused on recovering the economy and reducing imbalances primarily through investment in research and innovation capacity and the application of advanced technologies, all with the aim of encouraging innovation. On the other hand, as regards to the digitalization process, the current need to reduce administrative and regulatory burdens and achieve greater transparency could be accomplished by digitizing various business processes and services (Government of the Republic of Croatia, 2021). The problem that lies behind the research's topic stems from the growing need to develop digital skills due to the current digitalization process on the one hand, and emphasizing the importance of investing in research, development and innovation on the other. Due to the above, the subject of this paper is the analysis of the connection between digital skills and the investment in research, development and innovation, i.e. linking the development of digital skills with investment in research, development and innovation at the European Union level. Therefore, the aim of this research is to link digital skills and investment in research, development and innovation through available models for monitoring the above. The research question formulated at the beginning of creating the framework in which the work would move was: Is there a connection between the level of development of digital skills and investment in research and development? Based on this question, the following hypotheses were made:

- H1: The level of digital skills development is positively related to business enterprise expenditure on R&D (BERD).
- H2: Countries with lower digital skills have a higher share of foreign-funded GERD.

2. METHODOLOGY

For the purpose of conducting the research, public databases of the World Bank, OECD, UNICEF, Central Bureau of Statistics, Digital Economy and Society Index and Eurostat were analyzed and basic comparisons of the type and scope of data offered and related to the topic were made. After analyzing the information, it was decided that the data from the Eurostat public database would be analyzed for the purposes of this paper, since it contains the necessary information on digital skills and investment in research and development. From the available Eurostat databases by topics, a database Science, technology, digital society was chosen, as it contains all the necessary data sets. After the additional analysis of the available frameworks, the following data was selected:

- A set of data called Digital skills was taken from the Digital economy and society database, which refers to individuals between the ages of 16 and 74 who have only basic digital skills and those with better developed digital skills. The data set was taken in such a way that it contained the total percentage of all individuals in the specified category, the total percentage of male individuals in the specified category, and the total percentage of female individuals in the specified category,
- Data sets within the category Research and development were downloaded from the Science and Technology database, as follows:
    - Gross domestic expenditure on R&D (GERD), tables in the category GERD by source of funds, which show the relative shares of different sources of funds in research and development, 5 tables showing the percentage of shares of GERD funded by different sectors: business sector, government, higher education, private non-profit sector and the rest of the world.
    - Business enterprise expenditure on R&D (BERD), tables in category BERD by NACE Rev. 2 activity and source of funds, which show expenditures of companies for research and development, category all sectors, amount in millions of euros.

The scientific methods used in the research are methods of analysis, synthesis and description, and the data were processed using the POWER BI tool. Downloaded excel tables contained 3 sheets: *summary* with basic information about a table, *structure* with a more detailed insight into the structure of the displayed data, and *Sheet 1* with a display of data fields by year. The data was analyzed and it was noticed that the amount of data varies by country. Excel spreadsheets have further been refined, leaving only data for the planned analysis framework by country and all data by year. The above tables were then linked in the three categories mentioned above with sheets containing different data sets for possible analysis and comparison. The three described tables were loaded in the Microsoft Power BI software tool and the first row was set as the column heading. The tables were then linked together by a country name. Finally, an analysis was made and the results are presented in the next chapter.

3. RESULTS

Due to the large amount of available data, and taking into account the topic of the research and the link between digital skills and investment in research and development, the following indicators were used to visualize research results:

- **Digital skills:** individuals between the ages of 16 and 74 who have basic or better overall digital skills. This indicator is based on selected activities performed by individuals aged 16 to 74 on the Internet in four specific areas (information, communication, problem solving, content creation). It is assumed that individuals who have performed certain activities have appropriate skills, and the indicator could be considered as a replacement for digital competencies and skills of individuals.
- **Gross domestic expenditure on research and development**: percentage of GERD (gross domestic expenditure on research and development) financed by industry, government, higher education and the private non-profit sector. The fifth source of funding shown is GERD funded from abroad. Research and development is an activity in which there are significant transfers of resources between units, organizations, sectors and countries. The importance of funding sources is recognized in one of Barcelona goals of the Lisbon Agenda, which considers that the appropriate ratio for research and development is 1/3 financed from public funds and 2/3 from private ones.
- **R&D expenditure**: measure of intramural R&D expenditure within the business sector during a given reference period, for all statistical classifications of economic activities and sources of resources, amount in millions of euros.

It was also noted that the most complete set of data is the data from EU member states, Norway and Switzerland. Therefore, it was decided that the analysis should be conducted within the mentioned framework. The ratio of all listed indicators by specific European Union countries, including Norway and Switzerland, for the observed year 2019 that contained all the data in the required categories, is shown below.

3.1. Comparison of digital skills development in male and female population by countries

Using the digital skills indicator, the percentage of the population aged 16-74 that has developed basic or better overall digital skills, according to the Eurostat base unit, is shown below. The representation is shown separately for men and women.

Figure following on the next page

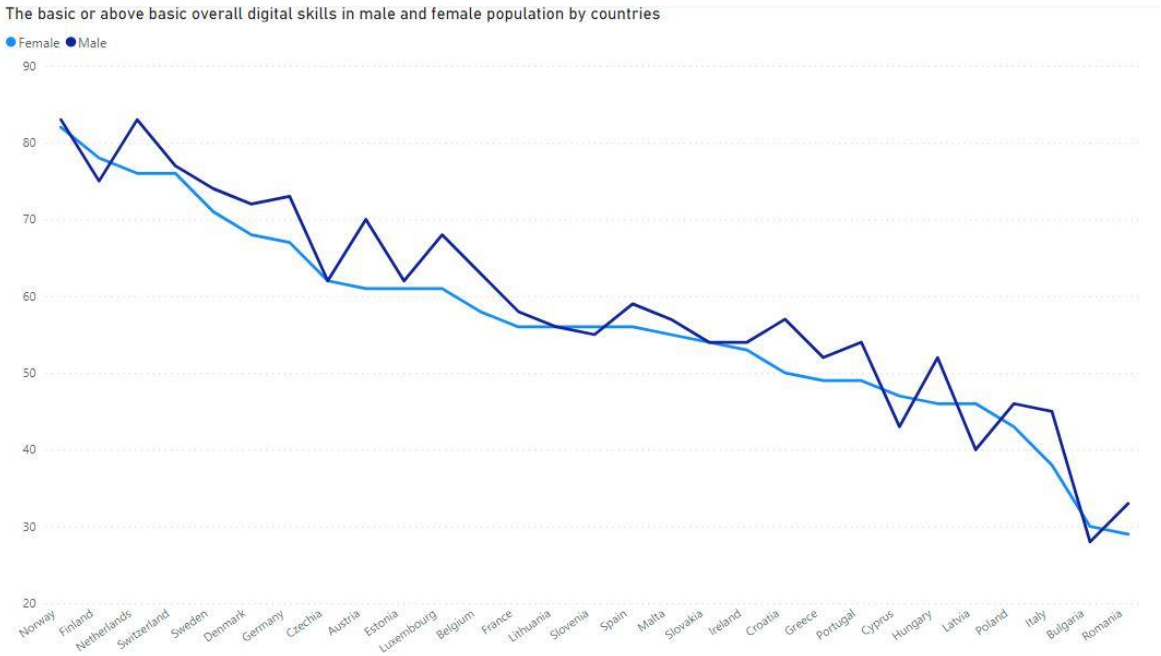

Figure 1: Review of the comparison of digital skills development in women and men by specific countries
(Source: author's work, 2022)

3.2. Relative shares of different sources of funds in R&D

For the purpose of presenting the structure of investments in research and development for the observed country and year, the indicator gross domestic expenditure on research and development (GERD) was used: percentage of GERD financed by industry, government, higher education, private non-profit sector and the rest of the world was shown as a relative share by sector.

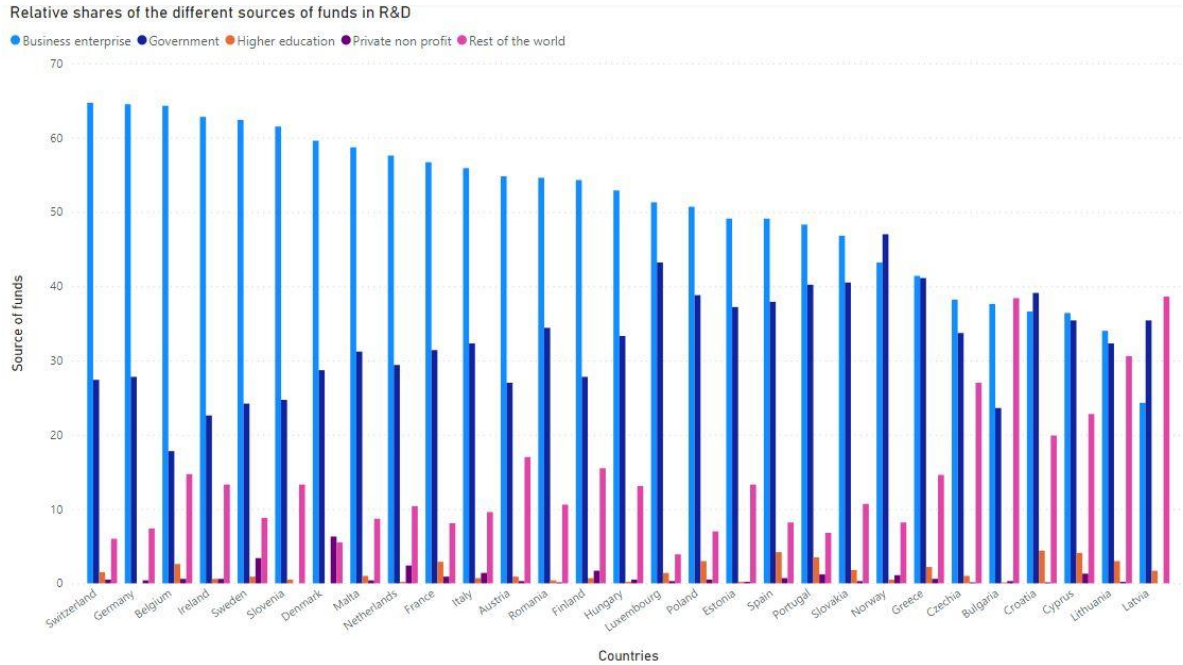

Figure 2: Relative shares of the different sources of funds in R&D
(Source: author's work, 2022)

3.3. The relationship between relative shares of different sources of funds in R&D and development of digital skills by countries

After analyzing the level of development of digital skills and gross domestic expenditure on research and development, the two categories were compared. As a result, a graph representing the relationship between relative shares of different sources of funds in R&D and development of digital skills by country, in the observed year, is shown.

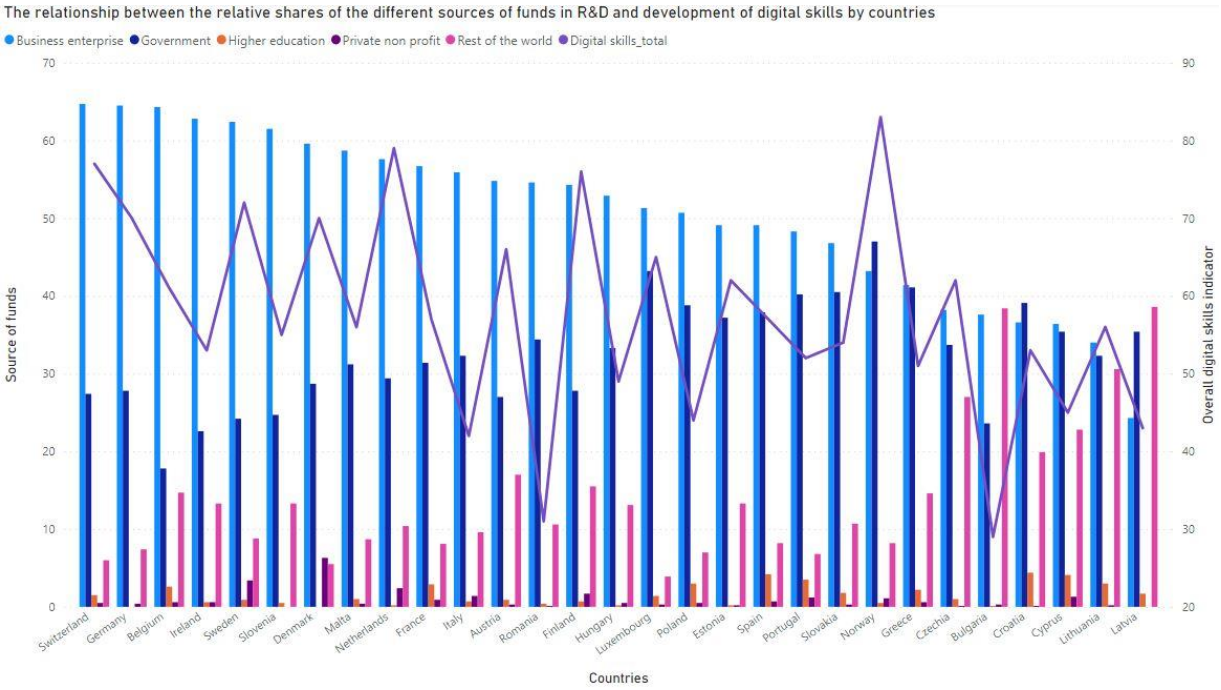

Figure 3: The relationship between the relative shares of the different sources of funds in R&D and development of digital skills by countries
(Source: author's work, 2022)

3.4. The relationship between digital skills development and share of gross domestic expenditure on R&D by industry

Given the mentioned importance of funding sources, recognized in one of Barcelona goals of the Lisbon Agenda, pointing out that the appropriate division for research and development is 1/3 of funding from public funds and 2/3 from private funds, a comparison was made between the level of development of digital skills and relative share of gross domestic expenditure on research and development financed by industry in the observed year.

Figure following on the next page

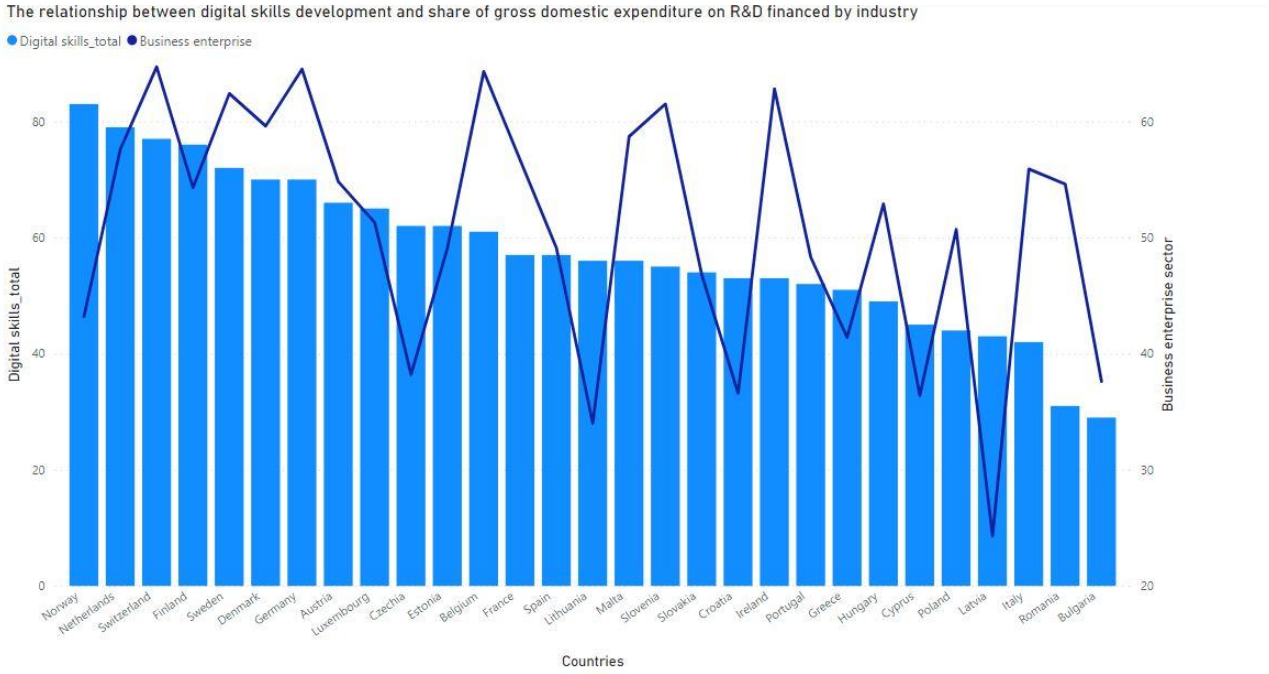

Figure 4: The relationship between digital skills development and share of gross domestic expenditure on R&D by industry
(Source: author's work, 2022)

3.5. The relationship between digital skills development and investments from abroad

Using the category of funding sources, and in order to compare the rate of digital skills development and investment from abroad, the relationship between digital skills development and relative share of gross domestic expenditure on research and development financed from abroad / the rest of the world in the observed year was analyzed.

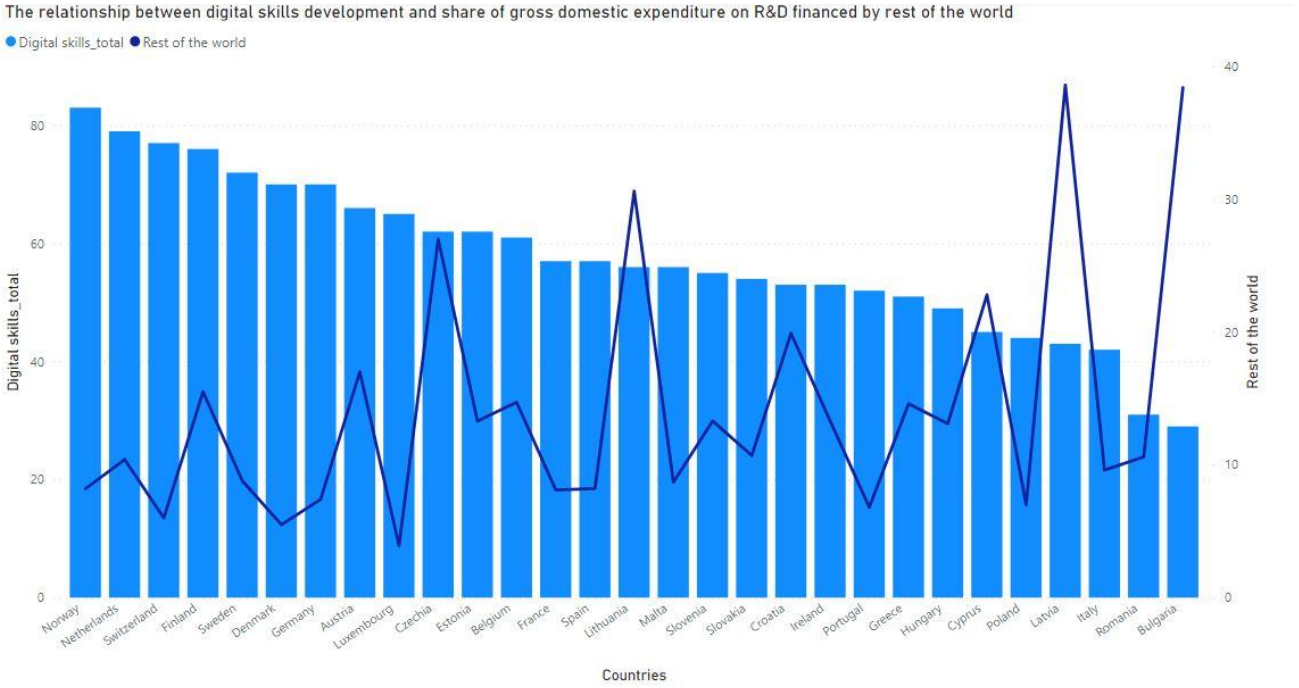

Figure 5: The relationship between digital skills development and share of gross domestic expenditure on R&D financed by rest of the world
(Source: author's work, 2022)

3.6. The relationship between digital skills development and R&D spending (BERD)

Using the indicator of the level of development of digital skills and the indicator of expenditures of companies for research and development presented in millions of euros, a comparison of the level of development of digital skills with the activities of companies related to research and development was made.

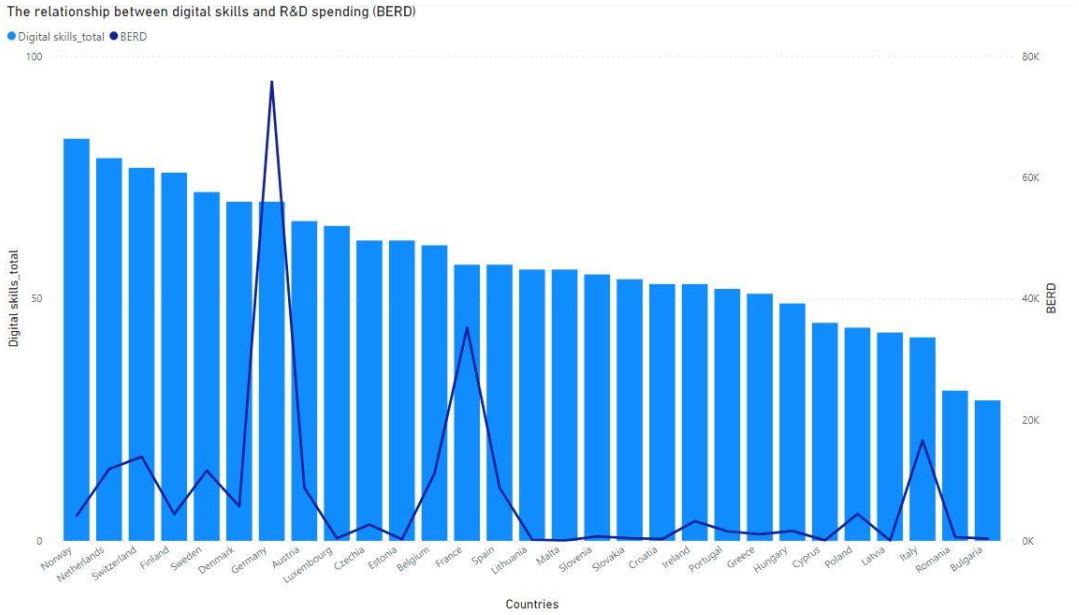

Figure 6: The relationship digital skills development and R&D spending (BERD) (Source: author's work, 2022)

The survey analyzed only data for the European Union and Norway and Switzerland. For a more relevant data set and comparison, it would be useful to supplement the data with countries that are world leaders in R&D investment, but also to take into account the context of each country when processing results so that certain phenomena could be analyzed and explained separately. The indicators used are limited to certain frameworks in terms of digital skills and investment in research and development. For a broader picture and more accurate results, the research should include several interrelated factors and certainly consider data and indicators for innovation separately. This could not be done for this research since the data for innovation activities are available for different years. The results obtained present a need for conducting a much larger research that would require covering larger data sets in order to obtain a more detailed picture. Therefore, it is proposed to use these results as a basis for a more detailed study of a larger set of data that could be used to clarify certain deviations from the overall trends / results.

4. DISCUSSION

The research results presented in the third chapter are divided into six separate units, depending on the observed indicators. In the first part, the degree of development of digital skills among women and men in certain countries is presented. In order to make the graph, a set of data was used that refers to individuals between the ages of 16 and 74, for those who have only basic digital skills and those with better developed digital skills. Graph 1 shows that in most cases men have better developed skills. Women predominate in Latvia, Cyprus, Italy, Slovenia, Lithuania, Sweden and Finland. Moreover, in Sweden and Finland they exceed a percentage of 75% and more percent. When it comes to men, in the Netherlands and Norway they predominate with percentages of over 82%. Countries with the lowest numbers of women and men with developed digital skills are Romania, Latvia and Bulgaria.

The second part shows the amount invested in research and development divided by sectors for each country. Business sector investments, public sector investments, higher education investments, private non-profit sector investments and investments of the rest of the world were observed. Countries with the biggest business sector investments in research and development are: Switzerland, Germany, Belgium, Ireland, Sweden, Slovenia and Denmark. Countries whose business sectors invest the least are: Latvia, Lithuania, Cyprus, Croatia, Bulgaria and the Czech Republic. For countries that see a decrease of share of investments by the business sector, the trend of growth of the share of investment by the government or from abroad can be noticed. The third section represents a comparison of indicators considered in the section 1 and 2. Namely, graph 3 shows the ratio of investment of different sectors in research and development and the percentage of digital skills development in certain countries. When we look at the results obtained, we can see that a number of questions arise. Interestingly, the chart shows that certain countries with large amounts of dedicated research and development funds invested by business sector have a low percentage of population with developed digital skills. Such countries include Romania and Italy. However, there is also an opposite situation, such as with Norway and Greece, where a population with highly developed digital skills has a low amount of shares of investment in research and innovation by business sector, and which grows in favour of the government. Finland and France, like Greece, have highly developed digital skills, which surpass investments in R&D by business sector. Ultimately, the least investment in all observed countries comes from higher education and the private nonprofit sector. The chart also shows that countries with low percentage of digital skills development have high investments from the rest of the world (Latvia, Lithuania, Croatia). Chapter 4 shows the relationship between digital skills and the share of investment in research and innovation of a country's business sector. In this case, there are large oscillations when it comes to digital skills and the order of countries according to the percentages of business sector investment, which is evident from the digital skills curve. Namely, Norway, which has digital skills of over 80% and is the strongest in terms of digital skills development, has amongst lowest shares of GERD financed by industry. A similar case is with Latvia, the Czech Republic and Lithuania, only the percentages are slightly lower, but the ratio of digital skills in the population and investment is equal. Luxembourg has an equal ratio of population with digital skills and GERB financed by industry, and Spain and Estonia are closest to it in terms of population with digital skills developed and investment ratio of GERB financed by industry. Chapter 5 shows the relationship between digital skills and the share of investment in research and development from abroad / the rest of the world. Namely, in this instance it is visible that countries with the lowest percentage of people with developed digital skills have a fairly high share of foreign investments (Lithuania, Cyprus, Latvia and Bulgaria). It can be concluded that the result from the previous chart is not only repeated and confirmed, but that external and foreign stakeholders have a high level of interest in such countries. Chapter 6 shows the total investment of companies in research and development in millions of euros per year in relation to the percentage of digital skills development. It can be seen that Germany invests the most of all countries (approximately 72,000,000.00 €). Namely, no other country has invested as much as Germany and has a ratio of money invested higher than the percentage of the population with developed digital skills. The countries that invest the least financially, but have a mediocre development of digital skills are Malta, Slovenia, Slovakia, Croatia, Bulgaria, Luxembourg, Cyprus and Belgium. Following all of the above, we can conclude that the answer to the research question (Is there a link between the level of digital skills and investment in research and development?) is that the link exists and there is a visible and fairly uniform trend for some of the observed categories and countries. However, some countries show some deviations from the trend, and the political, economic, legal and social context of each country should be analyzed in more detail in order to explain these deviations.

It is also concluded that hypothesis H1 (The level of digital skills development is positively related to the business enterprise expenditure on R&D (BERD) was rejected because there is no clear link between the trend of the chart showing digital skills development and the one showing the BERD. Hypothesis H2 (Countries with lower digital skills have a higher share of foreign-funded GERB) was partially confirmed in most cases in that a decrease in the percentage of digital skills increases the percentage of foreign-funded GERB, but there are discrepancies that should be analyzed in isolation.

5. CONCLUSION

Based on the conducted research, it is clear that the countries with the highest level of development of digital skills are those countries that are highly developed and economically advanced in other respects. The same percentage of countries shows a significant share of corporate investment, while this share shifts to forein investments as the level of development of digital skills per country decreases. The interdependence of digital skills and their impact on the investment in research and development could not be clearly determined in this way, but the foundations for a more detailed analysis have certainly been laid. The Eurostat database analysis conducted for the purpose of this paper identified indicators for digital skills and the investment in research and development, which consists of gross domestic expenditure on research and development for different sectors and expenditure of research and development of companies. The analysis concluded that the interdependence of digital skills and their impact on investment in research and development could not be clearly defined in this way.

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INFLUENCE OF FANS ON RESULT EFFICIENCY IN FOOTBALL

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ABSTRACT

Some previous studies suggest that fans have a positive influence on the home teams and the result of competition. The primary goal of this paper is to test the hypothesis of the positive influence of fans on players and referees on the football field. We used the term "home field advantage", meaning that the fans bring the home team an advantage at the game. The study sample consists of seasons 2019/2020 and 2020/2021 in the 1st Croatian league. The variables in the study are points won, shots on target, yellow cards, red cards, fouls and fans attendance. Due to the situation with the COVID-19 pandemic during the 2019/2020 season, almost all matches were played without spectators, which allowed us to test the hypothesis of the connection between the "home field advantage" and the presence of fans on the stands. Statistically significant differences were detected in the variable's points won by the host, free kicks by hosts and guests and shots on target by hosts. Statistical analysis indicated that with the presence of spectators, the home team won 1.76 points, while in the period without the fans it was 1.44 per game. The results of this study confirm that audience contributes to the performance of the home team and inferior performance of visiting team, also on performance and decision-making of referees.

Keywords: *Covid-19, football, home field advantage, spectators*

1. INTRODUCTION

Football fans are a group of people cheering on a football team. They can be fans of a club or a national team. The connection between a player and a fan is a complex relationship that is determined by a number of factors within a player's performance during a match. The general effect of the fan's positive shouts on the player is to raise his level of self-confidence, excitement, and to "raise" his level of adrenaline with the purpose of better performance of football players. For some players, the audience or fans will be a source of stress, feelings of discomfort and can cause anxiety and "pressure" which will result in poorer performance. This special connection between the fans and the players is called the "Fan Effect" (Murrell, Dietz, 1992). The key to the socio-psychological impact on a player's performance is the connection between him and the player. The player and their performance is divided into novice athletes, middle class athletes and elite athletes (Elferink-Gemser, et al., 2010). It is believed that beginner athletes or young players who meet the audience for the first time will often be negatively influenced by fans, due to the stress and pressure they must be the best, they will experience "burnout" and their performance will be worse.

Middle-class athletes to whom fans can have both positive and negative effects, and elite athletes who, if they have fans who support them, get the necessary "inner strength" and their performance will be of better quality. The term "home field advantage" is generally known in the world of sports, and it is closely associated with the audience or fans on various sports arenas, fields or tracks. Studies point to the analysis and research of the notion of home field advantage in all sports both individual and team sports (Legaz-Arrese, Moliner-Urdiales, Munguía-Izquierdo, 2013). Competitions across Europe and North America were most frequently researched. The base of research is large but for the purposes of this research, the following will be singled out: Jones (2015) for baseball; Pollard and Gómez (2013) for basketball; and several studies from football by Fischer and Haucap (2020), Tilp and Thaller (2020), Pollard and Gomez (2014) some of which were also conducted in the emerging situation with the COVID-19 virus pandemic. Furthermore, when defining the term “domestic advantage”, various factors are taken into account that can be used to describe the term of research. The most common factors in determining are the fan effect (Inan, 2020); referee decisions (Boyko et al., 2007), knowledge of the terrain, home team tactics, and the psychological factor it encompasses in his research (Pollard, 1986). According to Chelladurai (1994), the population engaged in sports is divided into active and passive populations. The active population consists of participants in organized sports programs, participants in recreational programs that are conducted regularly and occasionally. The passive population consists of television viewers, viewers at a sporting event. Television viewers include the entire population that watches or listens to a sports program via television, radio or any multimedia device. Spectators at a sporting event include all spectators who are at the stadium or auditorium during the match and follow the sporting event. This passive population includes fans. Fans can be defined as a heterogeneous group of people who are part of the spectators or sports audience at sporting events. The original idea of forming such a group was to cheer on their team during a sporting event by cheering or shouting. Lalić (1993) defines organized groups of individuals as a fan audience whose goal is to identify with their team, specific and ritualized behavior, special and accepted iconography with the team they support, or to achieve emotional connection all for the purpose of supporting their team to achieve the better the result on the battlefields. The presence of spectators at sporting events largely depends on the country and the popularity of the sport in that country. In Europe, the most popular and most visited sport is football. Considering the top 5 leagues in Europe (English Premier League, German Bundesliga, French League 1, Italian Serie A and Spanish League) according to statistics, the most visited stadiums in 2019 are those in Germany with an average of 42,740 spectators per sporting event. According to statistical data, the most popular sport in Croatia is also football. Attendance at the stadium is relatively low, given the capacity of the stadium and the popularity of the domestic league in the 2019/2020 season. The average attendance of the stadium was 2837 spectators per sporting event while in the season 2020/2021. is 147 spectators lower due to the ban on spectators attending the stands where they were allowed to attend from the fifth to the ninth round of the competition.

2. METHODS

The study sample consists of 380 matches played during 2019./2020. season. and 2020./2021. in the First Croatian Telecom League (HNL), the highest level of competition in Croatian football. During the two seasons played, 11 clubs participated in 380 games (Dinamo, Rijeka, Hajduk, Osijek, Gorica, Lokomotiva, Istra 1961, Slaven Belupo, Varaždin, Šibenik, Inter Zaprešić). The matches are divided into 36 rounds each season, five matches per round. In this research, the sample of variables consist of home team points, home team shots on target, away team shots on target, home team yellow cards, visiting team yellow cards, home team red cards, away team red cards, home team fouls, away team fouls and fans attendance.

The values of the variables were taken from the Results website (https://www.rezultate.com/) and processed using notational analysis. For statistical analysis, the program Statistica 13 was used. For the variables home team and away team win, draw the frequency values were calculated. For all the other variables the basic descriptive parameters were calculated (mean, standard deviation). For the determination of the relation between the variables, the T-test for independent samples was calculated.

3. RESULTS

Using the program Statistica 13, data were processed and compared during the matches with the presence of spectators and during the time when the spectators were limited to a certain number (in relation to the capacity of the stadium) or were forbidden to attend the matches. The primary task was to determine the advantage of the home field through the points won during all observed matches and to determine whether there is dominance in technical and tactical terms during matches and whether the audience influences the referee's decisions and the performance of players by monitoring certain variables. The victory of the home team scores with 3 points, a draw with 1 point, while the victory of the away team is -3 points. Furthermore, in order to determine the advantages of the home field during the presence of spectators at the stadium and during the time when the number of spectators was limited or should not be at the stadium at all, the variable of points won at home was divided into two groups (PS- with the presence of spectators = 179 matches and LS- limited number of spectators or without spectators = 181 matches) whose results are shown in Table 1.

	PS		**LS**	
	Frequency	**%**	**Frequency**	**%**
Home team win	91	50.838	73	40.331
Draw	42	23.464	41	22.652
Away team win	46	25.698	67	37.017
Total	179		181	

Table 1: Frequency of results with the presence of spectators and without the presence of spectators

In further analysis, statistical data was collected in order to test the advantages of the home field with the presence of fans or without the presence of fans in stadiums during matches. These results are shown in Table 2.

	PS			**LS**					
	N1	AS1	SD1	N2	AS2	SD2	t-value	df	p
Home team shoot on target	**179,00**	**10,60**	**4,30**	**181,00**	**9,35**	**3,70**	**2,96**	**358,00**	**0,00**
Away team shoot on target	179,00	8,54	3,66	181,00	8,38	3,92	0,40	358,00	0,69
Home team points won	**179,00**	**1,76**	**1,31**	**181,00**	**1,44**	**1,34**	**2,31**	**358,00**	**0,02**
Home team yellow cards	179,00	2,45	1,59	181,00	2,21	1,42	1,49	358,00	0,14
Away team yellow cards	179,00	2,75	1,50	181,00	2,46	2,16	1,45	358,00	0,15
Home team red cards	179,00	0,10	0,30	181,00	0,12	0,33	-0,63	358,00	0,53
Away team red cards	179,00	0,17	0,42	181,00	0,10	0,30	1,91	358,00	0,06
Home team free kicks	**179,00**	**15,42**	**4,51**	**181,00**	**14,07**	**4,36**	**2,89**	**358,00**	**0,00**
Away team free kicks	**179,00**	**15,21**	**4,85**	**181,00**	**14,19**	**4,37**	**2,10**	**358,00**	**0,04**

Table 2: Descriptive parameters of the observed variables

Observing the data from Table 2 and statistical analysis it is concluded that in four out of nine variables a significant difference is determined. By processing the data of the variable home team shots on target, a significant difference was found during the period without the audience in relation to the time when the audience was present at the stadium (p-value = 0.00) while in variable away team shots on target is not found a significant difference. Furthermore, according to the points won by the home team during the presence of the audience and without the presence of the audience, there is also a significant difference (p-value = 0.02), 1.44 points are won by the hosts without the presence of the audience while on the period without the audience that value was 1.76. In the variables of yellow cards, there are no significant differences for the home and away teams, as well as for the red cards of the home and away teams. Analyzing variable free kicks by the home and away teams, it was found a significant difference with regard to the presence of spectators. The result in the variable free kicks for the home team with the presence of spectators is 15.42 per game, while in the period without the presence of spectators the value is 14.07 free kicks per game, which confirms a significant difference (p-value = 0.00). Also in the variable free-kicks of the visiting team, the average score with the presence of spectators is 15.21 free kicks per game while during the games without the presence of spectators the number dropped to 14.19 free kicks, and also a significant difference in that period was found (p-value = 0.04).

4. DISCUSSION

By processing the statistical data of all matches during the past two seasons of the football league (seasons 2018./2019. and 2019./2020.) in which matches were played in the presence of spectators and without the presence of spectators due to the COVID-19 virus pandemic, a significant difference was determined in several variables. The variables that differ significantly are the free kicks for the home and away team, the home team shots on target and the home team's points won. By studying matches without the presence of spectators, the claims of Pollard and Pollard (2005) were noticed and confirmed, who are guided by the thesis that the advantage of the home field in sports, and especially in football, is a multidimensional issue. That is, there are significantly more factors that affect performance during a football match than statistics show. During their research, they came to the conclusion that there is a spectator influence on the advantage on the home field. That is, this spectator-related factor exists but is difficult to isolate and quantify. Comparing the results of their research with this study and the obtained data, it is established that the 1st HNL in 2002 had a percentage of 68.5% of home victories, while according to this research this number decreased to 50.84% with the presence of spectators while without the presence of spectators to 40.33%. Dilger and Vischer (2020) conducted a study in which they confirmed these theses in the first German league. Namely, the results of their research during the game with the presence of spectators and the victory of the home team is 48%, while the percentage after the break of the championship and continued without the presence of spectators fell to 33%, a drop of 0.44 points per game. Comparing this research, we confirm the thesis about the loss of the advantage of the domestic field with regard to the presence of spectators. More precisely, the results are 50.84% with the presence of spectators, while without the presence of spectators, that number drops to 40.33%. More precisely, the drop of the home team's points of 0.32 points per game is evident, which makes a significant difference. Also, by comparing the variable "home team shots on target", Dilger and Vischer proved that there is a statistically significant difference (p value = 0.002), more precisely that the home team produce a lower number of shots on target. The results are only 13.33 during the game without the audience in relation to the time in the presence of the audience which is 15.98 shots per game. Comparing this with the results of this research, whose results with the presence of the audience are 10.60 shots per game, while without the presence of the audience, that number is 9.35, which statistically means a significant difference in the

results. McCarrick et al. (2020) confirm the thesis of a significant difference in free kicks for both the home team and the away team in a survey conducted on the 15 strongest European football leagues. The conducted research for free kicks for the home team differs significantly in the period with the presence of the audience from the period without the presence of the audience (p value = 0.017). The same conclusion also applies to the variable free kicks to the away team. Which only confirms the results of this research which also identifies significant differences between these periods (p value = 0.00 for the home team, p value = 0.04 for the away team).

5. CONCLUSION

Significant differences in variables of this study can be attributed to the presence of fans, although this is difficult to isolate and classify. It can be concluded that fans, namely the audience and their interaction in stadiums contribute to the performance of the home team, performance and decision-making of match referees.

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INVITED SESSION

Digital Intelligence: The Driving Force of the Digital Economy and Innovation

Invited Session Editor:
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IMPLICATIONS OF DIGITAL WORK ON EMPLOYEE PRODUCTIVITY AND THEIR DIGITAL EMPATHY

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ABSTRACT

Digital empathy is a concept that did not originate during the Covid-19 pandemic, but as such existed several years ago and reached its peak during the Covid-19 pandemic, when millions of people around the world communicated exclusively electronically. The purpose of this paper is to determine the level of understanding other people when mutual communication takes place on-line. Digital empathy is a new segment of the business world that needs to be continuously built and developed. The aim of the research is to establish that electronic communication affects the lack of empathy, which is primarily built through physical contact with verbal and non-verbal communication. The extent to which frequent electronic communication affects reduced productivity, coldness, and lack of empathy. Is the necessary business information provided on time, to what extent is there a lack of face-to-face communication and did the employees of the regional self-government cope with the feeling of loneliness and isolation? Employees of the regional self-government who worked from home during the pandemic were selected for the research sample. The research was conducted using the questionnaire method in a way that explores the opinion of self-assessment of regional self-government employees who worked from home, and related to their productivity, flexibility in working from home, and digital empathy. Based on the results of the survey questionnaires, it was determined that electronic communication affects reduced productivity, coldness and lack of empathy. This paper provides an overview of the disadvantages of electronic communication, which is impossible to avoid in the digital age. Building digital empathy is important in creating the competencies of digital citizens and contributes to increasing digital intelligence. The pandemic catalyzed the digitalization of society and the implications of digital empathy will be further explored in future periods.

Keywords: *Digital empathy, Digital work, Pandemic, Productivity*

1. INTRODUCTION

The beginning of the COVID 19 pandemic brought changes in the labor market, both in the world and in the Republic of Croatia. In order for employers to protect their workers and not expose them to the possibility of contracting the new virus, digital work was introduced. Counties, as units of regional self-government, were not excluded from making decisions to perform daily work tasks from home. As the change in the performance of daily business obligations affected employees, whether employees received all the necessary information on time to perform their work are just some of the issues we are dealing with in the conducted research. Along with intelligence and emotional intelligence, digital intelligence is becoming an important aspect of scientific research. Because digital intelligence is a broad field, the emphasis in this paper is on digital empathy and the implications of digital work on employee productivity. According to Park (2019), the fourth industrial revolution we are currently in is advancing artificial intelligence, automation and other digital innovations. What is empathy and what is the concept of digital empathy?

Empathy is „the ability to share others feelings and it entails both a cognitive and an emotional / affective component“ (Everhart, 2016). Technology brings changes in the way of communication, but also in digital communication it is necessary to pay attention to empathy, ie digital empathy. Digital empathy according to Friesem (2016), "seeks to expand the traditional understandings about empathy phenomena into the digital arena". There are many more definitions of digital empathy, and for the purposes of this paper, the definition from DQ Global Standards Report 2019 that digital empathy will be used ”The concept of digital empathy implies that an individual knows how his online interaction can affect other people's feelings and recognize what the interaction of other participants is“, (Park, 2019). It follows that face-to-face communication immediately recognizes how the interlocutor feels and behaves through verbal and nonverbal communication, while digital communication relies on an individual's ability to show empathy for the interlocutor and recognize his feelings through online communication. Prior to the COVID 19 pandemic, working from home was not so common, but COVID 19 pandemic requires quick solutions and even faster system adjustments, in this case rapid adaptation to a different forms of work. Data collected by the OECD show that countries with comparable data had increased rates of teleworking during the COVID-19 pandemic. Recent research (Luić, Švelec-Juričić, Lasić Lazić, Šantalab, 2020) has shown how important role school principals play in leading institutions, towards the digitalization of the work process. Thus, regional self-government units had to adapt to the new way of working, manage employees, achieve flexibility in work, increase motivation to work, and monitor how working from home affects employee productivity. It is also necessary to define tasks in a timely and clear manner. Motivation to work from home and flexibility depend on the available working conditions, whether the employee has own work space or shares it with family members, who also work from home, or children attending online classes, what technical equipment they have, what is the Internet, has the employer provided an employee who does not have all the necessary conditions with the opportunity to use an official computer? All this was confirmed in the research (Škoda, Baksa, Luić, 2021) that teacher is the one who in online learning must create materials for work, support and monitor student reactions, because there is no part of direct communication in work at home. Previous research (Chung, Seo, Forbes, Birkett, 2020) confirms this problem that employees do not like working from home because of lack of interactive communication, lack of equipment or work space and the inability to clearly set boundaries between business and private obligations, which raises the question of how balance work from home, increase the productivity of this form of work, and reduce the feeling of isolation of employees. The Labor Relation Agency lists a number of advantages and disadvantages of working from home. Some of the benefits of digital work would not be possible without the advancement of information technology. The possibility of saving on rent is mentioned as an advantage, but it is also stated that not all jobs can be done from home, so it is very important to know business processes. The transition to digital work during the pandemic was sudden, especially in regional self-government units because they are primarily designed to be accessible to all citizens residing in their area. A recent study (Niebuhr, Borle, Börner-Zobel, Voelter-Mahlknecht, 2022) notes that due to the rapid process of transition to work from home due to the pandemic, the technical equipment of many people's homes was not sufficient to enable them to work efficiently and healthily. If the ratio of work from home to work in the office increases in the future, technical equipment would need to be improved. Working from home also affects the health of employees (Tavares, 2017) states that the most common health problems when working from home are related to stress, increased work and isolation or depression. The research question of this paper is to increase knowledge about the circumstances of how working from home affects the productivity of employees in regional self-government units, and do workers feel empathy during digital work?

The aim of the paper was to determine how employees of regional self-government units felt when working from home, whether they felt like they were at work, or did they were more productive, whether they could separate working hours from private responsibilities, and whether felt lonely and isolated while performing work duties. In accordance with all the above, the following hypotheses have been set:

- H1: Working from home negatively affects employee emotions.
- H2: Working from home negatively affects employee productivity.

2. METHODOLOGY / MATERIAL AND METHOD

The research was conducted anonymously through a survey - google form, which was sent electronically, in compliance with all relevant provisions of the GDPR to publicly available electronic addresses of employees of all units of regional self-government in the Republic of Croatia. A total of 1,000 e-mail addresses were available to which the survey was sent, while 138 employees of regional self-government units throughout the Republic of Croatia volunteered to participate in this research. The survey was conducted in the period from April 18, 2022. - 24.04.2022. It contained 13 questions that included general demographic data on respondents, gender, age, education, place of work, and specific questions related to the research question.

3. RESULTS

All respondents - employees of regional self-government throughout the Republic of Croatia, through a survey questionnaire - google form were asked 13 questions based on which the results were processed as follows. The number of women in the share of respondents was 103 and 74.6%, while the number of men who participated in the study was 35 and 25.4%. Furthermore, respondents had to answer the question of which age group they belong to, so in the age group from 26 to 35 years participated 25 respondents or 18.1%, in the age group from 36 to 45 years participated 41 respondents, or 29.7 %, in the age group of 46 to 55 years participated 41 respondents and 29.7%, in the age group of 56 to 65 years participated 29 respondents and 21%, while the study involved only two respondents over 65 years of age whose the share in the total research mass is 1.4%. The study involved 13 respondents with secondary education (9.4%), 13 respondents with higher education (9.45), 98 respondents with higher education (71%), 10 respondents with a master's degree (7.25) and 4 respondents with a doctorate (2.9%). The largest number of respondents who participated in the research were employed in Istria, Varaždin and Koprivnica-Križevci counties. Among other things, respondents answered the question of how often they worked from home during the Covid-19 pandemic, so 76 respondents, or 55.1%, answered that during the Covid-19 pandemic they worked from home in shifts, ie combinatorics, in such a way that one one day working from home and one day from the office or in a way that one week they worked from home and one week from the office or some other combination. 60 respondents, or 43.5%, stated that they did not work from home during the Covid-19 pandemic, while only two respondents, ie 1.4% of respondents, worked from home during the entire duration of the Covid-19 pandemic. As this paper determines whether digital work affects employee productivity and digital empathy, one of the questions asked was "What do you think digital empathy is?" To the above question 113 respondents who participated in the survey, or 81.9% answered that for them digital empathy is understanding the feelings of others when communication takes place electronically, while 25 respondents and 18.1% answered that for them digital empathy electronic communication that takes place according to the standard principle. One of the questions asked to the respondents who participated in the research was whether they had all the necessary computer equipment to work from home, including the appropriate Internet connection. To this question, 17 respondents, or 15% said that their employer provided them with all the necessary equipment

for work from home, 43 respondents, or 38.1% answered that the employer did not provide them with all the necessary computer equipment for work from home, while 53 respondents, or 44.9%, answered that their employer provided them with only a part of computer equipment for working from home while they used their own internet. Respondents were asked what they missed most about digital work during the Covid-19 pandemic. To this question, 24 respondents, or 20.9%, answered that during work from home they mostly lacked computer equipment and all other equipment needed to perform tasks within their scope, 50 respondents or 43.5% of the total number of respondents answered that they most missed the conversation with colleagues live, ie face to face, 35 respondents, ie 30.4% most missed the information needed to do the job, seven respondents, or 6.1% most missed the appropriate high-speed Internet connection, while none of the above was missing 31 respondents, or 27% of them. When asked if they have a feeling when working from home that they are at work, 76 respondents, or 67.9% answered that they do not feel that they are at work while 36 respondents, or 32.1% answered that they feel they are at work while working from home. When creating the survey questionnaire, in addition to all the other questions mentioned above, we asked three central research questions below as follows:
Respondents were asked if they felt the emotions of the interlocutor when using electronic communication. As can be seen from Figure 1, 81 respondents do not feel emotions when using electronic communication, while 51 respondents claim that they feel emotions when using electronic communication.

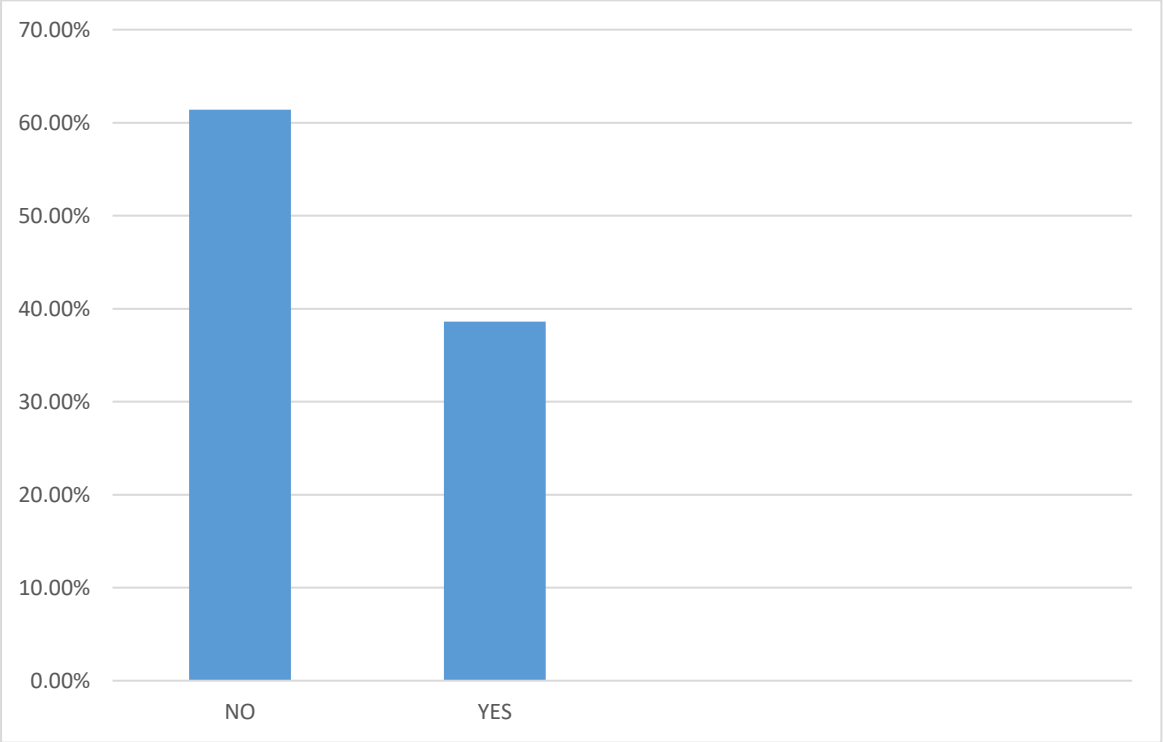

Figure 1: Percentage of respondents who feel or do not feel the emotions of the interlocutor when using electronic communication
(Source: Authors research)

When asked what work from home represents for the respondents, and as can be seen from Figure 2, 40 respondents answered that working from home is an advantage for them, 60 respondents answered that for them working from home is a disadvantage, while indecisive were 32 respondents.

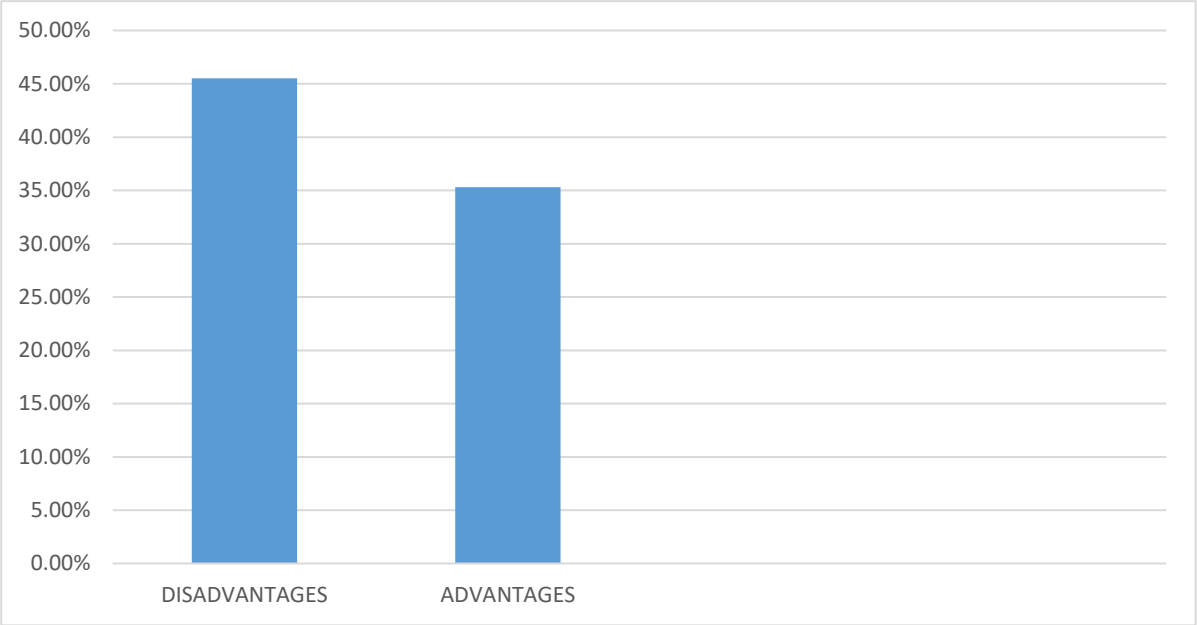

Figure 2: Statistics of respondents who believe that working from home is an advantage or disadvantage
(Source: Authors research)

As can be seen from Figure 3., 94 respondents who participated in the survey answered that they are more productive when working in the workplace while 19 respondents answered that they are more productive when working from home.

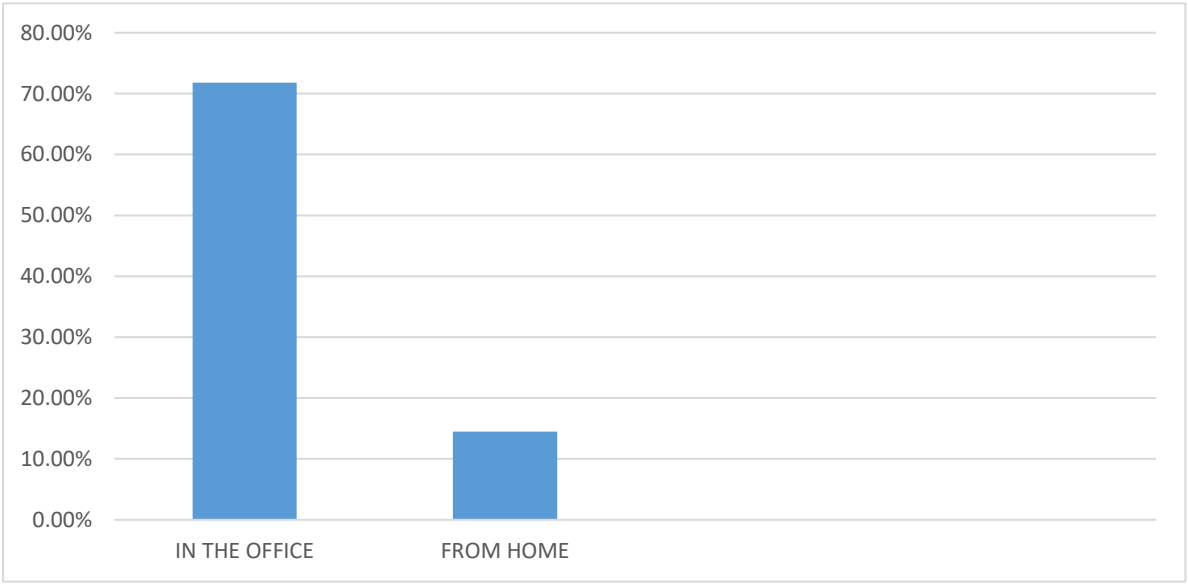

Figure 3: Percentage of respondents who are more productive when working in the office compared to those working from home
(Source: Authors research)

4. DISSCUSION

In order to establish understanding of other people and self-assessment of their own attitudes when communicating with each other electronically, and based on research conducted through a questionnaire - Google form sent to e-mail addresses of all publicly available employees of regional self-government throughout Croatia, research results confirmed that electronic communications are affected by reduced productivity, coldness and lack of empathy.

During the Covid-19 pandemic, when we had the feeling that the whole world had "stopped" and when millions of people all around the world were employed in jobs that involve contact with people, they lost their jobs, a certain percentage of people employed in public administration tasks within its competence for the purpose of accessibility to citizens, by order of the employer, continued to perform electronically. However, the main problems that arose when working from home, ie during "on-line work" are the lack of face-to-face communication, lack of emotion of the interlocutor's emotions and extremely reduced productivity. Starting from the theory that "people are social beings who meet their needs in everyday communication with other people", and that the most common way to meet social interactions is communication, the logical question is whether electronic communication is to meet social needs. feel emotions. Based on previous research on the perception of emotions through visual and auditory channels, it has been found that "the ability to recognize emotions is considered a major component of emotional competence because it is responsible for empathy and the ability to interpret human reactions and predict subsequent reactions." Furthermore, in face-to-face communication, emotions are primarily seen on the interlocutor's face, and to a lesser extent on the body. When working from home, and in accordance with the scope of work within their competence, employees of regional self-government mostly used e-mail correspondence, while involvement in audiovisual platforms was rare, so based on this research it can be concluded that respondents who participated in the research did not feel the emotions of the interlocutor when working from home, that they felt lonely and isolated compared to the fact that most of them lacked face-to-face communication during work from home. The next hypothesis we set up relates to the issue of employee productivity of digital work during the Covid-19 pandemic. The issue of work in general, among other important segments, should be considered through employee productivity. In many developed countries, various institutions and companies invest more in employee productivity than in capital expenditures. Unfortunately, this is not often the case in Croatia, especially not in state administration bodies, bodies of local and regional self-government units and other legal entities with public authorities, due to scarce budgetary resources. The issue of productivity of employees of state administration bodies, local and regional self-government units and legal entities with public authorities in the Croatian public and media space is often questioned, emphasizing the reduced abilities of their employees and, consequently, the issue of productivity. negative perceptions of public bodies in general. The media review of their productivity gained an even greater dimension during the Covid-19 pandemic, when, as we mentioned earlier, thousands of people across Croatia lost their jobs. At a time when the whole business process has moved from the office to the homes of employees, it is very important to analyze their productivity, work orientation and sense of presence in the workplace. 55% of respondents who participated in surveys during the Covid-19 pandemic worked from home, either in shifts or combinatorially, working one day from home and one day from the office, or working one week from home and one week from the office, which indicates the fact that the regional self-government bodies did not have the necessary amount of work space to provide epidemiological measures for all their employees, so employees worked part of their working time from home, part from the office. Furthermore, when we talk about work from home related to the public sector, we understand digital work and it is assumed that the bodies of regional self-government units have provided their employees with all necessary computer and IT equipment for work from home, but from the established results it turns out that only 17 respondents had the equipment provided, while the rest of the employees were provided by the employer with only part of the computer and IT equipment or did not provide them with anything to work from home. Given that the majority of employees of regional self-government units are people with a university degree, it is to be expected that they have basic computer equipment for working from home, but the question is whether all respondents who worked from home had an adequate high-speed Internet connection.

In our survey questionnaire, only seven respondents pointed out that they lacked high-speed internet connection when working from home, but if we take into account that 138 respondents participated in the survey, we believe that the number of people that are working from home during the Covid pandemic 19 significantly higher, and that it is possible that a larger number of respondents had a problem working from home with a suitable high-speed Internet connection, especially at a time when thousands of people were locked in four walls and spent most of their free time online. Furthermore, when working from home, more than 67% of respondents did not feel that they were working from home, so this is another issue that we can draw in parallel with the issue of productivity when working from home. By getting ready for work every day, traveling to and from work, completing specific job descriptions and a range of other work-related activities, people gain a routine that is interrupted overnight during the Covid-19 pandemic, but this routine apparently contributes productivity, given that 72% of respondents said that they are more productive while working in the office and that they do not feel at work when working from home. Given that the study involved 138 respondents out of a total of just over a thousand potential respondents whose e-mail addresses are publicly available on the websites of regional self-government units in the future it would be necessary to conduct additional research in some other areas during the Covid-19 pandemic. from working in the office started working from home.

5. CONCLUSION

With this research work conducted through a survey - google form on employees of regional self-government in Republic of Croatia, we very easily came to the hypothesis, ie the realization that digital work from home affects reduced empathy, employee productivity and coldness of respondents. Furthermore, with this work, we covered a number of shortcomings of digital work from home, which in the digital age, especially at the time of the pandemic, was impossible to avoid. The pandemic has further catalyzed the digitalisation of society, and the implications of digital empathy will be further explored in the coming future, especially for employees who frequently work in office but they have to work from home in certain circumstances. Digital work also needs to be regulated through a legal framework so that both employers and employees can reap certain benefits from a such work. Some future research could focus more on the pros and cons of working from home in other sectors such as banking, education or trade. As digital work will be further developed in the future, it is good to recognize the stated shortcomings of such work, and in the future to turn to investing in their elimination so that there are no differences in work from home and office.

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THE ROLE OF PERSONAL DIGITAL COMPETITIVENESS IN THE DIGITAL ECONOMY: ATTITUDES AND VALUES OF DOCTORAL (PHD) STUDENTS

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ABSTRACT

Digital Intelligence (DQ) is a global standard model related to digital literacy, digital skills and readiness for contemporary digital challenges. Furthermore, DQ is a set of capabilities which acts as a key driver for digital competitiveness and digital economic growth. In this paper the authors will research relationship between selected digital competencies and digital competitiveness in digital economy. Digital economy is defined as a part of economic activity that primarily derives from digital technologies with a special focus on advancing the business model based on digital products or services. Such a business model is defined by the hyperconnectivity among people, organisations and machines primarily through mobile technology and the Internet of Things. In the digital economy, all business-to-business and business-to-consumer stakeholders have their business interactions where and when they want, according to their preference. The aim of this research paper is to examine the attitudes and values related to a personal digital competitiveness within the target audience – doctoral (PhD) students – who can play an active role in the further development and application of digital competencies in digital economy and society. The perception of the DQ monetarization possibilities (personal income, working conditions) in the market-digital competition, as well as DQ capitalization possibilities in the so-called "social status" sphere, (quality of life and reputation) are topics which determine the framework of the research problem. The research will be conducted using a quantitative method through the collection of empirical data in the form of a structured questionnaire with closed questions. The research results aim to indirectly contribute to raising awareness of digital competitiveness and at the same time to directly contribute to the harmonization of public educational policies aimed at enhancing the digital competencies of both educators and students within the context of the current highly dynamic digital economy development.

Keywords: *Digital competitiveness, Digital economy, Digital intelligence, Socioeconomic status*

1. INTRODUCTION

The modern world is changing rapidly with the common denominator being digital transformation. Game-changing digital innovations are becoming the "new normal", as digital economy (Tapscott, 1996) stakeholders need to swiftly adapt to timely identify and meet key business to business (B2B) and business to customer (B2C) needs and expectations. The emerging digital economy is aggressively shaping existing societies, business and operational models but, at the same time, also introducing a new spectrum of opportunities and challenges. Moreover, the digital economy is bringing novel digital tools and technological advances into our lives, such as *Artificial intelligence*, *Augmenting Human Intelligence*, *Deep Learning*, *Internet of Things*, *Big Data Analytics*, *Robotics and Hyperconnectivity*, just to mention some of them.

The processes of digital transformation are bolstered by the industrial to digital economy transition demands, with data becoming the key resource (Luić, Alić, 2022). In the period from 2018 to 2025 the value of the data economy in the EU27 is expected to grow from €301 billion to €829 billion, while the number of data professionals will rise from 5.7 million to 10.9 million. In parallel, EU population with basic digital skills will increase from 57% to 65%, which will be essential for adaptation to market changes and the estimated 60 million new jobs created, worldwide, by AI and robotics until 2025 (European Council, Council of the European Union, 2022). According to the World Economic Forum (WEF), the combined value of the digital transformation could generate upwards of $100 trillion over the next 10 years, with society set to gain more than business (WEF, 2022.). Digital transformation is, therefore, becoming a key factor in the labor market, which will differentiate *winners* from *losers* in society digital transformation. Nevertheless, the key to digital transformation are still people. Accordingly, this research focuses on digital competencies that develop and strengthen digital competitiveness. The used model was developed by the *DQ Institute* and endorsed by the Coalition for Digital Intelligence (DQ Institute, 2018). Just as the digital economy can be the driving force behind a society, highly educated and digitally capable individuals can be a driving force behind the digital economy. Digital Intelligence (DQ) represents critical skills needed to thrive in the digital age. DQ is defined as "a comprehensive set of technical, cognitive, meta-cognitive, and socio-emotional competencies that are grounded in universal moral values and that enable individuals to face the challenges and harness the opportunities of digital life." (DQ Institute, 2018). One of the most operable terms of the modern economy is competitiveness, which measures economic success by efficiency, economic growth and development (Vurnek, Hodak, Bengez, 2019). During the digital transformation process one of the key concepts is digital competitiveness (as shown in *Figure 1*), measured by the capacity and readiness of economies to adopt and explore digital technologies as a key driver for economic transformation in business, government and wider society. The digital economy is defined as a part of economic output derived solely or primarily from digital technologies with a business model based on digital goods or services. The basis of such an economy is the hyperconnectivity of people, organizations and machines through the Internet and mobile technology. On the other hand, the competitiveness of the national economy is the ability to produce goods and services in free market conditions that will meet international requirements and at the same time increase the personal income of citizens (Perkov, 2019). According to Porter, one of the most important authors in the field of economic competitiveness, among the main factors of production requirements are: knowledge (as the most important input resource) and human resources - available labor force in its quantity and quality. Human and knowledge resources have a critical role in creating a competitive advantage (Andrijanić, Pavlović, 2012). Thus, in this paper we will study individuals' attitudes and values, especially of those who are not only meant to be an object but also a proactive subject of digital transformation. Accordingly, this research is focused on a specific population sample with the ability to identify and develop oneself as a competent changemaker in the digital economy. The research is measuring their digital competencies in the field of digital competitiveness and their perceptions of the importance, role and position of digital competencies in the economic domain. More precisely, the aim of the research is to examine the attitudes and values of the PhD students in information and communication sciences at the University of Zagreb and the University North.

Figure following on the next page

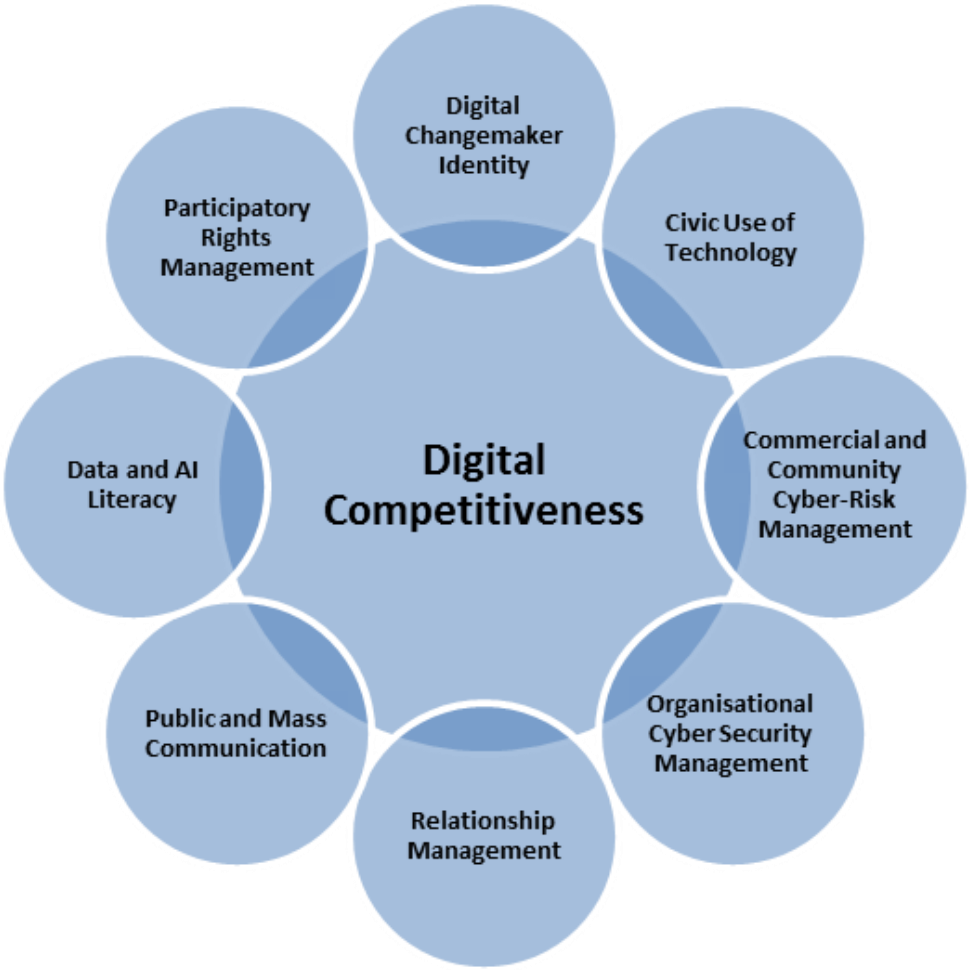


Figure 1: Digital Competitiveness
(Source: DQ Institute, https://www.dqinstitute.org/)

2. METHODOLOGY

The research was conducted using the questionnaire method, from April 21 to April 28 2022, with numerical analysis of obtained data. The survey was created using *Google Forms*. In the introductory part of the survey, along with the identification of the researcher, the purpose and goal of the research are presented. The survey contains 26 questions, three of which are questions of sociodemographic structure (gender, age and years). The closed-ended questions are a combination of multiple choice and questions composed on the principle of an interval scale (Linkert scale) of assessment of attitudes of 5 degrees, where the value of 1 (one) is the lowest value and the value of 5 (five) is the highest value. A link to survey was sent to targeted PhD students at their official university e-mail addresses asking them to complete a questionnaire. The PhD students filled out the questionnaire anonymously and on free will. In accordance with the aim of the research, the following hypotheses were set and categorised for better exploration at the social, personal and national level: Hypothesis H1: Personnel level – Advanced digital competitiveness (as part of digital intelligence / DQ) provides better personal income as well as better social reputation of individuals (socio-economic status/SES) in the digital market competition. Hypothesis H2: Social level - Digital intelligence/DQ and digital competitiveness are set of skills that are key factor for success in the digital economy. Hypothesis H3: National level - The synergy of the education system and labour market needs contributes to the development of the digital economy in Croatia. Within this hypothesis, development factors for raising digital competitiveness were investigated.

3. RESULTS

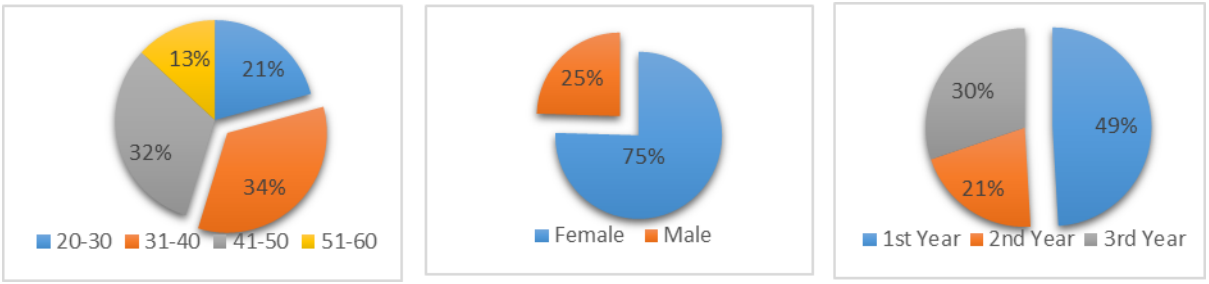


Figure 2: Age, sex and academic year determinants of the tested PhD students (Source: Authors research)

Overall, 53 respondents (N = 53) participated in the survey, of which 38 were doctoral students at the University North (71.1%) and 15 were doctoral students at the University of Zagreb (28.3%). Most respondents are in the age groups 31-40 years (34%) and 41-50 years (32%). Taking into account younger respondents who have a very high potential for further development (20-30 years - 20.8%) and those who predominate with their accumulated professional knowledge and skills (51-60 - 13.2%) we can deduce that survey representative sample includes a good combination of knowledge, skills, experience and youth. Regarding the responder's gender structure, women make up 75% of the respondents (as shown in *Figure 2*). Based on the hypotheses and responders' answers, the results of the research are structured by chapters. This structure presents the research results by levels that are most important for the digital transformation of society as well as for the development of digital competitiveness in the new economy.

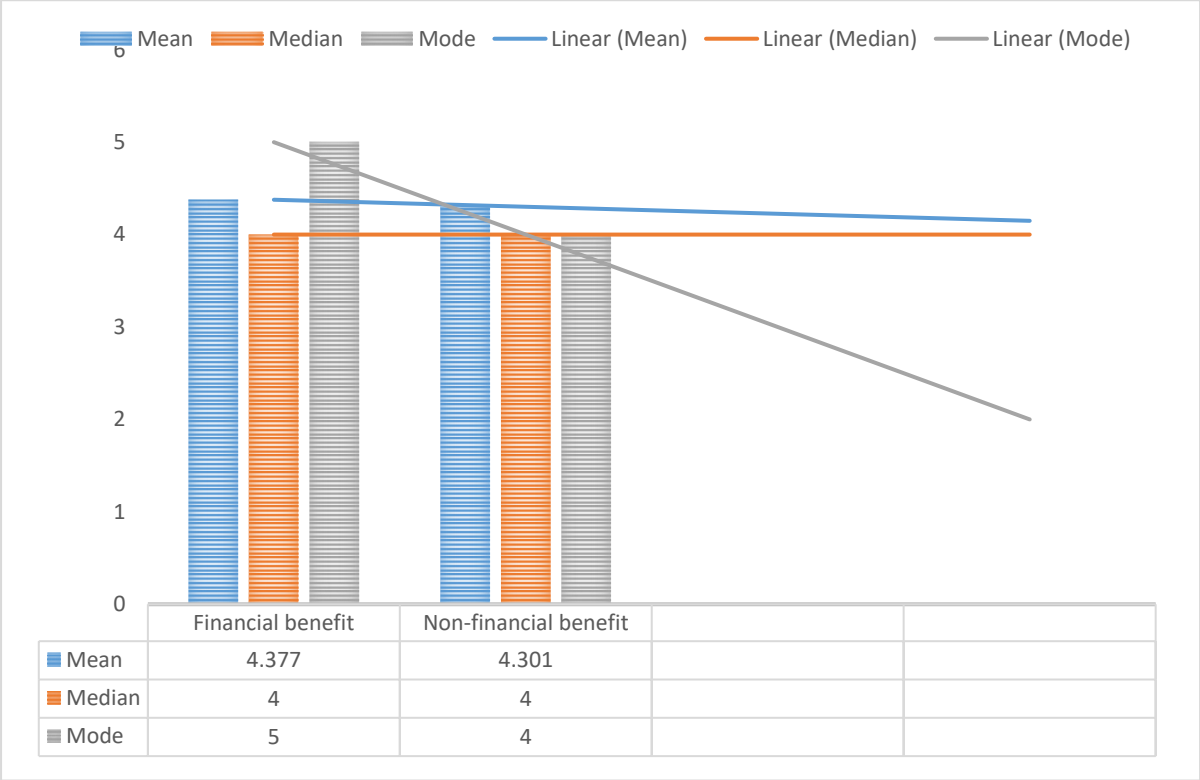
3.1. Personal level – Assessment of personal digital competencies and digital competitiveness as a factor of personal socio-economic success

In the research, the respondents have demonstrated significant coherence and supported a common perception of responses and have been substantially positive regarding digital competencies (as shown in *Table 1*). The interest and ability to assume the role of "a changemaker" in digital economy by developing its own digital competencies (in local, national and global community) has indicated certain indecisiveness regarding the interest (32% neither agree nor disagree) and abilities (36,54% neither agree nor disagree).

DIGITAL COMPETITIVENESS	MEAN	MEDIAN	MODE	MAX	MIN
Digital Changemaker Identity	3.1	3	3	1	5
Civic Use of Technology	3.5	4	4	1	5
Commercial and Community Cyber-Risk Management	3.0	3	3	1	5
Organisational Cyber Security Management	2.9	3	3	1	5
Relationship Management	4.2	4	5	1	5
Public and Mass Communication	4.1	5	5	1	5
Data and AI Literacy	2.6	3	3	1	5
Participatory Rights Management	3.8	4	3	1	5

Table 1: PhD students ranking their digital competencies and digital competitiveness in the digital economy using 1-5 Likert scale (Source: Authors research)

Likewise, the category of managing the cyber risk (35,8% neither agree nor disagree), implementing cyber protection (41,5% neither agree nor disagree) and applying AI and algorithmic tools (54,7% neither agree nor disagree) identifies the fact that the respondents are indecisive. Furthermore, H1 hypothesis has been confirmed, meaning that personal digital competitiveness (as part of digital intelligence/DQ) in market and digital competition enables higher personal income, better working conditions, social status and individual status (socio-economic status/SES). The respondents claim that personal digital competitiveness will enable higher personal income and better working conditions on the digital economy market (in elaborating this statement, 49,1% absolutely agree, and 39.6% agree) and that personal digital competitiveness will enable better social status in digital society and better quality of life (in elaborating this statement, 43,4% absolutely agree and 45,3% agree) (as shown in *Figure 3*).



	Financial benefit	Non-financial benefit		
Mean	4.377	4.301		
Median	4	4		
Mode	5	4		

Figure 3: The perception of the digital competitiveness financial and non-financial benefits using 1-5 Likert scale (1 – no benefit; 5 – strong benefit)
(Source: Authors research)

3.2. Social level – DQ and digital competitiveness as a set of abilities crucial for economic growth

H2 hypothesis has also been confirmed. It claims that digital intelligence (DQ) and digital competitiveness are a set of abilities (knowledge and skills) that will be crucial for the success in digital economy of next generation of business people, companies and processes (in elaborating this statement, 54,7% absolutely agree and 37,7% agree, as shown in *Figure 4*) and that qualified work force with developed digital intelligence is the most important factor of digital economy development (in elaborating this statement, 50,9% absolutely agree and 34% agree). Besides, positive stances regarding digital intelligence are additionally confirmed by the attitude that digital competitiveness and digital economy bring more benefits than risks and dangers to future business and employment (in elaborating this statement, 47,2% absolutely agree and 30,2% agree).

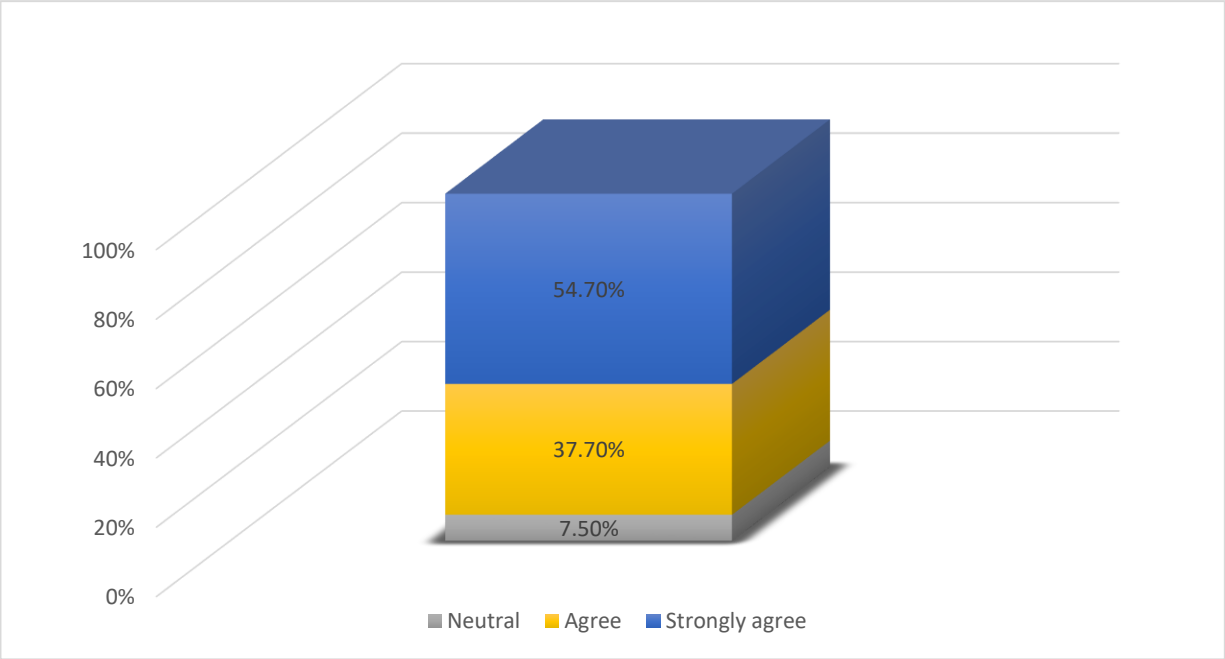


Figure 4: DQ and digital competitiveness are set of capabilities that will be crucial for the success in digital economy
(Source: Authors research)

3.3. National level – Synergy of educational system with labour market in digital economy and key factors of synergy

H3 hypothesis has also been confirmed. It claims that synergy of educational system with the needs of labour market contributes to digital economy development in Croatia.

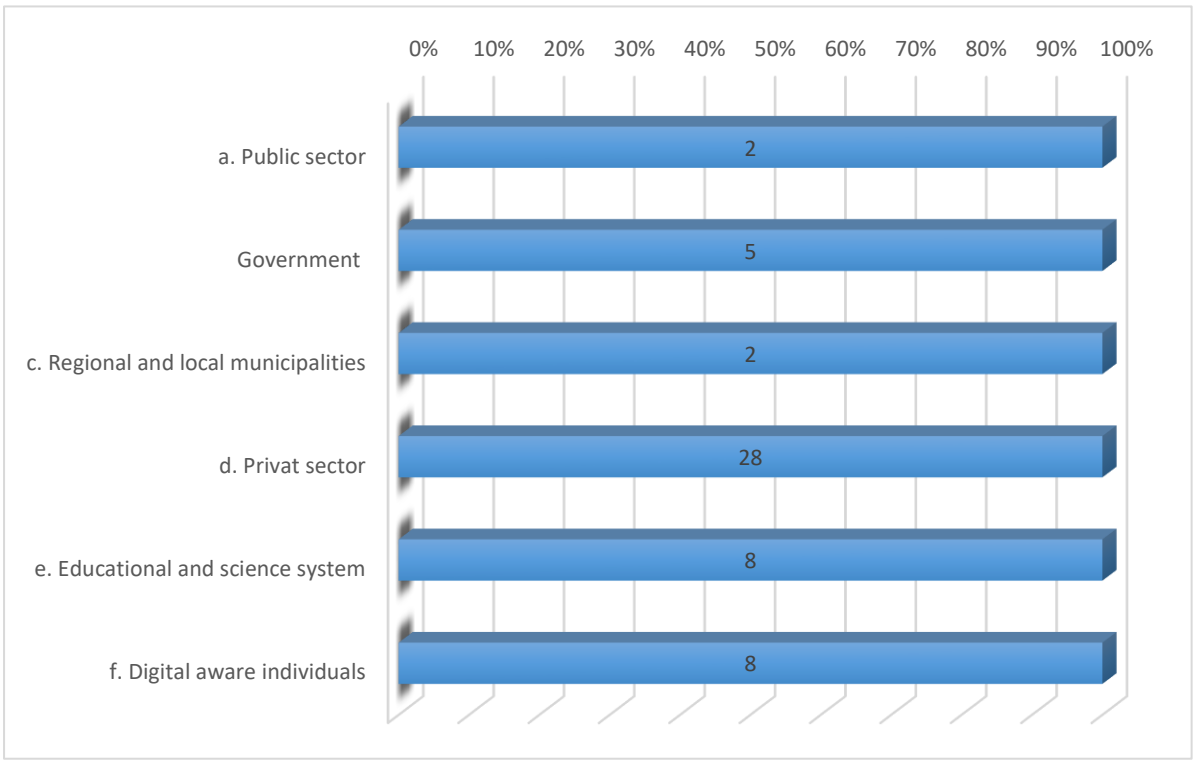


Figure 5: Potential for raising digital competitiveness in the digital economy by subjects,
(Source: Authors research)

Synergy factors have been examined within this hypothesis, where the respondents expressed their opinion that private sector unquestionably has the greatest potential of raising digital competitiveness (52,8% of responders chose private sector as a first choice, as shown in *Figure 5*). However, the greatest potential of strengthening the cooperation between academia (the university), industry and government, i.e. Triple Helix model of cooperation (as shown in *Figure 6*) was found in the educational and scientific system (37,7% respondents) and the Government (30,2% respondents). Also, in support of these statements, there is a very positive elaboration of the stance that the alignment of educational system with the needs of the labour market contributes to the development of digital economy in Croatia (in elaborating this statement, 71,6% absolutely agree and 18,8% agree, as shown in *Figure 7*), and that education and skills gaining in the field of digital intelligence contributes to the development of digital economy in Croatia (in elaborating this statement, 67,9,% absolutely agree, and 26,4% agree). Moreover, the respondents very positively perceive efforts and projects of the private entities working on the development of new national digital strategies, such as Croatian Artificial Intelligence association (CroAI) which advocates the development of national strategy for AI. In other words, in the context of development of digital economy and digital competitiveness, the respondents agree that Croatia is a small country with great opportunities, with companies such as Infobip, Nanobit having a vision and ambition to develop digital economy in Croatia (in elaborating the statement, 54,7% absolutely agree, and 32,1% agree).

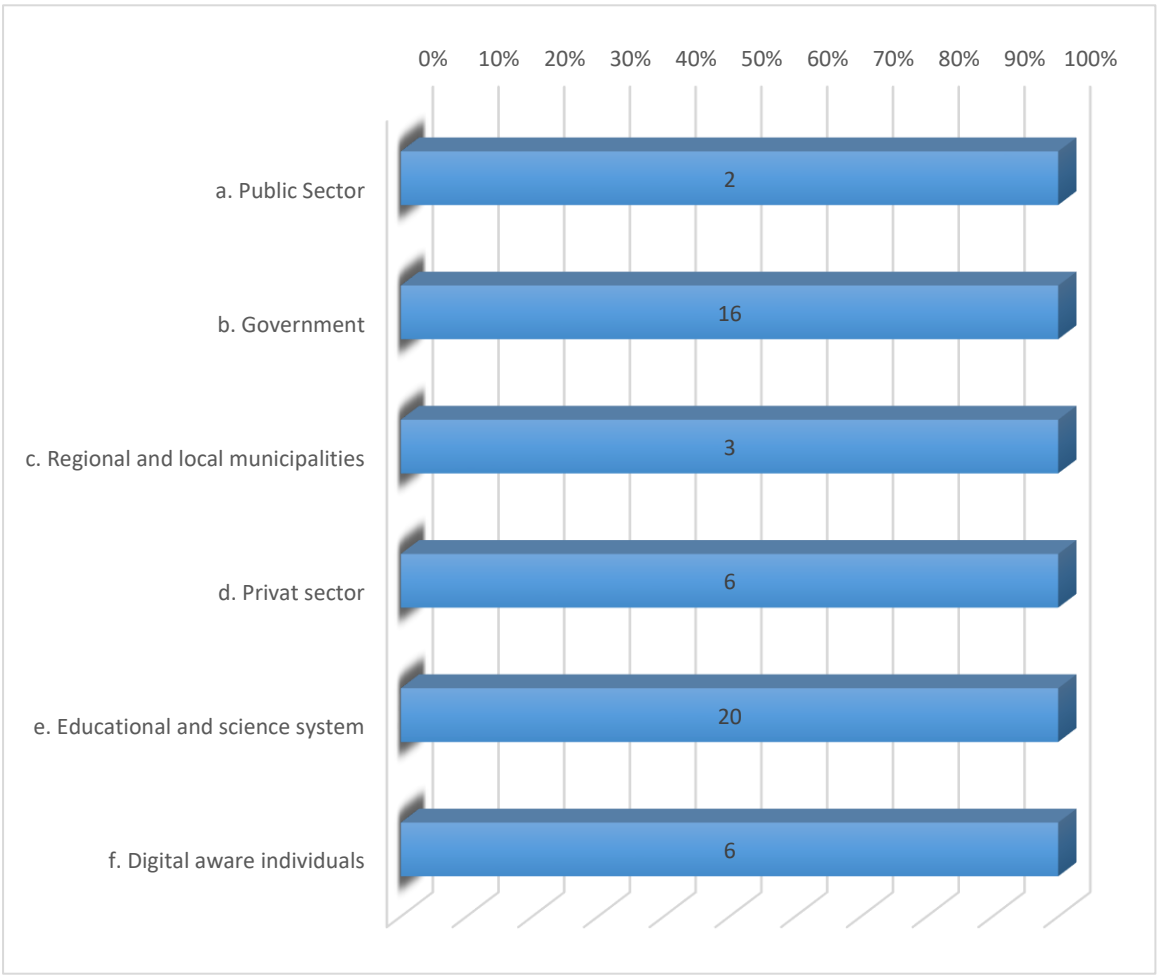


Figure 6: Potential for strengthening interactions between academia, industry and government (Triple Helix model) to foster digital economy development (Source: Authors research)

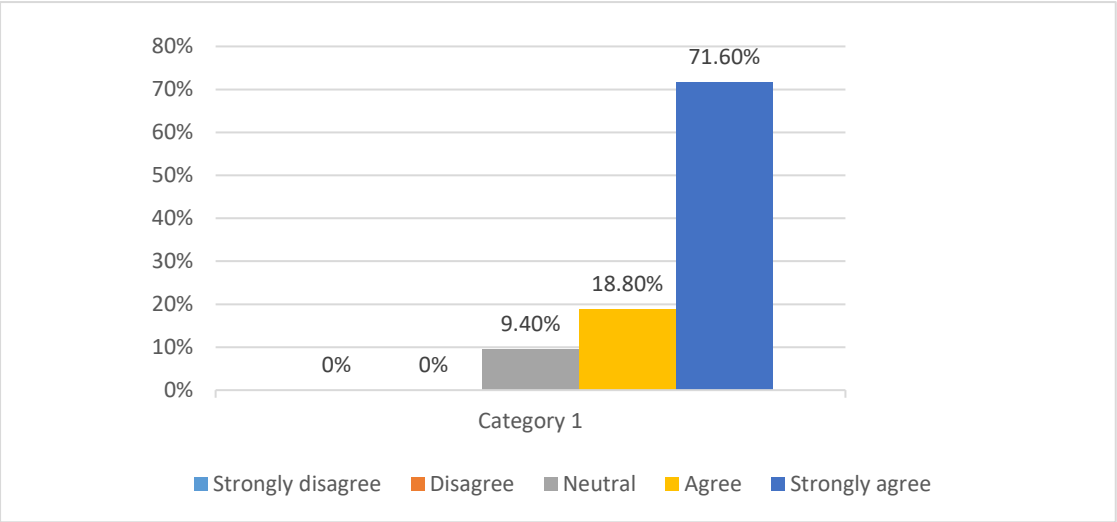


Figure 7: Harmonization of educational system and labor market contributes to the digital economy development
(Source: Authors research)

4. DISSCUSION

One of key prerequisites of digital transformation of the society and development of digital economy is the knowledge of digital competencies and digital competitiveness – their functions, roles and importance in targeted society and economy. Thus, the synergy of educational system with the needs of labour market is crucial in the process of digitalisation of the society and economy and, if properly implemented, can provide a catalytic effect. This effect is possible because, in digital economy, knowledge and innovativeness are becoming the main resource and driver of economic development, as well as indicators of competitiveness. Competitiveness of national economy is key driver of social prosperity and growing welfare. Business access to the latest digital technologies, synergies between digital and other key technologies provides a network of digital innovation centers (Sunigovets, 2019). Therefore, it is indicative that doctoral students of information and communication sciences believe that the greatest potential for strengthening the cooperation between academia, industry and government, which is critical for comprehensive digital transformation, lies within educational-scientific system and central executive power. i.e. the Government of the Republic of Croatia. Despite the current unenviable position (59. place) of Croatia at global index of competitiveness (IMD World Competitiveness Ranking, 2021.), the respondents claim that, in the context of development of digital economy and digital competitiveness, Croatia is a small country with great opportunities. This is also in line with the official Croatia expectations (National Development Strategy of the Republic of Croatia by 2030) to reach the EU mean in Digital Economy and Society (DESI) Index by year 2030. The research provided very positive stances towards the activities like those of Croatian Artificial association (CroAI), which pro-actively and systematically advocate the development of national strategy for artificial intelligence. Regarding to assessment of personal digital competencies and digital competitiveness, research identifies the fact that the respondents are indecisive or uncertain in certain area (the category of managing the cyber risk, implementing cyber protection, applying AI/ algorithmic tools and interest/ability to assume the role of a "changemaker" in digital economy), indicating the interpretation that certain digital competencies are in the initial phase of development, i.e. that there is a significant room for improvement of digital competencies in the Croatian society. To overcome these and similar challenges in academia setting, strategic thinking is extremely important and requires the development of strategic plans (Švelec, Luić, 2021).

On the other side, the best results are measured in categories: „Public and Mass Communication" and „Relationship Management" where responders exhibit strong positive attitude towards collaborative technology use that is ethical, purposeful, and principled to engage in a productive discourse with their digital communities as well as for self-motivation and a commitment to provide an inclusive culture that cultivates tolerance to one another and teamwork towards building and growing positive communities online. Simultaneously, other digital competencies are well accepted and the respondents' self-awareness of them and of their own abilities are well developed. Besides, the research showed a positive perception that personal digital competitiveness will enable higher personal income, better working conditions, social status and status of individuals (socio-economic status). Those attitudes and values, together with claims that digital intelligence (DQ) and digital competitiveness are a set of abilities (knowledge and skills) which will be crucial for the success in digital economy of next generation of business people, companies and processes and that qualified work force with developed digital intelligence is the most important factor of digital economy development - are *a key driver for digital competitiveness.* This is a tangible indicator of a *pro-DQ mindset* in higher education population, i.e. PhD students in information and communication sciences. It could be interpreted as a positive contribution of information and communication sciences to digital economy and digital transformation of Croatia in general.

5. CONCLUSION

Apart from transforming traditional ways of doing business and creating new products, services and business activities, digital economy increases productivity, profitability and digital competitiveness of companies and significantly contributes to overall digital transformation of the society. However, during the digital transformation of society, it is necessary to adapt and synchronise personal stances and values with conditions and stakeholders in the digital economy. Joint efforts of all actors can create a digital eco-system with positive impact on development and dynamics of digital economy on B2C and B2B market. What is important in digital economy with regard to digital competitiveness is the fact that digital innovations create competitive advantage. In consonance with this, research showed that digital competencies need to be further developed as a set of knowledge and skills – or as a capital of DQ knowledge and skills – to contribute to digital transformation of society and development of digital economy. When it comes to the future research, it could be productive to continue this exploration as longitudinal research, in order to keep track of changes in this domain. Summa summarum, the development of digital competitiveness and digital economy can have a catalytic impact on the overall economy of Croatia and serve as a driver of economic growth and new strategic investments. In this process, the important element is the improvement of digital competencies of high-educated and motivated persons who have a *pro-DQ mindset,* which has been evident in this paper. This approach will have a *gamechanger* character where critical theses are neutralised, like the "paradox of natural wealth" thesis, explaining that countries abounding in natural wealth are mostly characterised by poor economic development. Digital transformation of the Croatian society and economy can change the above-mentioned thesis in a radical, positive and irreversible way and thus unlock overall capabilities of the Croatia.

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DIFFERENTIATION OF DIGITAL PUBLIC RELATION TOOLS ANALYSED FROM A DIGITAL LITERACY PERSPECTIVE

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ABSTRACT

The use of digital tools in both personal but also working life has become a daily reality and, as regards the public relations aspect, it is necessary to explore whether the frequency with which digital tools are used has an impact on the digital literacy of professionals. The purpose of the work is to explore digital tools and to identify whether they enhance the digital literacy of PR professionals, PR experts, and the aim of working to detect which digital tools significantly improve public relations, viewed from a digital literacy perspective. The research question on which this work is based, which determines its character, questions the frequency with which public relations experts use digital tools and examines whether their use, has an impact on the development of digital literacy. The survey was carried out in Croatia, using a deliberate sample of public relations companies, selected on the basis of the number of employees, geographical area and sector of activity, in order to understand which digital PR tools are the most commonly used by PR professionals and whether, use of these tools is correlated with their level of digital literacy. Following the data collected, a comparison of the tools used by public relations companies was carried out and an analysis of the functionality content of the most commonly used tools was carried out using a quantitative and qualitative method. The Analytical Matrix specifies the frequency with which individual tools are used, as well as their impact on development of the digital literacy. The commutation of results concludes that the use of a specific set of PR tools has a direct impact on digital literacy if professionals use them, and indirectly on the advancement of their digital intelligence, which provides an incentive for further related research. To what extent and how the use of only one digital tool facilitates the development of digital literacy of PR professionals in relation to the use of other tools is one possible route to continue research.)

Keywords: *Digital tools, Digital Literacy, Public Relations, PR experts*

1. INTRODUCTION

Public relations have evolved throughout the years and we see increasing progress with the introduction of digital tools that facilitate their use every day. In more developed countries, many organisations use a variety of digital tools to be able to manage their reputation easily and reach a favoured audience. Digital tools and technology have greatly improved the way in which public relations are practised, and the live streaming of technologies has become fully free of charge, while it had to be paid for transmissions in the past. It is not only the use of digital tools that is crucial for the development of public relations, but many factors have an impact on this. Some of the factors influencing development are: ways of doing business, expertise, investment in education, technological inefficiencies, cost, corruption, government, adoption of new media, etc. This paper will illustrate the impact of digital tools on developing digital literacy among PR professionals, but above all, it is necessary to define what actually public relations are. There are various definitions in this regard, but one of the most important is perhaps the definition that public relations are 'management of communication between an organisation and its public' (Grunig and Hunt (1984)) and a detailed definition of public relations as a process/acquisition of public attitudes, delivery of action programmes and communication of information to the public through channels/media, i.e. to gain public acceptance and good will (Ikpe and Olise (2010)).

All these definitions are not the most recent and can still be seen as seamless integration through multiple channels, ensuring continuity in certain channels, all of which are responsible for success. Therefore, public relations are not only the maintenance of mutually beneficial relations between organisations and their public. Most global communication platforms are now digital and mobile; such as, for example, videoconferencing, mailing, Twitter, Facebook, Snapchat, LinkedIn, Pinterest, Skype, etc. It is essential for people dealing with public relations to be able to communicate through multiple channels and in different ways in order to keep up with time, and it is not enough to simply know how to communicate, but to know digitally. This is why there is a need to develop digital literacy, which is crucial for every organisation dealing with public relations today. Several 'digital literacy' can be identified, mainly from the pre-digital era, but presented as a way to understand phenomena that have become more significant or even transformed in the digital context.

2. DIGITAL LITERACY

In order to facilitate the understanding of digital literacy, several types have been defined from the pre-digital era as an explanation of the phenomenon that is currently occurring. The need for computer literacy has existed since the late 1960s and has been booked in three stages:

- The mastering phase (by mid 1980),
- The application phase (mid 1980 until late 1990) and
- Reflection phase (end of 1990 onwards) (Martin 2003).

Each of these three phases has been instrumental in raising awareness of the importance of digital literacy, so it can be said that the interest, attitude and ability of individuals to properly use digital technology and communication tools to access, manage, integrate and evaluate information, build new knowledge and communicate with others to effectively participate in society (van Joolingen, 2004). The development of digital literacy has also been greatly influenced by the evolution of other forms of literacy, making the development of literacy concepts more multi-layered and complex. In the United Kingdom, SCONUL was a key driver in fostering digital literacy considerations in the UK; their 'Seven pillars' model for higher education students identifies seven 'main skills' that form information literacy:

- Identification of the need for information;
- Identification of which information will meet the need;
- Develop strategies to locate information;
- Finding and accessing the requested information;
- Collating and evaluating information obtained from different sources;
- Organising, administering and communicating information;
- Synthesis and monitoring of the information.

As can be seen from the previous paragraphs, strong information is the most important thing to master in the digital age. As everything around us is digital, if daily information are becoming more and more, it is necessary to learn to make use of digital tools to maximise digital literacy.

2.1. Digital tools of public relations professionals

Over time, it could be observed that some skills in any job became the past and some new ones took the lead. Leading to this opinion, more and more public relations professionals surveyed have confirmed that, today, the development of analytical skills and knowledge of the digital environment are precisely highlighted as one of the most important skills. Public relations have changed dramatically over a dozen years as technology has evolved and will continue to evolve, and it is therefore very important to keep pace with the technology.

Of all digital tools existing and used by public relations experts, they can be classified in 5 categories:

1) Digital tools to improve public relations
2) Digital monitoring tools and reports
3) Digital tools to improve writing skills
4) Digital tools for visual editing
5) Digital search tools

2.1.1. Digital tools to improve public relations

Digital tools for improvement, just as the name tells them, serve exactly this. One of the most well-known tools is Prezzy, Buffer and Hootsuite. These digital tools allow you to write press posts directly from the tool into the database of your contacts, the ability to create a newsroom for your company, make it possible to create a social media post schedule that will be published on several platforms, to run all social networks directly in the app, to answer questions without going to the platform, and to analyse the effects and many other benefits. This facilitates communication with the media: instead of sending high-resolution documents and images or large amounts of texts in e-mails, simply send a link to your story. Moreover, there is even an option that gives journalists more than the press release itself. Indeed, facts about the company and key people can be updated, and journalists can also search for past events.

2.1.2. Digital monitoring tools and reports

These digital tools are used to produce reports for public relations experts, who save the time for developing and calculating important metrics and are also easy to use. First, all linkages of articles mentioning the PR campaign are pasted within the tool and then purified (usually a screenshot of the whole article) and transformed them into a visually beautiful report. There are also tracking tools that search the internet and inform that your client or company is mentioned within seconds of publication. They are accompanied by over 100 million sources, including social networks such as Facebook, Twitter and Instagram. Analysis of campaigns is also possible: within the report section, outreach and engagement data, analysis of sentiment and main influencers written on a specific brand can be found. The help of these tools does not need to ask for publications, but it is also possible to obtain a detailed PR analysis with a multitude of graphs. Some of the most well-known digital tools are Mediatoolkit and CoverageBook.

2.1.3. Digital tools to improve writing skills

One of the most important performances of such digital tools is to single out long and complex sentences and frequent errors in order to improve the readability of the text, advise you to use shorter words when necessary and warn for words that weaken writing, provide a “second opinion” on the text, check spelling because, in addition to repairing common mistakes, correcting wrong oppositions, phrases and idioms, and even syntax. They are also used to develop writing in all respects, especially nowadays, when people are increasingly reading and have less developed vocabulary. The most famous digital tools are Hemingway Editor and Grammarly.

2.1.4. Digital tools for visual editing

Two divisions between these tools are digital tools for editing graphics designs and video editing tools. Digital video editing tools, e.g. Canva, offer a multitude of design options that go beyond the creation of posts for social media, can be used to design e-books, brochures and online event invitations. It is precisely with this tool and many others that it is no longer necessary to wait for the designer to correct the ordinary typher, which saves the budget and time.

Digital tools used to edit videos are nowadays one of the most important tools, precisely because social media posts, Instagram storyji, Snapchat, YouTube, etc., and even traditional websites in a large number, post videos together with texts. However, despite growing demand, PR experts remain quite sceptical when it comes to video publication. Before making the customer's video, it took hours, sometimes days, and required professional equipment, sound effects and assembly. What Canva is for static images is now different, tools like Wave do for video. In just a few minutes, you can install raw video material from your mobile phone, address it in the app, select music and have a finished video. The stock can also be seen in the tool to make the story/publication even better.

2.1.5. Digital search tools

There are really countless tools of this kind, but one of the best known are Buzzsumo and Answer The Public. Their most important characteristics are that they are simple but powerful tools that make it possible to search for popular topics online, while also pointing to blogs and articles linked specifically to the topic, they also serve to draw inspiration from popular topics, or when you want to find a popular angle of viewing your topic, allowing journalists who write on the topic or companies similar to those on which the current publication is to be found, to inspire SEOs, improve marketing content and even search advertising. The benefits of using these tools are precisely that when they are blocked or when tasks and clients for PR professionals are quite the same, they help to look at the same topic from a completely new angle and thus create a different and more interesting job.

3. RESEARCH ON THE IMPACT OF DIGITAL TOOLS IN PUBLIC RELATIONS EXPERTS AND IMPACT ON THE DEVELOPMENT OF DIGITAL LITERACY

The aim of the research is to identify which digital tools significantly improve public relations viewed from a digital literacy perspective, and whether the frequency with which they are used has an impact on the development of digital literacy. The survey was carried out within 3 agencies whose primary activity is public relations for a total sample of 30 respondents, of which 60 % are women 40 % of men aged 30-60. For the purpose of the survey, a self-constructed online survey questionnaire was used and the average time to fill in the survey was 10 minutes. Among other criteria, respondents had to make a self-assessment of how the use of digital tools affects their development of digital literacy. The scale according to which respondents gave answers on the use criteria ranged from 1 (not relevant) to 5 (extremely important) and the frequency of use of the scales 1 to 5:

- 1 — never,
- 2 — almost never,
- 3 — sometimes,
- 4 — frequently,
- 5 — most of the time.

The online survey was divided into 5 areas, each of which had 4 questions, with a total of 20 closed questions and one open question on the self-assessment of the use of digital tools from the perspective of developing digital literacy. The results of the survey are reported using a table for each type of digital tool according to certain criteria, and the frequency with which they are used. It can be seen from the table that the most important criterion when selecting tools is the ease of use of the tool and the price is the least important item. The frequency of use is highest for digital tools to improve writing, visual editing and search skills. It is precisely from the results of the survey that it is most important for PR professionals how they do work in terms of communication and outreach to their desired audience.

According to the replies, 86.67 % of respondents gave a positive opinion that the frequent use of digital tools has a direct impact on improving their digital literacy.

	Ease of use	Price	Language of the tool	Frequency of use
1. Digital tools to improve public relations	4	3,5	4	3
2. Digital monitoring tools and reports	4	2,5	4	4
3. Digital tools to improve writing skills	3	3,5	3	5
4. Digital tools for visual editing	5	3,5	3,2	5
5. Digital search tools	2,5	2,7	4	5
Average	3,7	3,14	3,64	4,4

Table 1: Criteria and frequency of use of digital tools
(Source:Authors research)

According to the results presented in the table, many things related to the use of digital tools as well as the criteria relating to them can be concluded. User-friendliness is the most important item in visual editing tools, and at least important for tools to improve writing skills. Price as a criterion is free of excessive deviations, only the least relevant for monitoring tools and reports, so it can be concluded that the reliability and accuracy of such tools is the most important for respondents. The language used by public relations experts to communicate with tools is the least relevant for visual editing tools. Each tool has some criteria that are more relevant for use and less relevant for use. Digital tools to improve public relations do not vary too much in all criteria, while for monitoring tools and reports, the lowest of these is the price and price is the most important criterion in the case of better writing tools. Digital visual editing tools have a wide range of criteria, and the most important is that they are user-friendly and the least important is the language of communication. Ease of use and language of communication are almost equally important for search tools, while price and not so important.

4. CONCLUSION

Nowadays, when we all live in the virtual world, and when everyone around us is digital and public relations professionals have had to adapt and keep up to date. Nowadays everything that could have been done in a certain way is no longer seen as an advanced knowledge that could compete on the market. All knowledge and skills have reached new levels over the past few years and all possible ways need to be navigated. It is for PR professionals that things have changed at an unprecedented pace. The world works differently than it was in 20 years ago. The emergence and large-scale use of media, and social media in particular, had to develop new skills and new knowledge. The use of ICTs and thus the development of digital literacy are increasingly appreciated, and this is achieved through the use of digital tools. Digital tools have countless and need to know when, what and how to use. This article describes five sets of tools that serve public relations experts. Each of these groups serves something and there is no one-size-fits-all tool, but requires knowledge of several tools to be able to perform the best and better quality work, i.e. communication. Research carried out among different public relations companies shows that none of the above-mentioned sets of tools are available that they do not use. Absolutely every group is used on a daily basis and, as the respondents themselves have stated, each of the tools helps to develop digital literacy, which is essential today.

One of the biggest misconceptions is that the development of digital literacy has started recently, on the contrary, development started more than 40 years ago and there is no indication of an end. At a time when the Internet is ubiquitous and people increasingly spend time to explore and learn in a virtual environment, digital literacy needs to be developed and improved. The use of digital tools, in particular to improve writing and search, has a direct impact on the development of digital literacy, while all others have a major impact on the development of digital intelligence and navigating in a virtual environment.

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THE IMPORTANCE OF HARMONIZATION OF EDUCATIONAL PROGRAMS IN DIGITAL TRANSFORMATION

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ABSTRACT

Digital transformation is the process of integrating digital technologies into human action and continuous adaptation for its intelligent use. The subject of this paper is a comparison of the teacher study syllabus that prepares masters of primary education for the education of primary school students and a curriculum according to which teaching is conducted in primary schools. The goal is to determine whether student learning outcomes from the faculty are consistent with student learning outcomes in primary schools and whether the students of teacher education are trained for education according to the societal requirements. Comparison of the syllabus of the Integrated undergraduate and graduate university teacher study of the Faculty of Teacher Education, University of Zagreb and the Curriculum of the cross-curricular topic The Use of Information and Communication Technology for primary and secondary schools was carried out by the desk method. The mentioned syllabuses were selected for sampling because the majority of students on teachers' faculties are educated at the mentioned faculty in Croatia. The aforementioned curriculum has the outcomes that in all teaching subjects determine the activities that encourage responsible, efficient and creative use of information and communication technologies. Based on the results, the differences between syllabus and curricula have been determined, by which it is possible to elaborate strategies for development of teacher education syllabus that will be more harmonized with primary school curricula and digital transformation needs. This paper provides an innovative approach in researching the differences between programs of different education levels, but also points to a key subject of public policy and harmonization of educational programs that prepare non-IT professionals while opening up space for further complementary research that would determine the level of digital competencies of students at the end of their studies.

Keywords: *Digital competencies, Digital transformation, Formal education, Harmonization*

1. INTRODUCTION

The omnipresence of digital technologies has changed the human behaviour throughout all aspects of life. Digitalization of health services, construction industry, judiciary and numerous other areas has similarly imposed entirely new demands in private lives of individuals. Due to the changes these have caused in terms of data collection methods, the digitalization has also affected human thought patterns and behaviour, subsequently also influencing organisation of life, life priorities and communication in general. The key resource for those and similar processes, which are primarily encouraged by the requirements of transition from traditional to digital economy, are the data, which have developed and altered the digital business models and business practices, even affecting formation of markets where the offer and demand are virtually connected, which is why some of the biggest companies of our time, often those engaged in rental business, transportation or trade, possess literally no property, cars or inventory (Alić, Luić, 2022).

The rate of changes occurring nowadays, namely those caused by such an overwhelming integration of digital technologies, is hardly comparable to any other rate of change in the society ever before. All, without any exception, are challenged to adapt to such new living conditions, not just the ones who have already chosen their careers in ICT, but also those who will choose them in the future. Part of defining the concept of digital transformation, the purpose of which is to enhance productivity and creativity by exploiting IoT technology (Internet of Things), Big Data technology, blockchain technology, 3D-print (additive production), robotics, artificial intelligence (AI) and alike, is grounded precisely on the adaptation to such digitalized environment for the purpose of enhancing competitiveness. The digitally transformed society is a competent society, a society that has adjusted and is capable of continuously adapting to the everchanging conditions, aimed at intelligent use of digital technology. When defining digital competencies, it is primarily required to notice the implementation of basic terms used to describe them, within a wider array of human activity. Thus, the knowledge, skills and attitudes required to use digital technologies will shape the digital competency of an individual to the extent when it shall include abilities and values required for ethics and autonomy in communication and information management. This being said, the knowledge implies having expertise in operating various computer applications, internet and technologies, skills indicate skilfulness in the virtual realm, while attitudes define shrewdness in evaluating content. The responsibility and obligation of the educational system in developing social literacy skills therefore evolved into its crucial obligation in terms of developing digital literacy. Students of today, so-called digital natives – the younger generations born in the digital age are those inherently prone to skilfully using digital technology, but it is still required to deliberate on whether they are actually using digital technology creatively and safely. Besides, it is also important to reflect on the school principals and teachers who play an exceptionally important role in the implementation of purposeful education – the principals do this as leaders of the school team (the collective) during digital transformation of the school as an organization (Švelec-Juričić, Luić, 2021), whereas teachers do this as the role models closest to students and as specialists in the teaching process, in which they directly influence the evolution of students' competencies. The teaching staff therefore needs to be prepared in due time for the transformation because the teachers, as well as the principals, may widely be labelled as digital immigrants – those who have mastered using computers and other digital appliances in their adult age, thus being prone to resist substantial changes, as resistance is precisely the biggest challenge for digital transformation (Savić, 2019). The differences between digital natives and digital immigrants may be circumvented by designing and elaborating strategies based on recognizing factors that either directly or indirectly influence digital fluency of them both, and which can be described as the ability to upgrade knowledge and produce information with the purpose of creative and appropriate expression in the digital environment (Wang, Myers, Sundaram, 2013). In that sense, the digital transformation in formal education needs to be deep-rooted in the systematic approach of the school itself, of the founder, of the Ministry of Science and Education, of the Education and Teacher Training Agency and of other relevant institutions, so as not to rely on the commitment of an individual teacher-enthusiast (Luić, 2018). Formal education is conducted at the accredited educational institutions. By completing formal education, certificates and diplomas are acquired, and the acquirer of such a public document issued by an authorised legal entity is considered to be qualified according to the curriculum pursuant to which such formal education is conducted upon, and which had previously been approved by the competent body. The Ministry of Science and Education, acting as the body in charge of formal education in the Republic of Croatia, has been frontally conducting the curricular reform in the Republic of Croatia since the academic year 2019/2020, namely for the 1st, 5th and 7th grades, and it shall do the same for all other grades in primary school as of academic year 2021/2022.

The curricular reform is certainly one of the primary measures referred to in the Strategy for Education, Science and Technology, which was designed in compliance with the European educational standards and adopted by the Croatian Parliament in 2014. The reform's main purpose is to establish a more harmonized and more efficient educational system, which encourages development of students' functional literacies and generic competencies required for living and working in the 21st century, promotes relating education to students' life experiences, needs, interests and abilities, but also to the requirements of the society and economy, in which teachers need broader autonomy in choosing content, methods and type or work, all with the purpose of applying teaching methods that empower a more energetic role of students, based on clearly defined outcomes that are not focused solely on development of cognitive abilities, but also on development of attitudes, skills, innovation, critical thinking and alike, all this alongside evaluation as part of the learning process. Subject-matter curriculum and cross-curricular topic curriculum, pursuant to which classes are conducted since the introduction of the reform in primary and secondary schools, set the purpose and goals of learning and teaching, the structure in the overall educational-vertical segment, educational outcomes with elaboration and description of levels in mastering outcomes and valuation modalities. Cross-curricular topics are conceptualised in a such way in order to link educational fields and subject-matter topics of all curricular subjects; they define competencies mastered throughout education, but they are not related to the subject itself, as they instead focus on life-long learning. Seven cross-curricular topics are defined: Personal and Social Development, Learning to Learn, Civic Education, Health, Entrepreneurship, Sustainable Development and cross-curricular subject that defines the learning outcomes focused on development of digital competencies – Use of Information and Communication Technology. Pursuant to the Act on Scientific Activity and Higher Education, the studies in the Republic of Croatia are conducted according to the study programme and the syllabus, adopted by the institution of higher education. The syllabus designates teachers and associates, i.e. the teaching staff, as well as the teaching venue, class schedules, types of classes, format of final exams and exam schedules, required literature for mastering a particular curriculum and for exam taking, option to perform classes in foreign language and other important details related to conducting classes. This research paper is based upon presumption that students development of digital competencies is directly correlated to digital competencies attained by teachers, on the basis of which the framework of research regulates the issue of the extent to which the development of students' digital competencies (being requirements for methodical stimulation of developing students' digital competencies) is planned throughout the syllabus during the studies. Based on the issue at hand, a hypothesis presents itself, suggesting that the syllabi pursuant to which classes are conducted within the module (in programme 903) at the Faculty of Teacher Education of the University of Zagreb are insufficiently harmonised with the cross-curricular topic entitled the Use of Information and Communication Technology for primary and secondary schools, according to which teaching is conducted at primary schools.

2. METHODOLOGY

The research was conducted by content analysis, in which the cluster-sample method was used to choose syllabi for teacher education with modules used at the Faculty of Teacher Education, University of Zagreb (programme 903) and part of the curriculum of cross-curricular topic entitled the Use of Information and Communication Technology for primary and secondary schools, namely the part referring to primary school (1st, 2nd and 3rd cycle, up to page 41). The analysis includes syllabi as follows: syllabi of core subjects in all modules (Core), syllabi of the Croatian Language module (Cro), syllabi of the Information Technology module (Inf), syllabi of the Arts module (Art) and syllabi of the Educational Sciences module (Edu).

The selected syllabi were downloaded from the website of the Faculty of Teacher Education of the University of Zagreb, while the curriculum of the cross-curricular topic entitled the Use of "Information and Communication Technology for Primary and Secondary Schools" was downloaded from the website of the Ministry of Science and Education. The former mentioned syllabi were chosen according to the criterium of syllabi analysis used to teach and educate the highest number of students at teacher education faculties in the Republic of Croatia, whereas the latter-mentioned curriculum was used due to its focus on life-long learning in the field of digital competencies. The analysis includes part of the curriculum referring to primary school, due to the fact that the Teacher education faculty, whose syllabi were chosen for the sample, is the venue where teachers teaching at primary schools are educated. The units of analysis within this analysis of content (the text) within the desk method, are in fact the learning outcomes, which describe what the participant – pupil, i.e. student will know, understand or be able to do after learning, as well as the descriptions or subject content and vital content within the curricula, which additionally emphasises specific knowledge, skills and attitudes, the development of which needs to be encouraged when achieving the desired outcomes. Due to the complexity of categorization criteria of the units of content, which resulted in the division among four categories, and due to the intention of conducting analysis as precisely as possible, the goals of the subjects in the syllabi and goals of the cross-curricular topic in the analysed curriculum were excluded, owing to their lack of comparability. Goals of the subjects described in the syllabus refer to concrete goals of a particular subject, teaching of which is conducted within the shortest time period (semester), and the goals of the cross-curricular topic described in the curricular document refer to educational goals of learning and teaching of the cross-curricular topic, which are sought to be achieved from the start of primary school until completion of the secondary school. The analytical matrix was constructed based on the words and linguistic syntagms in their capacity as units of content. The words and linguistic syntagms are classified in subordinate categories according to analytic criteria, which enable identification of crucial features of the content and derive from the domain of curriculum of cross-curricular topic entitled the Use of Information and Communication Technology for primary and secondary schools, and which are also harmonized with the DQ 24 framework, as part of the Global standard for digital literacy, digital skills and digital readiness of the DQ Institute.

Example of categorizing:

- Category: Research and critical evaluation in digital environment
- Word/linguistic syntagm: information management, data protection, critical evaluation

When identifying key words and linguistic syntagms that are harmonized with the DQ 24 framework, i.e. the meaning of which is crucial in the digital transformation, approximately 200 words and linguistic syntagms were found. However, due to the lack of identified words and linguistic syntagms in the teacher studies' curricula and syllabi, the words were omitted from the research. The remaining words and linguistic syntagms found in the curricula and syllabi were grouped according to their similar meaning.

Figure following on the next page

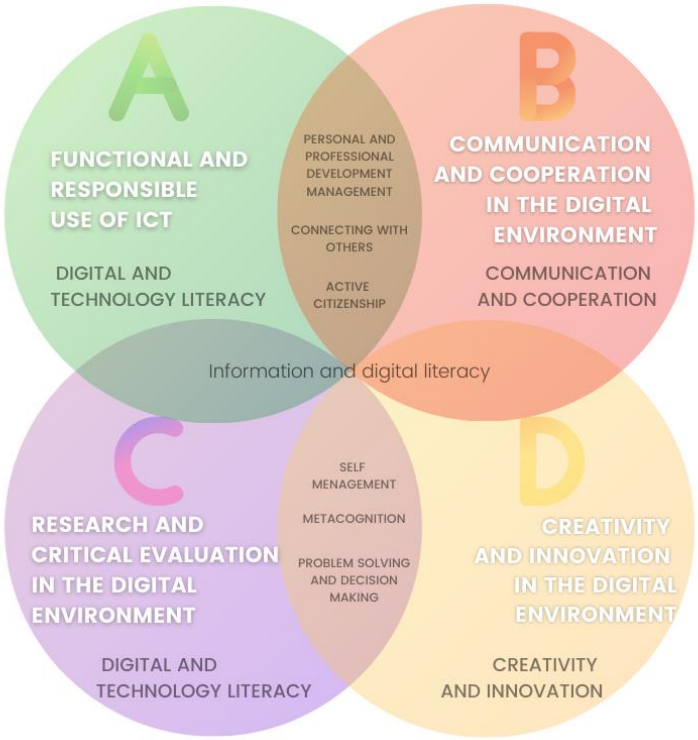

Figure 1: Structure of cross-curricular topic Use of Information and Communication Technology for primary and secondary schools with basic competencies (Source: https://mzo.gov.hr/istaknute-teme/odgoj-i-obrazovanje/nacionalni-kurikulum/medjupredmetne-teme/kurikulum-medjupredmetne-teme-uporaba-informacijske-i-komunikacijske-tehnologije-za-osnovne-i-srednje-skole/3854, adaptation by the authors)

	Digital Identity	Digital Use	Digital Safety	Digital Security	Digital Emotional Intelligence	Digital Communication	Digital Literacy	Digital Rights
Digital Citizenship	1 Digital Citizen Identity	2 Balanced Use of Technology	3 Behavioural Cyber-Risk Management	4 Personal Cyber Security Management	5 Digital Empathy	6 Digital Footprint Management	7 Media and Information Literacy	8 Privacy Management
Digital Creativity	9 Digital Co-Creator Identity	10 Healthy Use of Technology	11 Content Cyber-Risk Management	12 Network Security Management	13 Self-Awareness and Management	14 Online Communication and Collaboration	15 Content Creation and Computational Literacy	16 Intellectual Property Rights Management
Digital Competitiveness	17 Digital Changemaker Identity	18 Civic Use of Technology	19 Commercial and Community Cyber-Risk Management	20 Organisational Cyber Security Management	21 Relationship Management	22 Public and Mass Communication	23 Data and AI Literacy	24 Participatory Rights Management

Figure 2: Framework DQ 24 (Source: https://www.dqinstitute.org/global-standards/#contentblock1)

3. RESULTS

The following results are derived from the research conducted on the sample: in the chosen part of the curriculum of the cross-curricular topic entitled the Use of Information and Communication Technology for primary and secondary schools, the total number of appearance of units of content was 193. The biggest number of repetition of units of content was detected in the syllabi of subjects of module Informatics (42), whereby the harmonization, i.e. overlapping of this syllabus with the chosen curriculum amounted to 21, 76 %.

In other syllabi, the total number of repetition of units of content did not exceed 13: in the syllabi of subjects that are core to all modules, the harmonization amounted to 6,74 %; in the syllabi of subjects of the module Croatian Language, it amounted to 5,18 %; in the syllabi of subjects of the module Art, the harmonization amounted to 0,52 %; in the syllabi of subjects of the module Educational Sciences, the harmonization amounted to 2,07 %.

Sample	Appearance	Percentage of Harmonisation
Curriculum of the cross-curricular topic Use of Information and Communication Technology for primary and secondary schools	193	-
Syllabi of the subjects that are core for all modules (Core)	13	6,74 %
Syllabi of the subject Croatian Language module (Cro)	10	5,18 %
Syllabi of the subject Information Technology module (Inf)	42	21,76 %
Syllabi of the subject Arts module (Art)	1	0,52 %
Syllabus of the Educational Sciences module (Edu)	4	2,07 %

Table 1: Total number of appearance of units of content with the percentage of harmonization according to syllabi
(Source: Authors research)

3.1. The category entitled Functional and Responsible Use of ICT

According to the results shown in Table 2, the conclusion is that within 4 groups of linguistic syntagms terminologically related to digital and technological literacy, i.e. units of content (digital technology, responsible use of technology, digital environment, digital appliances, operative system and computer software), the total of 96 appearances of individual units of content were detected in the curriculum of cross-curricular topic entitled the Use of Information and Communication Technology for primary and secondary schools. The aforementioned linguistic syntagms have appeared 3 times in the syllabi of the subjects that are core to all modules; they appeared 30 times in the syllabi of subjects of the module Informatics; they appeared once in the syllabi of subjects of the module Educational Sciences; whereas in the remaining syllabi, i.e. the syllabi of subjects of the module Croatian Language and the syllabi of subjects of the module Arts, the mentioned linguistic syntagms have not appeared at all.

Category	Word/linguistic syntagm	Curr.	Core	Cro	Inf	Art	Edu
Functional and Responsible Use of ICT	digital technologies	15	1	0	7	0	0
	responsible use of technology	9	1	0	7	0	0
	digital environment	56	0	0	2	0	0
	digital appliances, operative system and computer software	16	1	0	14	1	1
	SUM	96	3	0	30	1	1

Table 2: Matrix of category Functional and Responsible Use of ICT
(Source: Authors research)

3.2. Category Research and Critical Evaluation in Digital Environment

By analysing results shown in the Table 3, a conclusion can be drawn that units of content, words and linguistic syntagms linked to critical evaluation and IT literacy (information management, data protection and critical evaluation) do not appear at all in the syllabi of the subjects of module Arts, they appear once in the syllabi of the subjects that are core for all other

modules, they appear 3 times in the syllabi of subjects of the Educational Sciences module, 4 times in the syllabi of subjects of the module Croatian Language and 6 times in the syllabi of subjects of the module Informatics.

Category	Word/linguistic syntagm	Curr.	Core	Cro	Inf	Art	Edu
Research and Critical Evaluation in Digital Environment	information management	13	0	0	0	0	0
	data protection	7	0	0	5	0	0
	critical evaluation	3	1	4	1	0	3
	SUM	23	1	4	6	0	3

Table 3: Matrix of category Research and Critical Evaluation in Digital Environment (Source: Authors research)

3.3. Category Communication and Cooperation in Digital Environment

In the curriculum of the cross-curricular topic the Use of Information and Communication Technology for primary and secondary schools 17 units of content (cooperative learning in digital environment, social networks) were found, as outlined in Table 4. In the syllabi of subjects that are core to all modules, the mentioned units of content have appeared 3 times, whereas in the syllabi of subjects of the module Croatian Language, Educational Sciences and Arts, the mentioned units of content have not appeared at all.

Category	Word/linguistic syntagm	Curr.	Core	Cro	Inf	Art	Edu
Communication and Cooperation in Digital Environment	cooperative learning in digital environment	6	2	0	0	0	0
	social networks	11	1	0	1	0	0
	SUM	17	3	0	1	0	0

Table 4: Matrix of category Communication and Cooperation in Digital Environment (Source: Authors research)

3.4. Category Creativity and Innovation in Digital Environment

In the table for matrix of category Creativity and Innovation in Digital Environment, it is evident that the singled-out units of content (creative activity, multimedia content design, innovative action and proprietary protection) have appeared 57 times in the curriculum of cross-curricular topic The Use of Information and Communication Technology for primary and secondary schools. On the other hand, they appeared 6 times in the syllabi of the subjects that are core for all modules and in the syllabi of the subjects of the module Croatian Language, i.e. 5 times in the syllabi of the subjects module Informatics, whereas a complete lack of units of content may be observed in the syllabi of subjects module of Educational Sciences and Arts.

Category	Word/ linguistic syntagm	Curr.	Core	Cro	Inf	Art	Edu
Creativity and Innovation in Digital Environment	creative action	19	1	0	2	0	0
	multimedia content design	27	5	6	3	0	0
	innovative action and proprietary protection	11	0	0	0	0	0
	SUM	**57**	**6**	**6**	**5**	**0**	**0**

Table 5: Matrix of category Creativity and Innovation in Digital Environment (Source: Authors research)

4. DISCUSSION

Based on conducted analysis of the research results, the hypothesis of the research has been confirmed, by establishing that the syllabi according to which classes are conducted within the module (in the programme -903) at the Faculty of Teacher Education University of Zagreb are insufficiently harmonised with the curriculum of cross-curricular topic entitled Use of Information and Communication Technology for primary and secondary schools, pursuant to which classes at the primary schools are conducted. Lack of harmonisation of the syllabi in relation to the curriculum is evident in Table 1, which shows the total number of appearances of a certain unit of content (words and linguistic syntagms) in a specific part of the sample (in the curriculum, i.e. a particular syllabus). The same table also shows the differences between various syllabi. The syllabi of the subject module Informatics stand out as the syllabi more harmonised with the curriculum, in comparison to other syllabi. This specific feature in the result may be explained by studying the focus of the subjects Informatics module toward developing digital competencies in students. It is important to mention that if other units of content in the syllabi of the Informatics module would be used, the analysis could lead to a different result, more favourable for the Informatics module. Furthermore, it is valuable to propose for the syllabi of the subject Informatics to conduct qualitative research, in which units of analysis would be valued according to predeterminate criteria. From the illustrated structure of the cross-curricular topic entitled Use of Information and Communication Technology for primary and secondary schools with core competencies (Figure 1), the link and mutual interconnection of the domains may be observed, which results in complexity of categorisation within this analysis. The interconnection of categories may be best observed in the practical examples of linguistic syntagms, such as "data protection" and "proprietary protection", and be described upon practical examples. For instance, at a lesson from the subject of Nature and Society in the 2nd grade of primary school, the lesson unit which aims at stirring students to deliberate on responsible conduct of people toward themselves and nature, the students may be familiarized with notion of personal data and provided with rules and advice on how to protect them. Related to this, the students will be encouraged, on the other hand, during realization of another lesson unit in the class of Croatian Language in the 5th grade, to creatively express themselves, motivated by experiences from the preceding lesson when they got to know a literary work of an author, as well as the author's name and surname, to mandatorily cite in each school paper the author's name, alongside with the explanation of how important it is to protect author's copyrights. The degree of difficulty in categorisation therefore points to the possibility of differently interpreting results in case of re-categorising units of content.

4.1. Category of Functional and Responsible Use of ICT

In the category Functional and Responsible Use of ICT, 4 of the most important linguistic syntagms stand out, which is by 1, i.e. by 2 words/linguistic syntagms more than in other comparable categories, and all this because the category is derived from the domain of the curriculum which encompasses the widest area, so the biggest number of relevant terms was found therein. The highest appearance of units of content in the curriculum was detected under the linguistic syntagm "digital environment", in which the linguistic syntagm "virtual environment" is integrated in. The cited linguistic syntagm in the curriculum is most often mentioned in the sense of familiarity with the rules for responsible and safe work in digital environment, but it may also be found in the sense of individual choice of digital environment for personal growth and learning.

4.2. Category Research and Critical Evaluation in Digital Environment

Due to specific nature of digital environment and skills required to a subject who is working and cooperating with others in the digital environment, the syntagm "critical valuation", which

does appear in syllabi (most often in the form and in the sense of critical thinking), but does not relate to critical evaluation in the digital environment, had to be omitted from the result due to the fact that encouraging critical evaluation which is described in the syllabi affects the development of critical thinking skills about the digital environment content only indirectly.

4.3. Category Communication and Digital Cooperation in Digital Environment

In the matrix Communication and Cooperation in Digital Environment, 2 most important linguistic syntagms are shown, which are by 1, i.e. by 2 less than in other comparable categories. Namely, the category Communication and Cooperation in Digital Environment is derived from the domain of the curriculum which encompasses the most specific, i.e. the narrowest field, thus resulting in finding the least number of significant terms. The linguistic syntagm "cooperative learning in digital environment" was created by amalgamating subordinated syntagms (learning management, cooperative learning, digital educational environments, videoconference), whereas in conducting classes planned by the curriculum, it also implies cooperation in digital environment and exploiting advantages of digital educational environment (for example, videoconferences during cognition) with the purpose of achieving better quality in learning management.

4.4. Category Creativity and Innovation in the Digital Environment

Out of the highlighted linguistic syntagms in the category entitled Creativity and Innovation in the Digital Environment (creative action, multimedia content design and innovative action and proprietary protection), the linguistic syntagm "multimedia content design" is the most represented, as in the curriculum and syllabi - it refers to creation of digital multimedia materials, such as photography, posters, audio and audio-visual materials etc.

5. CONCLUSION

Due to the changes caused by omnipresent digitalization, the Republic of Croatia has initiated the process of conducting digital transformation, both through formal education in the form of curricular reform, but also project-based, as in the project entitled "e-Schools: Complete informatization of school business processes and teaching processes for the purpose of creating digitally mature schools for the 21st century" with the aim derived from the European standards outlined in the document "Digital Competence Framework for Educators". Still, from the aspect of preparation for digital transformation, the changes within studies for teaching teachers are insufficiently encouraged, thus the development of teachers' digital competencies required for the digital transformation era is still left to mere willingness of an individual teacher. The comparison of educational syllabi discussed throughout this paper has set the grounds for systemic alterations of the curricula and syllabi, not only those of the faculties for teacher education, but also of other studies during which students are educated for non-IT professions; furthermore, it has indicated the need for implementing complementary research of syllabi of other faculties for teacher education in the Republic of Croatia and studies during which the students are educated for educational work in secondary schools and researches focused on examining the level of digital competencies in final-year students at the faculties of teacher education.

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THE INFLUENCE OF CITY ADMINISTRATION'S RESPONSIVENESS TO CITIZENS ATTITUDES TOWARDS CITY DIGITAL COMMUNICATION

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ABSTRACT

New technologies today allow users, citizens, to connect with organizations and to seek answers to their questions and requests, using a variety of tools. Such digital capabilities have posed new challenges towards organizations, which imply adapting to more intensive, efficient, and faster communication. This paper focuses on the study of digital competence Media and Information Literacy and Digital Civic Identity within the Digital Intelligence Model (DQ) based on the example of digital communication of City of Varaždin City Administration with citizens. Previous analysis ranked the City of Varaždin very highly in Croatia in terms of the effective communication between the City Administration and its citizens, but no survey has yet been conducted on the citizen's satisfaction with the City Administration's communication. The aim of the research is to estimate the impact of the responsiveness of the City Administration on attitudes of citizens about the digital communication of the City of Varaždin, and the subject of this paper, on the example of the City of Varaždin, is to determine their correlation. In addition to the structural analysis of available tools and the responsiveness of the City Administration in communication with its citizens, the satisfaction of the citizens with the digital communication of the City Administration has been examined and answers to research questions are being sought: Are the citizens satisfied with the digital communication of the City Administration? What is their attitude towards it? Does the responsiveness of the digital communication of the City Administration affect the satisfaction or the dissatisfaction of citizens with the digital communication? Qualitative and quantitative research methods have been applied in order to obtain adequate answers. Content analysis identified the digital communication tools of the City Administration, a Mystery Shopping method has tested the responsiveness of the City Administration on the identified tools and a survey on a representative cause of citizens has examined the attitudes of citizens to the digital communication of the City of Varaždin, the analysis of which the need for further development continuing the research necessary to design a validation model of the collaboration of the digitally competent citizen and Smart City has been identified.

Keywords: *Digital Communication, Digital Intelligence, Information, Smart City, Varaždin*

1. INTRODUCTION

Communication is certainly one of the necessary components of society as a whole and is very often defined in the framework of action or transfer of information. Such definitions generally see communication as a process of transferring information from sender to receiver (Kunczik and Zipfel, 2006). Global changes, which have largely manifested themselves in the digital transformation of all aspects of life, have not bypassed the adaptation of communication. With such changes, communication acquires completely new dimensions and meaning, and digital culture becomes a component of the culture of society as a whole (Švelec-Juričić and Luić, 2020).

The development of information and communication technologies has enabled a faster and more intensive communication and transfer of information, and such changes have posed new challenges to various organizations to adapt to. Cities, and thus city administrations, are one of the most important elements of society. According to United Nations statistics, 55.3 percent of the world's population lives in urban centers, and it is projected that by 2030, cities will cover 60% of the total population (UN, 2018). Such development presupposes good organization, and over the last two decades the concept of a "smart city" has become increasingly prominent (Albino et al., 2015). Although the concept of a "smart city" is not limited to the use of ICT (information and communication technology) (Allwinkle and Cruickshank, 2011; Albino et al., 2015), ICT is certainly an important component of creating a sustainable relationship and communication between city government and its citizens. Cutlip et al. (2003) point out that public relations professionals, as intermediaries, largely shape a thoughtful dialogue between elected officials and public authorities and citizens, which is the basis of democracy. Therefore, their role in motivating and persuading citizens to participate in government and the decision-making process is extremely important but often neglected (Ibid, 494, 495). One of the functions of public relations in public authorities is to continuously report their citizens on all activities. Successful governance, in addition to gaining the support of its citizens for policy implementation, implies their participation and active cooperation (Tomić, 2008). Precisely with the aim of establishing quality communication with citizens, informing citizens, as a result of which they can give their view of the problems and discuss them, the city administration must have a good foundation and an effective communication system. By using the right communication tools, fast, efficient, correct communication, and ensuring a continuous flow of information, transparency and openness in local government are achieved. Therefore, effective communication contributes to building trust, and trust in the organization is a prerequisite for engaging every individual whose activities could contribute to strengthening the reputation of the organization in the public (Švelec-Juričić and Luić, 2020). However, as Luić et al. (2020) state in the example of schools, the use of ICT must not be based on the motivation or the enthusiasm of individuals in the administration, but there must be a clearly constructed system. According to the 2021 Economic and Social Digitization Index, Croatia ranks 19th out of all 27 EU member states. According to a specific segment, the availability of digital Internet services for citizens in Croatia is also below the European Union average (European Commission, 2021). The Croatian company Apsolon has been conducting research on the digital readiness of Croatian cities for years and has especially been researching the component "communication channels between the city administration and its citizens" (Apsolon, 2021: 37). In the research conducted in 2021, three cities stood out in the parameter of communication between the city administration and citizens - Rijeka, Zagreb, and Varaždin (Apsolon, 2021: 41). According to the first results of the 2021 census, Rijeka and Zagreb are two of the four largest cities in Croatia in terms of population, while Varaždin is a medium-sized city. It is precisely the population size and its historical development in the context of educational, development and research institutions and organizations dealing with ICT technologies, like University North, Faculty of Organization and Informatics or the Tech Park, that point out Varaždin as an interesting subject of research on communication between the City Administration and its citizens. Previous research shows that the City of Varaždin conducts effective communication with its citizens, but this research also seeks to examine the attitudes of citizens in this regard. Therefore, a correlation is established between the responsiveness of the City Administration and the attitudes of citizens about digital communication of the City of Varaždin.

2. METHODOLOGY

The research focuses on the study of digital competencies Media and Information Literacy and Digital Civic Identity within the Digital Intelligence Model (DQ) (Dqinstitute, 2022) on the example of digital communication of the City Administration of Varaždin with its citizens. The main goal is to assess the impact of the responsiveness of the City Administration on the attitudes of citizens about digital communication of the City, and the subject of this paper is to determine their correlation on the example of the City of Varaždin. Therefore, questions are asked: Are citizens satisfied with the digital communication of the City Administration? What is their attitude towards digital communication of the City Administration? Does the responsiveness of digital communication of the City Administration affect the satisfaction or dissatisfaction of citizens with digital communication of the City? The paper examines the main hypothesis that the responsiveness of the City Administration significantly affects the satisfaction of citizens with digital communication of the City Administration. A combination of qualitative and quantitative research methods were used in the paper. In order to determine the digital communication tools of the City Administration, the method of content analysis was used, while the responsiveness of the City Administration was tested by the participatory observation method, i.e. the Mystery Shopping method (Wilson, 1998). Finally, in order to examine the attitudes of citizens about digital communication of the City of Varaždin, a survey was conducted on a representative sample of citizens.

3. RESULTS

3.1. Digital communication channels of the City Administration

The City of Varaždin has a total of five administrative bodies and most of the communication process related to informing citizens about the work of the City Administration is performed within the Administrative Department for the Affairs of the Mayor and the City Council. Five Departments have been established within the Administrative Department for the Affairs of the Mayor and the City Council, while Department for Protocol, Public Relations, Intercity and International Cooperation has the biggest focus on communication (City of Varaždin, 2021). The Department of Protocol, Public Relations, Intercity and International Cooperation coordinates and improves communication with the target audience of the mayor and deputy mayor. Through various communication tools and online communication, the Department works on involving citizens and the public in the work of the City Administration and in decision-making processes. The employees in the Department are in charge of implementing the right to access information to citizens. The department is in charge of directly informing citizens and the public about the work of the City bodies, as well as informing them through the media and using the city website and official profiles on social networks. Also, the Department cooperates with state bodies, various institutions, associations, media and citizens (City of Varaždin, 2021a). The department has four employees: Head of the Department for Protocol, Public Relations, Intercity and International Cooperation, Senior Adviser for Public Relations and Protocol, Senior Adviser for Protocol, National Minorities and International Cooperation and Senior Expert Associate for GRIC (City of Varaždin, 2021a). In the communication process, the department uses various communication tools and applies modern information and communication technology. Citizens can contact the City Administration of the City of Varaždin directly through their e-mail addresses that are publicly available on the website of the City of Varaždin (Varazdin.hr, 2022), through the free City Complaint Information Center (Gric.varazdin.hr, 2022), Facebook pages (Facebook.com), or Facebook Messenger. Back in 2004, the City of Varaždin launched the free City Complaint Information Center (GRIC). GRIC is a free system through which the citizens of Varaždin can report utilities or infrastructure problems, complaints and inquiries, calling the free number or via the website, and the solution of which is within the competence of the City of Varaždin or City services and

companies. Through GRIC, citizens can also receive feedback related to their inquiry like the status of solving the reported problem and all other relevant information. By entering the complaint number and password in to the system on the GRIC website, citizens can see the status of the received complaint at any time. The Facebook page Grad Varaždin currently has 8,640 followers, and the reach of posts reaches 17,956. Announcements about the activities of the City Administration are daily and often include several daily announcements. Followers of the Facebook page of the City of Varaždin often use the opportunity to comment below the post and, in this way, to express their opinion or to make an inquiry or complaint. Also, citizens use the popular Facebook Messenger application for their inquiries, most often for a short guide on where and whom to contact for a particular problem. In terms of digital tools, there is certainly room for improvement in terms of opening up additional digital channels for communicating with its citizens. Therefore, the City of Varaždin can focus on other Croatian cities such as Zagreb, which through Zagreb Holding enables communication via WhatsApp and Viber applications, or, for example, Karlovac, has a special chatbot with which citizens can communicate (Apsolon, 2021: 38).

3.2. Mystery Shopping of the City Administration of the City of Varaždin

The Mystery Shopping method, which is a specific method of participatory observation, was used to test the responsiveness of the City Administration (Wilson, 1998). With the Mystery Shopping method, researchers are transformed into users or potential users in order to monitor the quality of the process and service (Ibid). In this case, the mentioned method tested the responsiveness of the City Administration on digital channels: email, City Complaint Information Center (GRIC), Facebook page and Facebook Messenger. Responsiveness via email was tested by sending inquiries to officials from the Administrative Department for Construction and Utility Services regarding damage to equipment in the Youth Park, and GRIC was tested by sending inquiries about unsorted waste at the entrance of one of Varaždin's neighborhoods. Responsiveness on the city's official Facebook page was tested with a query on Physical Education in kindergartens sent in the form of comments on the Facebook post about the Kindergarten Olympics. Ultimately, Facebook Messenger was tested by sending inquiries about maternity benefits via email. The answer to the inquiry sent by email had not received by the end of writing this paper. The response from GRIC arrived within 17 minutes, but the response only stated that the inquiry had been received and that the status could be checked on the official GRIC website. Checking the status on the official GRIC website states that the query was assigned to a "solver", but no new information had been received by the end of writing this paper. Since the inquiry was related to the City's utility company, Čistoća, it is obvious that there is a lack of responsiveness on their part. The response to the inquiry through comments on the City's Facebook page arrived after 48 hours, and the response to the inquiry through a message on Facebook Messenger arrived in less than four hours (See: Table 1).

DIGITAL TOOLS	ACCESS
Email	No replies
City Complaint Information Center (GRIC)	17 minutes
Facebook page	48 hours
Facebook Messenger	3 hours i 48 minutes

Table 1: Responsiveness of the City Administration through digital channels (Source: Varazdin.hr, Gric.varazdin.hr, Facebook.com)

For the purpose of this paper, the City Administration of the City of Varaždin was sent an inquiry on the statistics and the number of received inquiries and answered inquiries on these digital channels. In response, the City Administration stated that it keeps statistics only for the City Complaints Information Center, and they sent us detailed statistics on the number of inquiries received, the number of answered or resolved inquiries and the nature of the inquiries. According to the data obtained for the period from 1 April 2017 to 1 April 2022, a total of 2808 inquiries (complaints) were received, of which a total of 2475 (88.14%) have been resolved or answered so far. The largest number of inquiries is related to public lighting, waste disposal, landscaping of public and private areas, parking in public areas and road maintenance.

3.3. Results of the survey questionnaire

In order to further deepen the analysis of the impact of the responsiveness of the City Administration on the attitudes of its citizens about digital communication of the City of Varaždin, a survey was conducted of a total of twelve questions.. The survey was created in Google Forms and distributed digitally and live. A total of 213 respondents from the City of Varaždin completed the survey, of which 52.11% were women and 47.88% were men. The largest number of respondents who completed the survey were 45 to 59 year olds (29.57%), followed by between 18 to 29 year olds (27%) and 30 to 44 year olds (24.88%), and a slightly lower percentage of those over 60 (17.84%). The largest number of respondents had completed high school (57.54%), college or university (34.63%), while only 2.79% of respondents had completed a master's degree or a PhD. A total of 5% of respondents had completed primary school education. The survey showed that less than half of the respondents had so far communicated with the City Administration (43.7%) and the vast majority (74%) had received an answer to their question (See: Figure 3). The respondents most often communicated via Facebook (Facebook page and Facebook Messenger), email (34.57%) and GRIC (28%) (See: Figure 1). More than half of those who have not had any digital communication with the City Administration yet, would choose email as the primary channel of communication in the future (57.85%), while a slightly smaller number of them would choose GRIC (24.79%). It is assumed that respondents who have not communicated so far, consider email the most reliable and direct option. Because they had not needed to communicate with the City Administration, they did not consider or were not informed about other options such as GRIC. The vast majority (80%) of respondents asked for a concrete answer from the City, while a small number only shared their experiences (See: Figure 2).

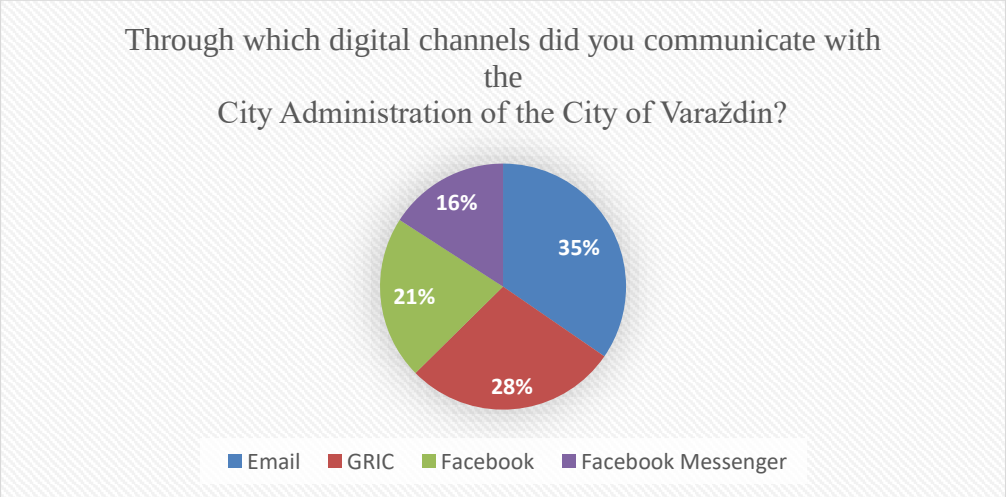

Figure 1: Digital channels through which citizens communicated with the City Administration (Source: Authors results)

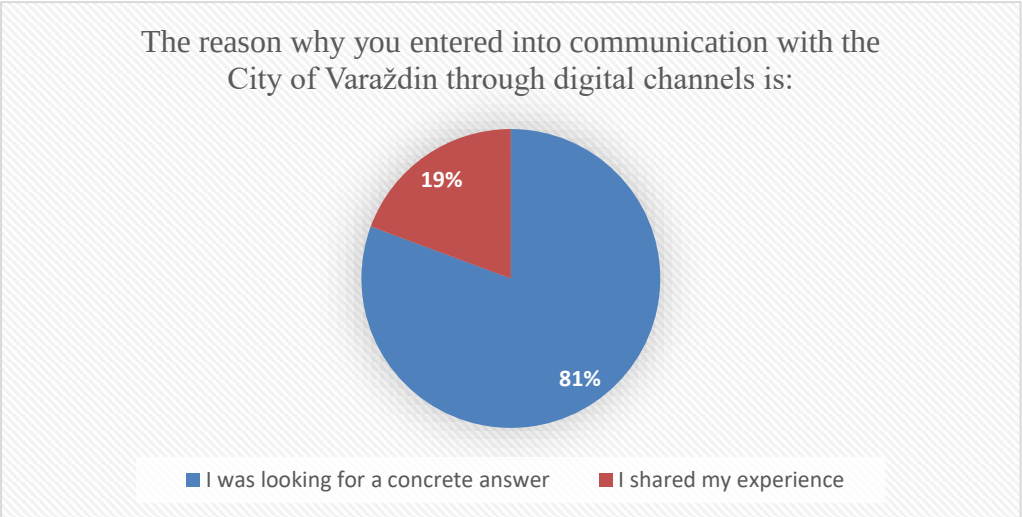

Figure 2: Reasons why citizens entered into communication with the City of Varaždin through digital channels.
(Source: Authors results)

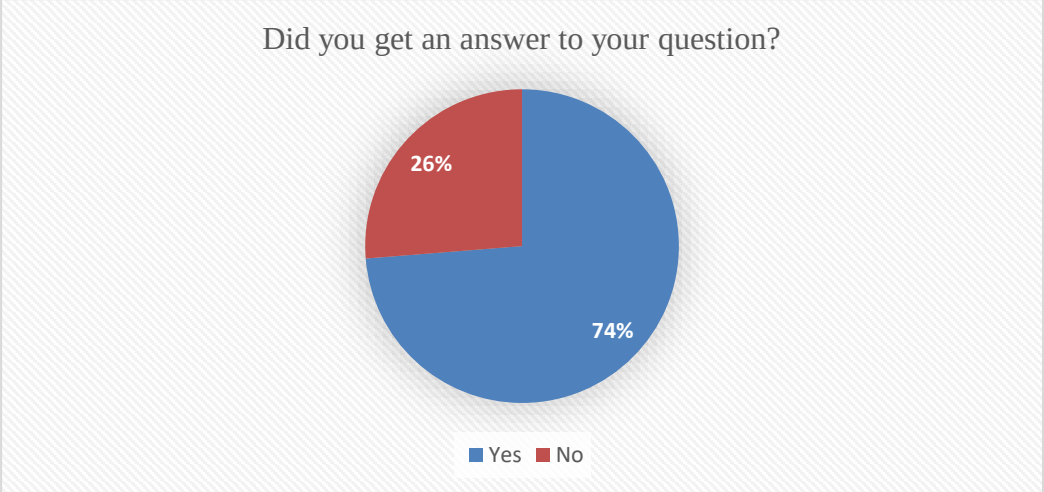

Figure 3: Respondents' answers to the question of whether they received an answer to the question asked.
(Source: Authors results)

The majority of respondents who only shared their experience did so through the digital channel Facebook. The research showed that the City Administration is generally reluctant to respond in those respondents who only shared their experience, which results in such respondents assessing the City Administration's digital communication extremely negatively, with an average score of 1.78. Respondents who asked for a specific answer received an answer in 84% of cases, and the largest number of unanswered specific inquiries were those sent via email. However, if we exclude those who only shared the experience and did not receive an answer to a specific query, in Table 2 we can see that the average score of the response rate was 3.67, while satisfaction with the response to the query was rated 3.79. Respondents rated GRIC the best in terms of response speed, and email the worst, while they expressed the greatest satisfaction with the answer in the case of email, and the least satisfaction with the answer received on Facebook. Respondents rate the digital communication of the City of Varaždin with an average score of 3.67, with the highest score given by those who communicated with GRIC, and the lowest by those who communicated via Facebook.

Evaluation	Satisfaction with the speed of response	Satisfaction with the answer	Evaluation of digital communication of the City of Varaždin
In total	3,67	3,79	3,67
Email	3	3,92	3,5
GRIC	4,32	3,76	3,76
Facebook	3,4	3,4	3,4
Facebook Messenger	3,85	3,71	3,64

Table 2: Average satisfaction ratings of response speed, response, and digital communication.
(Source: Authors results)

If we compare the obtained data with the Mystery Shopping method, we can see that the results largely coincide. The response rate established by the Mystery Shopping method coincides with the respondents' ratings. When we compare GRIC, the data also matches with the response in terms of satisfaction. Namely, GRIC was rated the best according to the speed of response but not according to satisfaction with the response in general. The reason is probably that, although the speed of the response is at an enviable level, the response is general and requires additional information from other responsible solvers. The respondents are most satisfied with the answers they received via email. One of the explanations may be that the respondents sent inquiries to specialized administrative departments that could provide them with a specific answer to the question. Finally, if we look at the results of the answer to the question "To what extent does the digital communication of the City Administration of Varaždin affect your attitude towards the work of the City Administration?", we can see that almost 60% of respondents point out that digital communication affects their attitudes (Graph 5). Interestingly, the research shows that respondents who have ever communicated with the City Administration online estimate that digital communication affects their attitude towards the work of the City Administration more than those who have not communicated so far.

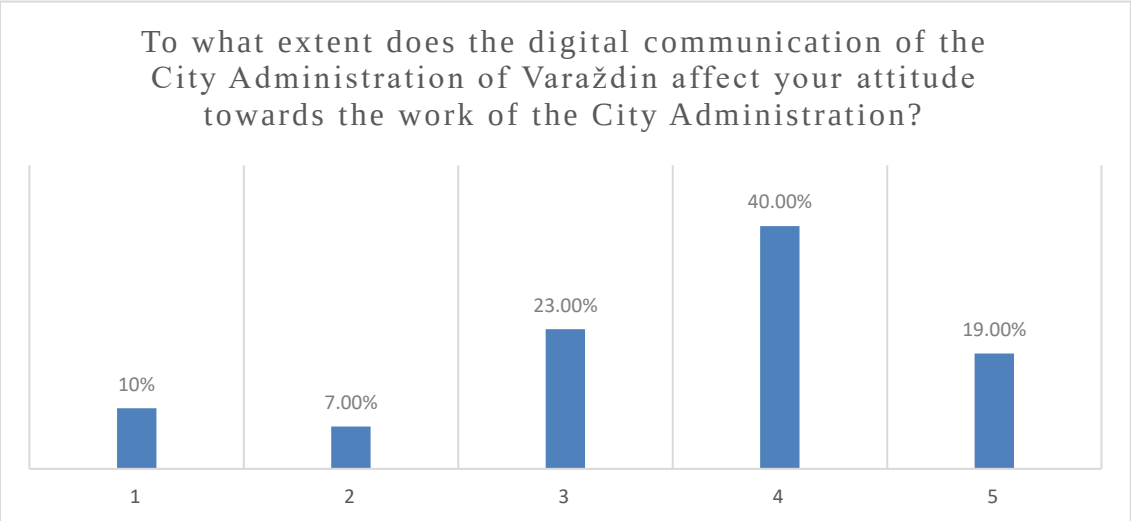

Figure 5: Respondents' answers to the question whether digital communication of the City Administration of the City of Varaždin influences their attitude towards the work of the City Administration
(Source: Authors results)

4. DISCUSSION

The content analysis determined that the City of Varaždin has a total of four digital channels through which it communicates with its citizens: email, the City Complaint Information Center (GRIC), Facebook page, and Facebook Messenger. In this context, the City of Varaždin definitely has space for improvement in terms of introducing other innovations for communication with itd citizens, such as the use of other social networks and applications such as Instagram, WhatsApp, and Viber, and, for example, chatbots. The Mystery Shopping method has shown that the City Administration is extremely unresponsive in terms of responding to emails, relatively responsive in terms of responding to Facebook page and Facebook Messenger, and extremely responsive in terms of responding to inquiries via GRIC. However, the research showed that the response provided by the City Administration through GRIC is general and lacks the responsiveness of those responsible for solving certain problems. The survey questionnaire showed that the vast majority of respondents in communication with the City Administration are looking for concrete answers and that the majority get them. Those respondents who communicated with the City Administration looking for concrete answers rated the speed of answers and answers in general, as well as the overall digital communication of the City of Varaždin, with an average score of very good. Significantly more negative digital communication of the City Administration is assessed by respondents who only shared their experience and did not receive an answer. An important fact is that almost 60% of the respondents point out that digital communication affects their attitude towards the work of the City Administration, with greater emphasis on this issue by those who have had the opportunity to communicate with the City Administration than those who have not.

5. CONCLUSION

In today's world, cities are one of the most important elements of the social system, and predictions show that they will aggregate more and more people in the future. Such a situation inevitably implies a better organization and an emphasis on the Smart City concept, of which information and communication technologies are an integral part. This paper, using qualitative and quantitative research methods, has confirmed the initial hypothesis that the responsiveness of the City Administration significantly affects the satisfaction of citizens with the digital communication of the City Administration but has also showed that there is considerable space for progress in developing digital channels and improving the responsiveness of the City Administration. The biggest shortcoming in terms of responsiveness can be seen in the response to those citizens who have shared their experiences through digital channels, and in regard to this, the City Administration should consider interacting with those citizens who only share their experiences through messages or comments. The conducted research once again confirmed the exceptional complexity of the process of examining the attitudes of citizens, but also the need for further development of digital competencies of the City Administration and its citizens. Therefore, the research has a significant applicative contribution in terms of improving the practice of the City Administration but also a scientific contribution because it provides a good basis for further research needed to develop theoretical models for assessing cooperation between digital citizens and Smart City.

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NETIQUETTE AND DIGITAL EMPATHY IN THE CONTEXT OF APPLYING CROSS-CURRICULAR TOPICS IN THE CONTEMPORARY EDUCATION

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ABSTRACT

Digital empathy means being aware and sensitive to one's own and other people's feelings, needs and concerns in an online environment. To build good relations with others using digital media doesn't mean only to act in accordance with rules of polite behaviour on the internet (netiquette), but also to possess a certain level of digital emotional intelligence, developed through the competence of digital empathy. Through the research of attitudes and values regarding the netiquette and digital empathy of participants of the educational process - teachers and students in senior years of secondary school - the starting point was a presumption that only teachers, who had been adequately educated on that specific topic, were able to adequately teach students through a sequence of cross-curricular topics, and in that way contribute to the development of their digital empathy. The aim of the research was focused on detecting attitudes and self-assessment of digital empathy of students and the influence of it on their success in their education and the choice of their future job. Through the method of content analysis, the cross-curricular curriculum "The Use of the Information and Communication Technology for Primary and Secondary Schools in Croatia" has been researched. Through the choice of key words, an analytical matrix has been determined. Through the method of a focus group, with seniors of Josip Slavenski Grammar School and The School of Economics and Trade in Čakovec, research has been carried out, involving three groups in each school. Moderators in each group were representatives of The Student Council. The interview has been done by the author of this thesis through the method of a structured interview. The results have shown a partial correspondence of attitudes and views of students and teachers, regarding the significance of teaching the topic of netiquette and digital empathy within the framework of cross-curricular topics. The teachers' views have shown an emphasised need for a lifelong education connected to digital competencies and literacy, as well as involving these topics in syllabi of formal contemporary education. Further research could be extended into studying of causal significance of digital competencies, digital communication and digital literacy, adopting and applying digital empathy in educational processes and programmes.

Keywords: *Cross-curricular topics, Digital competencies, Digital empathy, Education, Netiquette*

1. INTRODUCTION

Digital technologies change our way of life from the ground, how we communicate, spend our free time, educate ourselves, as well as our perspective of the entire reality. Although the time of generations born with a mobile phone in their hands has come, this does not mean that they are also born with all the competences necessary to use information and communication technology correctly. Today, education is defined as a lifelong process, which needs to be adjusted to social changes. In this context, learning is observed as a search for new understandings, an interesting journey and irreplaceable experience of acquiring new pieces of knowledge and skills, the process of understanding and accepting different attitudes and values, and inspiration for creating a better present and future.

In their paper Ćurković et al., (2020) pointed out that the process of teaching should be directed toward the student, so that the main aim of teaching is the method how to teach the student to think or take over the responsibility for one's own process of reflection, evaluation, analysis and making conclusions, based on verified facts – all that to enable the student to participate independently and responsibly in all fields of life. The readiness of teachers as pedagogical educational professionals is the key element for the usage and implementation of ICT in the pedagogical educational process.

It is of fundamental importance to determine if the people teaching children are aware of the importance of the use of ICT. The gap between those who teach and those who learn is significant. Some documents with guidelines have been issued on the level of The European Commission, defining advisable competences of modern teachers, to be up to date with new information and communication technologies, enabling them to competently teach their students new knowledge and skills.

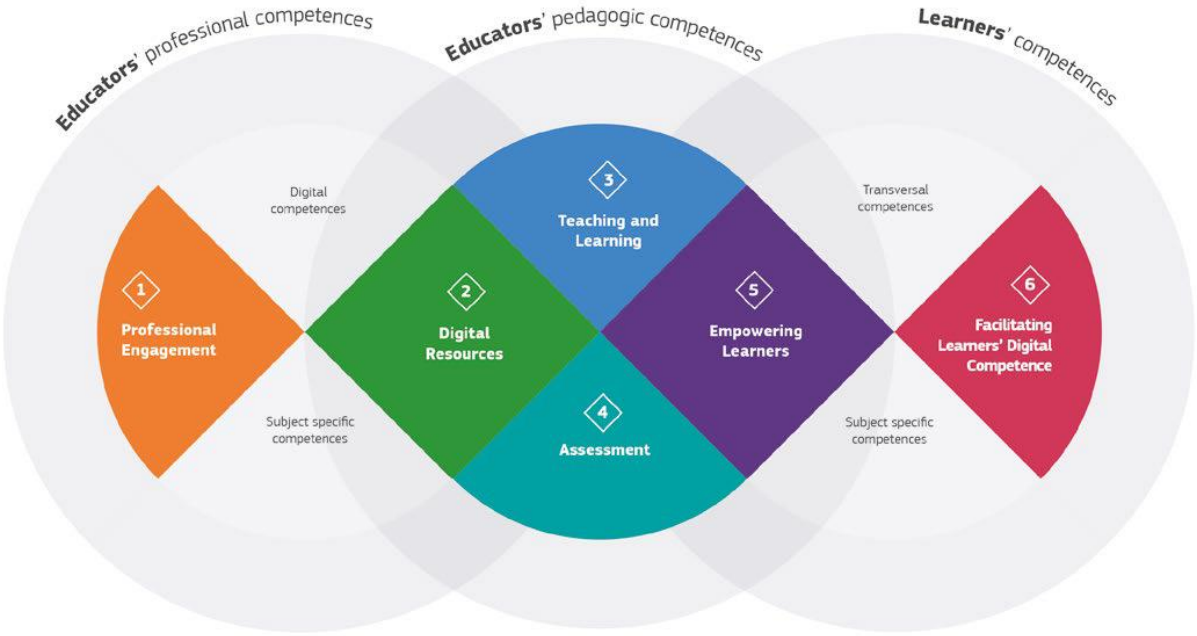

Image 1: display of competences of teachers (Redecker & Yves 2017, p.15)

In 2019 in Croatia, a new curriculum of the cross-curricular topic of The Use of ICT was issued. The project of "School for Life" was started. A new model of teacher training was introduced. The emphasis was put on virtual teacher training, with occasional on-site meetings. This approach assumed digital competences of teachers. Ćurković et all. (2020) claims that one of the aims of this project was to educate teachers about The Use of ICT in monitoring and assessment of students, as it was proven that The Use of ICT in any of the phases of the educational process has a positive impact on student motivation. Ljubić Klemše (2021) in her paper states that the Agency for Mobility and EU Programmes started a training course for teachers in the ICT surroundings on the eTwinning platform, and she pointed out that since December 2018, all the teachers have been actively involved in the education on the Loomen platform, The pandemic rushed The Use of ICT in classes even more. Up to that point, digital competences were not a mandatory topic of teacher training and were not evaluated by the Education and Teacher Training Agency. A teacher is a student throughout one's life.The cross-curricular topic The Use of ICT involves efficient, appropriate, timely, responsible and creative use of ICT in all subjects, fields and on all levels of education.

Children and young people are familiar with ICT and they accept it easily. This cross-curricular topic covers all school subjects and extracurricular activities. The primary aim of this research was to determine to which extent the curriculum of the cross-curricular topic The Use of ICT was implemented into our pedagogical educational system. Apart from the primary aim, the research had other aims, including analysis of the cross-curricular topic and experiences of teachers with the lifelong education, available training courses and implementation of the ICT into one's own subject and extracurricular activities, as well as the final aim, to find out to what extent the students are actually digitally competent after graduating secondary school and how much they know about digital competences, with a special emphasis on the notion of digital empathy.

2. METHODOLOGY

With the aim of collecting data systematically, several methods were used in this research. Quantitative and qualitative data were collected through the desk method of content analysis. The sample was the curriculum of the cross-curricular topic The Use of ICT in Primary and Secondary Schools. The unit of analysis was the notion of digital empathy and digital emotional intelligence. Through the quantitative analysis of the content of the same sample, the aim was to determine if the notions of digital empathy and digital emotional intelligence through knowledge, skills and attitudes were merely described and interpreted with different words. Further research was carried out at Josip Slavenski Grammar School and The School of Economics and Trade in Čakovec. Before the research was started, the consent to carry it out had been requested from both headmistresses. The students who expressed their wish to participate were also given consent forms.

The method of a focus group is a quantitative form of research, which includes group discussion on the given topic. The basic aim of the focus group is to encourage a thorough discussion, to research the attitudes and values of examinees to a certain problem or a topic, as well as understand and explain the meanings, beliefs and culture, which influence feelings, attitudes and behaviours of individuals. (Skoko & Benković 2009, p.115)

Seniors from both schools took part in this research. As the number of examinees was limited to 12, an online questionnaire was created for that purpose, and in that way, the focus group was formed with the 12 fastest applicants. The moderators of focus groups were members of The Student Council, who had previously attended the moderation workshop. The questions were divided into three thematic sequences. After introductory questions (how they felt etc.) the first sequence of questions referred to digital competences, if they were familiar with the notions of digital competence, skills, digital intelligence, emotional digital intelligence, and digital empathy. The moderator used subquestions to stimulate the dynamics of the group and the sequence of discussion. With subquestions, the moderator motivated students to explain each notion with an example from their own use of ICT. The second sequence of questions referred to the rules of behaviour on the internet, examples from their school or surrounding, and aimed at finding out if they tried to help and solve the problem. The last, third sequence, referred to the content they personally followed on the internet, what kind of content they shared, how important was for them that the content they shared had an empathetic character. Did they care about the emotions of others when they posted something online? The focus groups were held in the interval of ten days. The whole discussion was, with previously given consent of participants, audio-recorded and later transcribed. During the discussion, it was important that all the members of the focus group were relaxed and give as spontaneous and honest answers as possible. This kind of information is extremely valuable, because further research, based on it, can be done in the future.

In each school three teachers, who teach ICT, Croatian and English, were selected. The reason why ICT was chosen is the fact that the teachers of that subject are the closest to the quality implementation of the cross-curricular topic of The use of ICT. Teachers of Croatian run the extracurricular activity Media Literacy in each school. As for teachers of English, through the conversation before the beginning of the research, we came to a conclusion that the English language significantly involved the topics of digital intelligence and digital competences.

3. RESULTS

Through the quantitative method of content analysis, it was determined that in the cross-curricular topic The Use of ICT the notions of digital empathy and digital emotional intelligence were not mentioned. Although they were not specified in these words, through the qualitative analysis we came to a conclusion that both digital empathy and digital emotional intelligence were present. For example, B domain – Communication and collaboration in the digital surroundings – 5th cycle, about attitudes, it is stated: "respects equal participation of others in the process of communication, following ethical, social and legal values". Digital competences are mentioned as skills and attitudes, which should be equally present in all classes and subjects, in primary and secondary education. A significant emphasis is put on the digital competences of teachers themselves: teachers as educational experts, apart from the motivation for teaching the cross-curricular topic, should be familiar with the curriculum, pedagogical educational expectations and actual abilities of their pedagogical educational institution, to be able to efficiently involve ICT in their work. Precondition for successful teaching, apart from the use of ICT, is permanent professional development, bearing in mind that the content of this cross-curricular topic has been constantly changing. A difference was determined between focus groups of each school, depending on the number of lessons of ICT and wider general education. The grammar school seniors used ICT more often during their education and are more familiar with the terminology. Also, the grammar school seniors used more digital tools, online learning platforms, and almost every day they communicated with their teachers on Teams etc. (regardless of the fact if the classes were online or not). The seniors of the class for the tourism and hotel industry learnt about digital skills and competences in classes of English and Psychology. The other senior classes of The School of Economics and Trade said they were not familiar with the notions of digital competences (a lower number of ICT and English classes and they do not have Psychology as a subject). It should be noted, however, that our students do not connect content cross-curricularly. The content is still put into frames of individual subjects. The seniors of general education and language classes in the grammar school had also never heard of the notion of digital empathy, but they were familiar with digital skills because they were involved in facultative classes in that school (Civic Education, Digital Media and Media Literacy). The seniors of maths classes were familiar with the notion of digital empathy, but vaguely. In the discussion, most of them said they were not sure if they were right. "Is it about the influence of technology on our development or how we react to a situation we see in a moral sense?" The second sequence of questions concerned the rules of behaviour on the internet, netiquette. It was common for all focus groups that they almost identically described rules of behaviour on the internet and connected that content to what they learnt in Homeroom classes at primary school (netiquette assumes protecting personal data, respecting other people's privacy, never taking anyone's photos without their consent, do not reply to messages of unknown senders, obey copyright legislation). They continued to learn about netiquette in Homeroom classes at secondary school. The third sequence of questions referred to the content they followed on social networks and the content they shared. The difference between schools was noticed. The seniors of The School of Economics and Trade preferred entertainment content and spent more time on the social network Tik Tok.

Most content that they followed was determined by their search engines. Some spent up to 8 hours on that network: "We only scroll and the time passes by." They read what made them laugh and then they shared such content further. Grammar school seniors were more present on some other social networks. Some of them had profiles on LinkedIn network, where they could follow companies such as Info Bip etc. Most seniors of the grammar schools wished to enrol on the Faculty of Electric Engineering and Computing, so they followed such pages on social networks. Another difference between schools was noted here. Grammar school seniors connected their development and future education to the content on the social networks, they focused on what they were interested in professionally. On the other hand, seniors of The School of Economics and Trade used social networks only for fun, they had nothing else to do, and this is the way they spent their time. There was also a notable difference in the number of hours spent on social networks. At the grammar school, they said the maximum was three hours a day, as learning didn't leave them more time, otherwise, they would spend more time on social networks. At The School of Economics and Trade, they said they spent up to eight hours a day on social networks. They got the result automatically from their mobile phone. Some of them tried to set themselves a limit, but they failed. They use Facebook mostly to be up to date with the news. They often watched short films on Youtube. With seniors of the grammar school, a discussion was developed on the notion of "stalking". They would create a profile on all social networks where they could follow a certain person, and then they would turn on the location so that they could follow where this person went etc. Most seniors said they did not post personal pictures online, or share personal content, except if their parents did so. In this group, they had the option of choosing the content which they would share on the social networks. Two options were offered: an entertaining short film or an educational film, sending a message of empathy. Their choice was an entertaining short film. The English teacher at the grammar school is not satisfied with the expectations from teachers by the Ministry. She thinks the systems of assessment and e-learning systems have not been clearly explained. She thinks that she acquired enough knowledge on digital competences, but she does not know enough about teaching the topic, nor about digital empathy, although she would like to know more. She has not read the curriculum The use of ICT. The ICT teacher believes that the permanent education in this field is a part of his profession, however, he has not educated himself about digital empathy, nor has he taught students about it. He is familiar in detail with the content of the curriculum of the cross-curricular topic The Use of ICT and assesses his students regularly according to the outcomes described in the handbook. The Croatian teacher is delighted by the notion of digital empathy, although she thinks that the notion of empathy itself should be introduced in the school system first. She runs the facultative activity of Media Literacy, and she thinks she has enough knowledge in the field of digital skills and competences. She also actively transfers her knowledge to her students. She is happy with the teacher training courses in this field. She is familiar with the cross-curricular topic, although she has not studied the handbook in detail. The Croatian teacher from The School of Economics and Trade, apart from her subject at school, teaches facultative classes in Media Literacy. In these classes, with her students she makes short films for school, to present school on social networks etc. The teacher has recently come to work at school from the private sector, and she thinks that the expectations from teachers are too high. She acquired her knowledge of digital skills in the private sector and considers herself competent to transfer her skills and knowledge to her students. She thinks that there are not enough training courses about ICT tools, and, if she had not entered the digital world earlier, she would not have had enough time now. She says there is too much work with her basic subject, and she does not have time for additional competences. The ICT teacher regularly marks all dates such as Safer Internet Day, and she thinks that the number of ICT lessons is not sufficient to do everything. She has been taking enough training courses, but, due to the content of her subject, she does not have enough time to educate herself about topics

which her students might find more interesting. She is familiar with the cross-curricular topic and regularly uses outcomes and assessment in her work. The English teacher at The School of Economics and Trade is disappointed with the level of knowledge of that foreign language. She thinks that most students believe that her English is very good because they spend so much time on social networks, but, in reality, they are not able to express their thoughts in that language. As for the ICT, she thinks she has been educated as much as possible in her subject. Insufficiently, she thinks.

4. DISCUSSION

More detailed research in all the fields is necessary. The cross-curricular topic The Use of ICT is written very well but insufficiently presented to teachers. During the interviews, when we presented the image of digital competences each teacher should possess, according to the document by the European Commission, most teachers only rolled their eyes. As a pedagogical educational system, we are focused too much on the content of the syllabus and too little on skills and competences. Also, sadly, each change of the minister of education assumes a different attitude from the previous way of communication with the staff in education.

Digital competence has imposed itself as one of the unavoidable modern competencies. In accordance with the changes that have affected today's students, their teachers are also changing, theirs need to adapt their learning and teaching skills to new generations of students. (Luić et al. 2020, p.7169)

At schools, digital competences are in most cases restricted to media literacy (which is mostly taught as netiquette) and the use of digital learning tools, making films.

It is interdisciplinary oriented approach with tendency to introduce digital literacy through all subjects and cross-curricular topics, including extracurricular activities (in groups and individually), project-based learning, problem-based learning and mentoring. (Luić & Alić 2022. p 7213.)

Teachers dealing with this are usually the ones who are willing and motivated enough, and have enough time to tackle extra training courses on digital competences. It is a fact that today's generations of teachers were not born with mobile phones in their hands and often must learn skills, that their students possess from an early age. With this research, we are only at the beginning. Through the conversation with teachers, it has been determined that one does not know enough about the cross-curricular topic, and thereby it cannot be implemented in the pedagogical educational system properly. The curriculum of ICT skills as a cross-curricular topic has been left as an option to teachers who are motivated enough to use it. The cross-curricular topic could be tackled by everyone or nobody. Online training courses have not proven themselves as promising for all teachers, and some of them even avoided that form of education. The focus groups only confirmed the gap between the ones who teach, and the ones being taught. In fact, students are familiar with the rules of how to behave themselves online, they even know these rules by heart, but the discussion showed that they did not follow them. "Stalking" and similar activities do not contribute to acquiring the skill of digital emotional intelligence. The students are not keen on sharing sympathetic content online. It is not amusing. The students are not familiar enough with the notion of empathy. The students and the teachers understand the concept of "free time" and "wasting time" very differently. Possibly what the teachers consider wasting time is only acquiring new competences. Everybody involved in the pedagogical educational system expressed their wish for more knowledge in this field.

We have good seniors, young people who wish to be ready for today's labour market, teachers, who also have personal and professional reasons to acquire digital competences, but also be able to transfer the skill of digital empathy. All participants of the research were delighted by the notion of "digital empathy". The only open question is where to find space for additional education and additional knowledge? It is a fact that our subjects are full of content that needs to be memorised. The focus groups show that the most permanent knowledge is the one where they learn to do something on their own or participate. The things they have to learn to interpret are mostly what they later forget, but when they have to do something, it remains in their memory.

5. CONCLUSION

In the pedagogical educational system, there is still a lot to do to reach the notion of digital empathy. There is a large interest from all sides, starting from students, to teachers, to learn and apply these notions. The conclusion is that this cross-curricular topic is not implemented enough in the pedagogical educational system. There are possibilities for further research and guidelines to put everything into practice. The fact is that the world cannot go backwards, only forward, and these competences will become even more important. Although there are no simple answers to how to achieve this, we have started a discussion about it and we have got a basis for further research. The profession of a teacher and its development are fundamental for the development of digital competences, as well as the development of emotional intelligence and digital empathy among students. "Tell me and I will forget, show me and I might remember, involve me and I will understand." Confucius

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SYNERGISTIC EFFECT OF BUSINESS SYNTHESIS AND INFORMAL EDUCATION ON THE DEVELOPMENT OF REGIONAL DIGITAL ECONOMY

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ABSTRACT

Digital competencies in today's dynamic, technological world of business are acquired through a variety of formal and informal educational practices. Therefore, formal educational institutions must follow the pace of changing and upgrading technology and digital business. Informal sources of knowledge available through digital online communication channels and services are increasingly becoming available to the wider working population, and the degree of processing of this knowledge depends on the level of digital intelligence of the population. This paper presents a case study from the north of Croatia as an example of a business-initiated educational model oriented towards the local community. The research was conducted to examine the effectiveness of a new approach to education initiated by IT companies from the real sector. The research aims to determine the experience of participants in such training to answer the research question of whether such practices maintain a sufficient quality of formal education and whether such training has a direct impact on strengthening economic capacity in terms of employment, promotion, or raising the standard of work of already employed persons. The research also examines whether training launched by technology companies can help solve the problem of labor shortages in this industrial sector with an emphasis on regional development. The research sample includes participants from workshops and lectures held by IT companies in the north of Croatia. Based on the results obtained from the collected surveys, the statistical analysis determined the extent to which this type of education has an impact on their employment or progress in existing jobs. The results will be a good guide for further planning of the digital development strategy of the north of the Republic of Croatia and can serve as a supplement or as a basis for further, more extensive research of this type, at the national level, but also as a conceptual framework for related international research.

Keywords: *Digital economy, Digital intelligence, Education, IT industry, Entrepreneurship*

1. INTRODUCTION

According to the Croatian Chamber of Economy, the Croatian IT industry is the leading industry in the segment of exports and annual revenues. In 2020, these revenues amounted to HRK 27.81 billion. The largest part was realized by companies based in Zagreb, a total of HRK 21,703.38. This figure indicates the strong centralization of the IT industry in the Republic of Croatia. This relationship also raises the question of the need for professional staff. Projections point to further growth in the need for employment in the IT industry, and if this growth continues to be reflected mostly in Zagreb, there will be even greater disparities in the development of the regional IT economy (Croatian Chamber of Economy, 2021). In case the situation does not change, other Croatian counties will lose their more and more professional and educational staff, which is bad for IT companies in those counties, as well as for the economic development of those counties itself. According to the survey, "Finding new/retaining existing staff" is one of the major obstacles (33% of respondents cited this as a problem) to further growth or survival of young IT companies and startups. Projections for Croatia show the creation of 127,000 new jobs in the ICT sector by 2025 and a total of 97 million new jobs globally (Telegram 2021). Although the formal education sector seeks to meet these labor market needs through secondary and university programs, they are not sufficient.

The problem is that these programs depend on the will and ability of the governing bodies that compile and implement them. If these bodies do not react in time, the market and technologies will move forward, so students from formal institutions may be left deprived of the current knowledge needed in the labor market (Luić et al., 2020**).** Recourse to solve this problem, some IT companies have decided to help the market by launching their training and workshops. This scientific paper deals with a case study of a project called "Javascripting" initiated by Roberto Kedmenec, today's director of Krtech Digital d.o.o., precisely because of the need to create new staff in the IT industry in the northern region of Croatia. The research examines whether such an approach has a real impact on the development of the regional economy in terms of new employment or promotion of existing staff. This research is based on considering the accuracy of the statement that trainings initiated by IT companies have positive effects on the participants of these trainings and the economy itself. Employment and advancement of staff in the IT sector for the region or county mean less outflow of people, the possibility of opening new companies, and new financial revenues in the budget. According to the Croatian Chamber of Economy, the counties of the northern region of the Republic of Croatia lag behind the main leaders of the IT industry in Croatia, and the data on Korpivnica-Križevci and Krapina-Zagorje counties are particularly worrying.

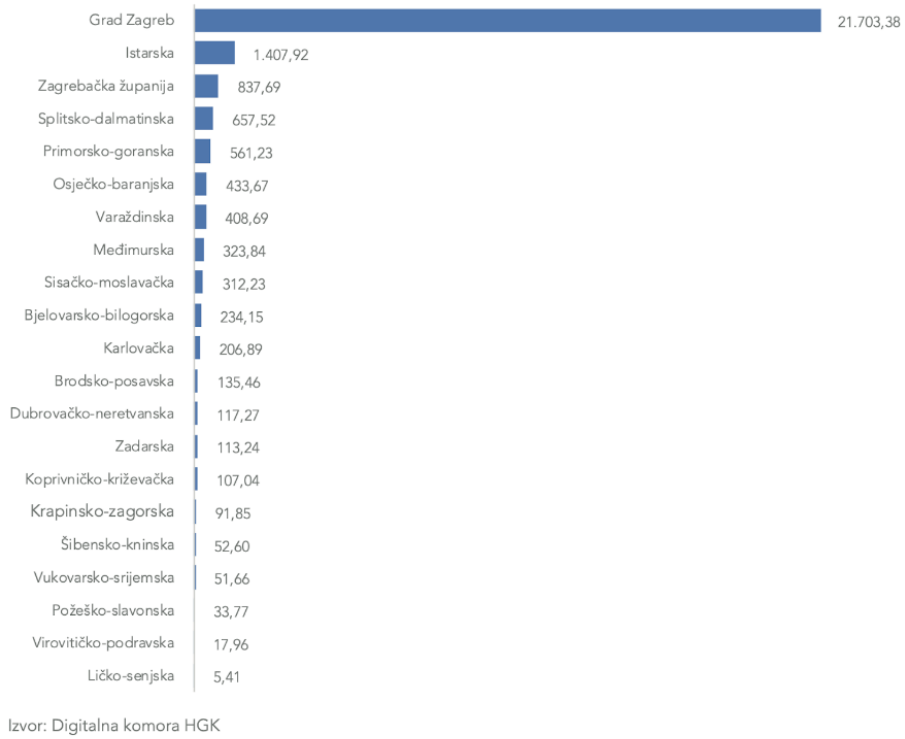

Figure 1: Total revenues (mil. kn) of the Croatian IT industry by counties (Source: HGK)

2. METHODOLOGY / MATERIAL AND METHOD

The research was conducted on the participants of the Javanese scripting, by the method of a survey questionnaire sent to the email addresses with which they applied for training. "Javascripting" is a localized name derived from the word Javascript, which is the name of the programming language used in education and workshops. In addition to programming itself, participants are introduced to communication tools used in industry and taught to plan, prepare and implement projects. This raises the level of their digital literacy, which is very important because most of the participants are younger, mostly high school and university students.

Media literacy involves recognizing and understanding digital content. (Luić and Alić, 2022) . What is important here is that this education of media-literate people who consume media content learn how to create a platform on which this content will be displayed. Out of 32 participants in the training, 24 of them gave their answers to the questions asked. Respondents come from the area of Međimurje, Varaždin, and Krapina-Zagorje counties, and education and workshops were held in Čakovec. The trial was conducted between April 25 and May 10. The introductory part describes the purpose of the survey questionnaire. The first two questions relate to the choice of age group and level of education. Other questions examine the impact of these educations on career development in the IT sector and examine the opinions of participants on the quality of this type of education and its importance for the economy. The survey questionnaire contains three types of questions. When asked where an unambiguous answer is required, respondents could choose only one answer. The possible outcomes of the training are listed for the questions, leaving the possibility to choose more answers or to correspond to one's own opinion. The questions that examine the quality of a certain segment are composed according to the principle of choosing the most important value according to the scale from the best to the worst choice where only one answer is required. The survey questionnaire was compiled on the service https://limesurvey.srce.hr/

3. RESULTS

Of the 24 respondents, 38% belong to the age group of 19-15 years, 21% are between 26-30 years old, and the same percentage are in the age group of 31-36 years, 4% of the respondent is aged between 37-45 years, 13% are between 45-55 years and 4% of respondent are older than 56 years. 29% of respondents have completed undergraduate studies, 8% are undergraduate, 8% respondents have completed graduate studies, 4% of them are currently graduate students, 4% are specialists, and 42% of respondents have completed only high school. 79% of respondents were satisfied with their education, while 21% were little or not satisfied. 54% of respondents think that this type of education is a good substitute for formal education, 41% of them think that it is a good supplement to formal education, and 1% of respondents do not agree with any statement. The majority (70%) attend such education once a year, and a smaller number attend it twice (20%) or more than once a year (10%). For 70% of respondents, the price of education influences the decision to attend. 54% of respondents think that free education is of poorer quality, 33% think that this is mostly not the case, 8% think that free education is never worse than paid education, and 4% of respondents think that free education is always worse than paid education. Education of this type did not affect the careers of 16% of respondents, while 41% of them had a positive impact, from new employment to promotion. (Figure 2) .

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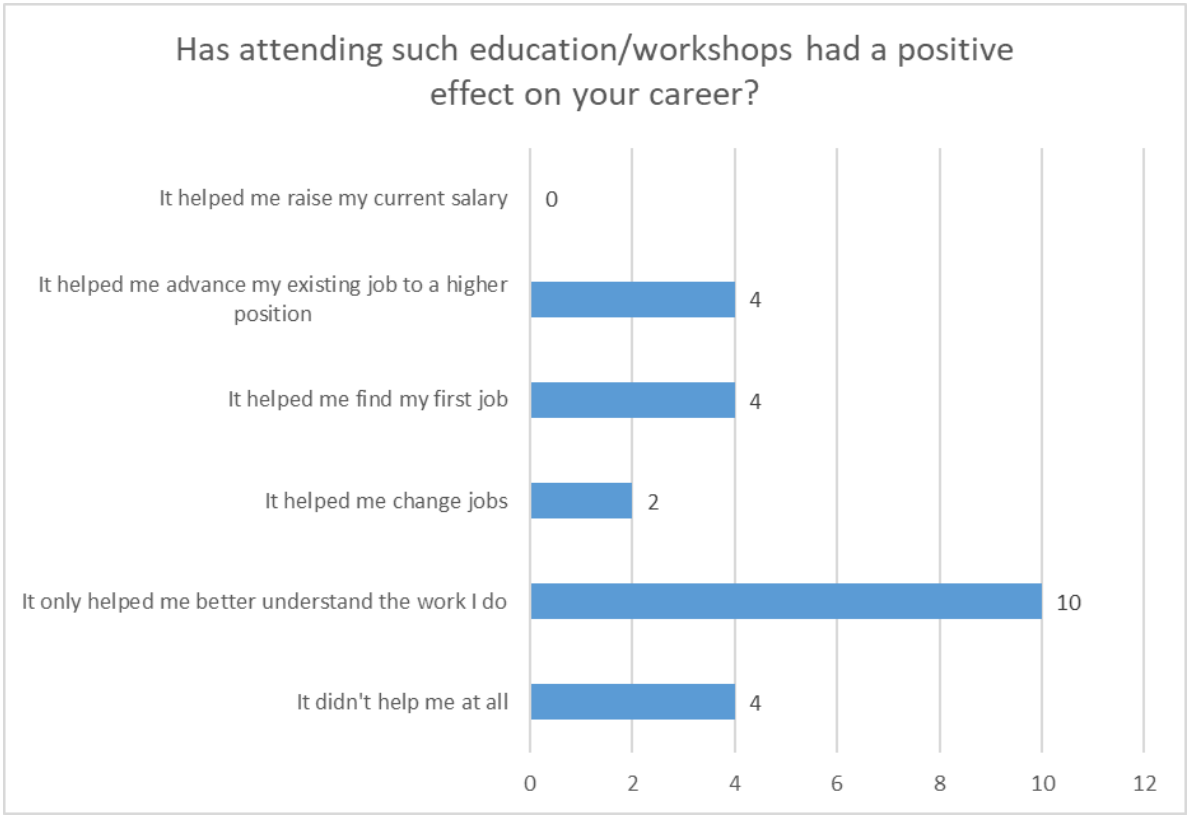

Figure 2: Effect on career
(Source: Authors research)

The majority of respondents (87%) believe that training initiated by IT companies can help create new jobs (Figure 2), new business ventures, increase salaries, and connect people. The general perception of the participants of such training is positive. (Figure 4).

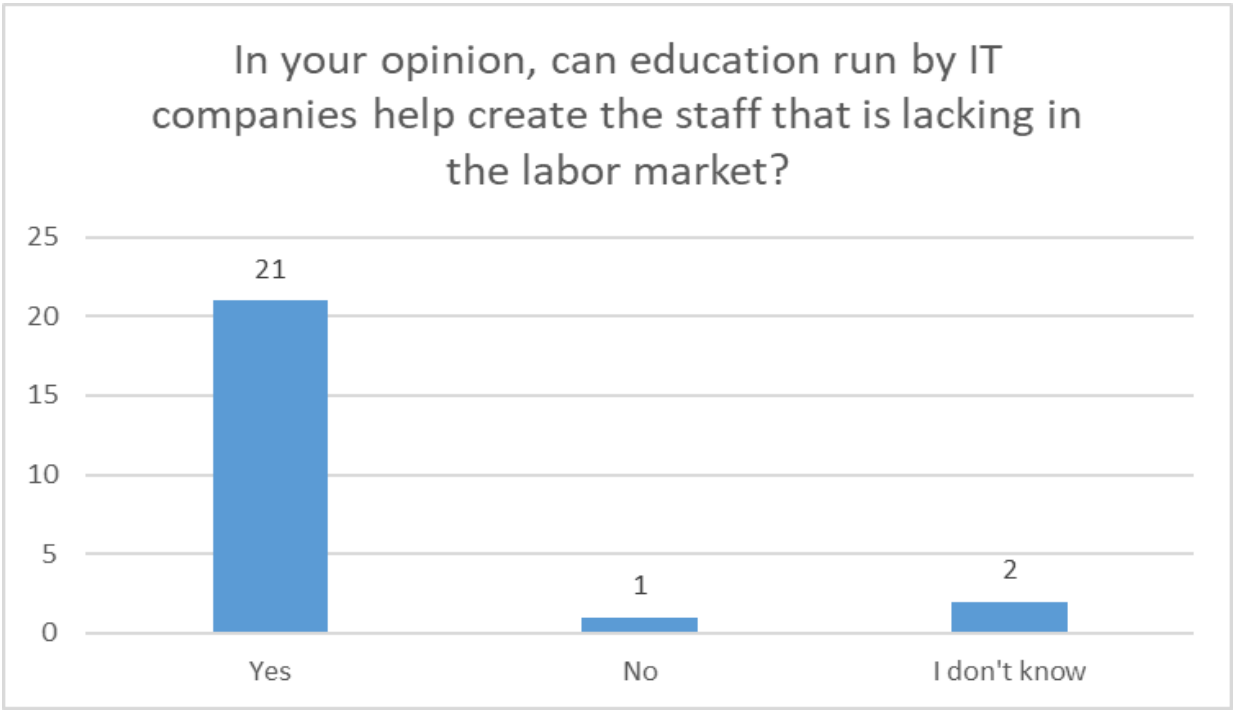

Figure 3: Labor market
(Source: Authors research)

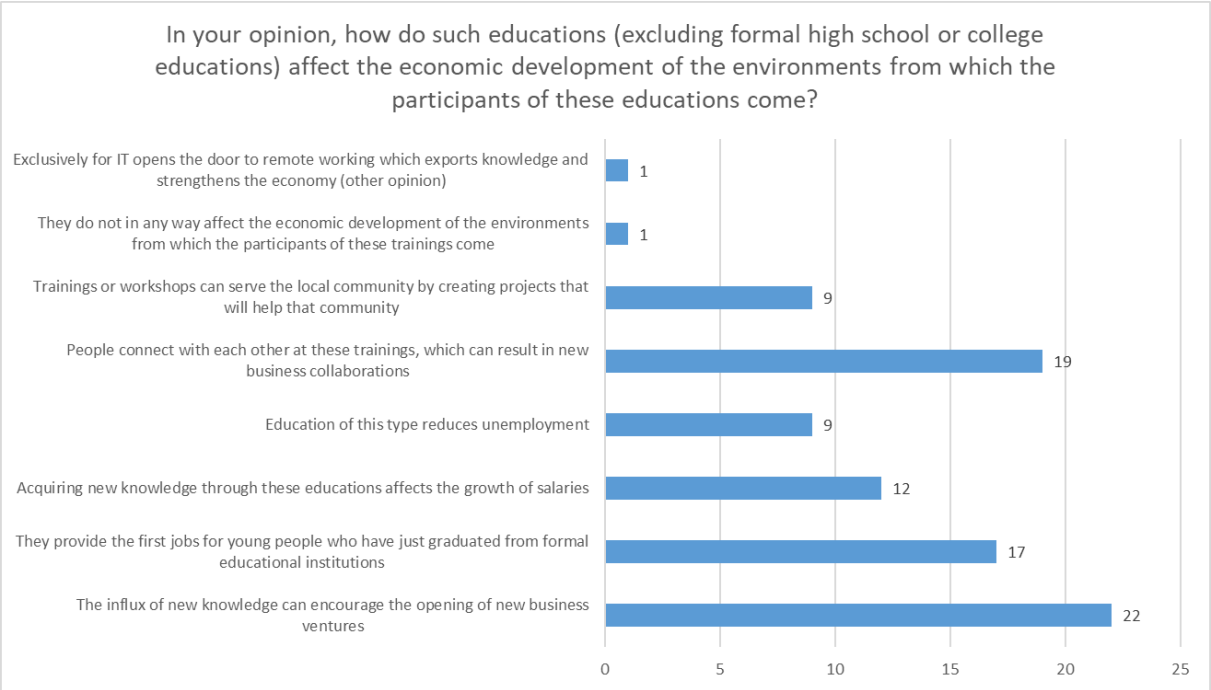

Figure 4: Affecting the economic development
(Source: Authors research)

All respondents agree on the inadequacy of secondary education. The majority (62%) of them believe that university education does not give a clear enough picture of the needs of the IT sector in the labor market, compared to education initiated by IT companies. (Figure 5). This is supported by the results of the question on the reasons for attending such education, which shows the respondents' desire for new knowledge and their progress. (Figure 6).

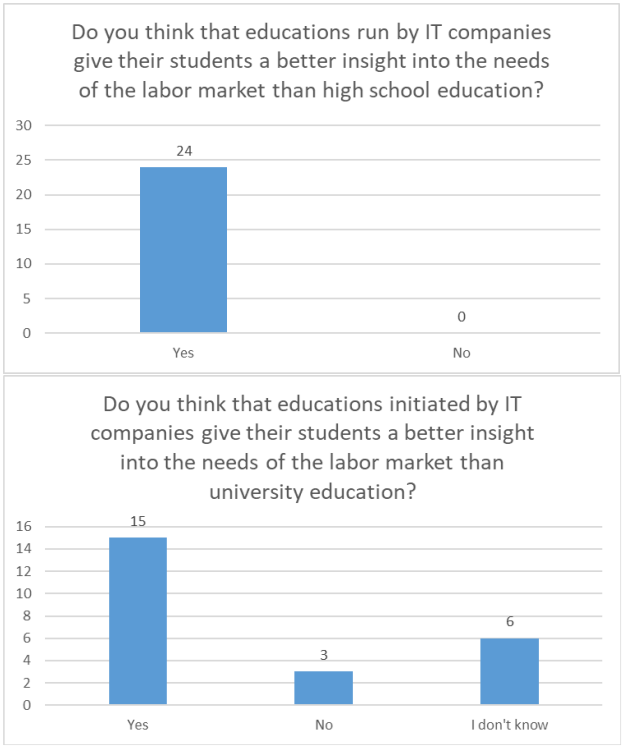

Figure 5: Comparison
(Source: Own research)

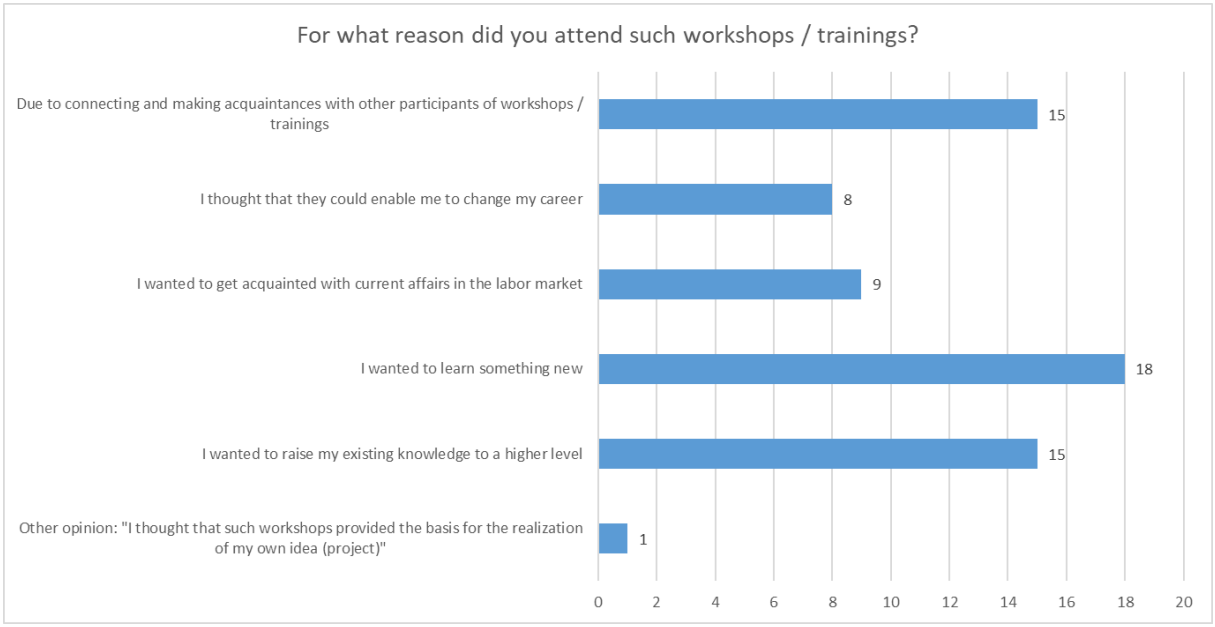

Figure 6:Reasons to attend
(Source: Authors research)

Respondents generally agree (85%) that education initiated by IT companies can affect the decentralization of knowledge and staff in the Republic of Croatia (Figure 7). Almost all respondents (95%) know at least one person who was helped by such training to find a job (Figure 8) and agree that they help to arouse the interest of the local community in IT technologies (Figure 9) which has a positive effect on the economy of the region in which they are held (Figure 10).

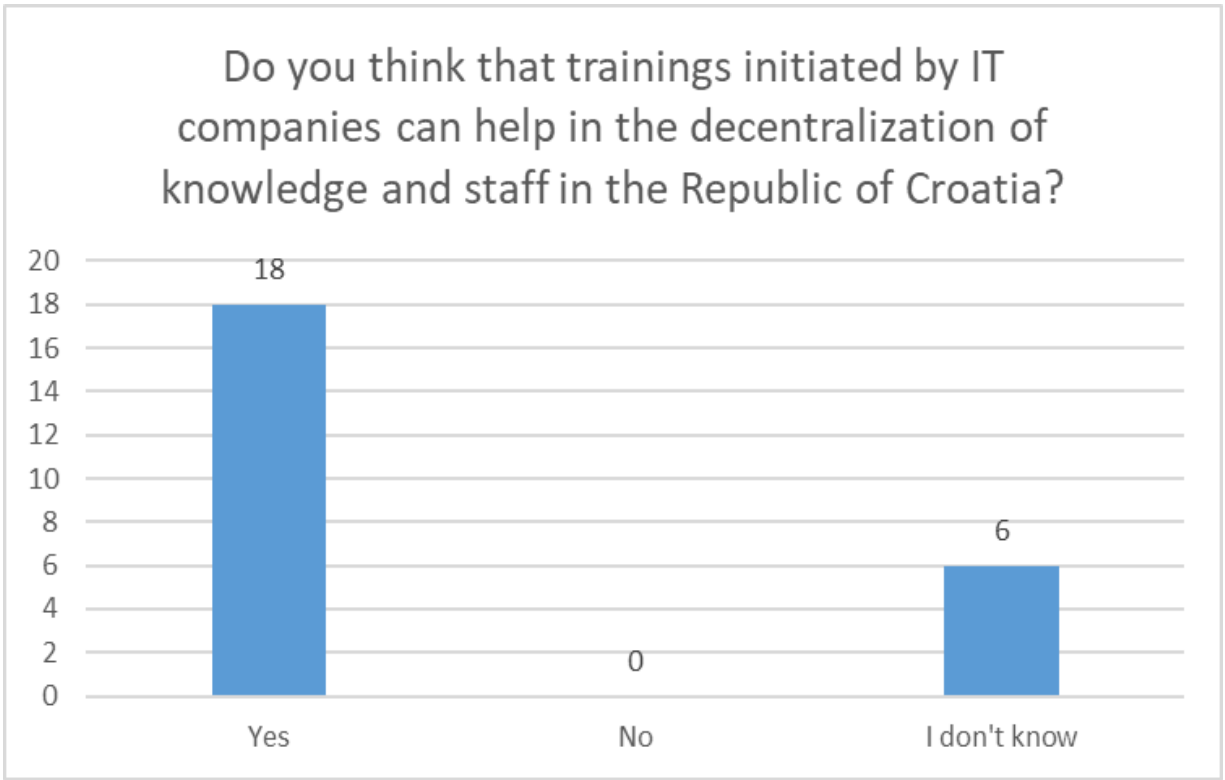

Figure 7: Decentralization
(Source: Authors research)

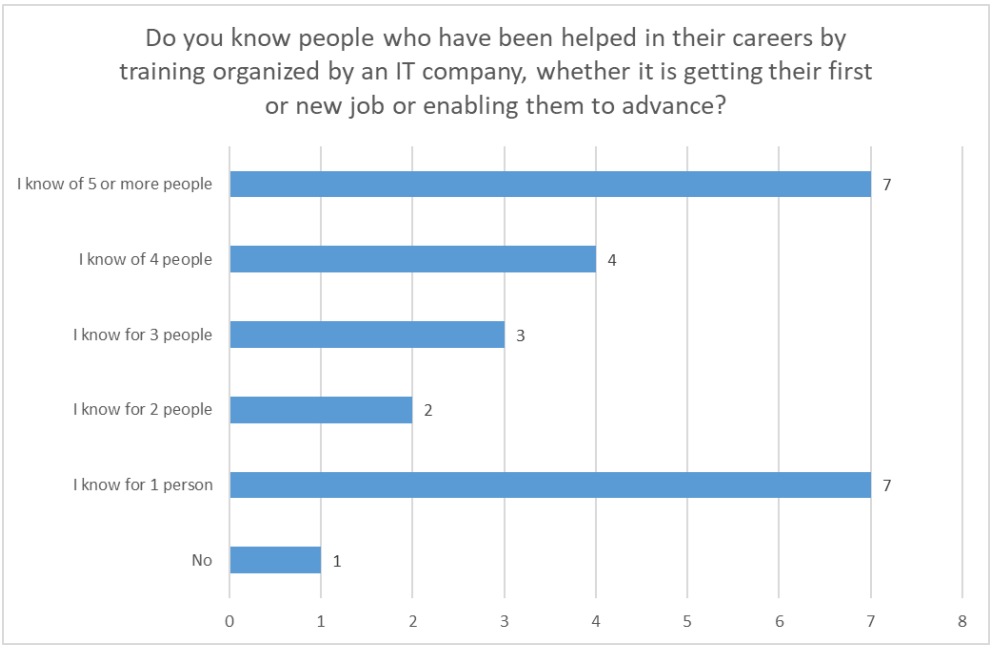

Figure 8: Other people
(Source: Authors research)

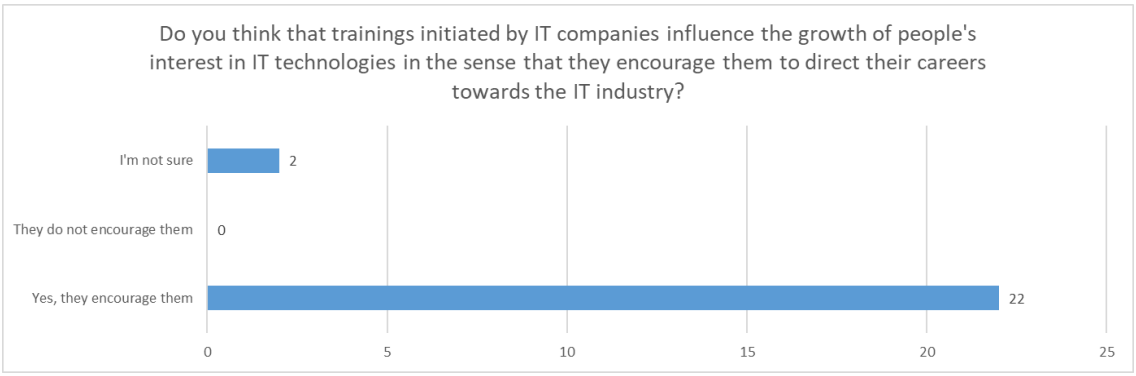

Figure 9: Encourage
(Source: Authors research)

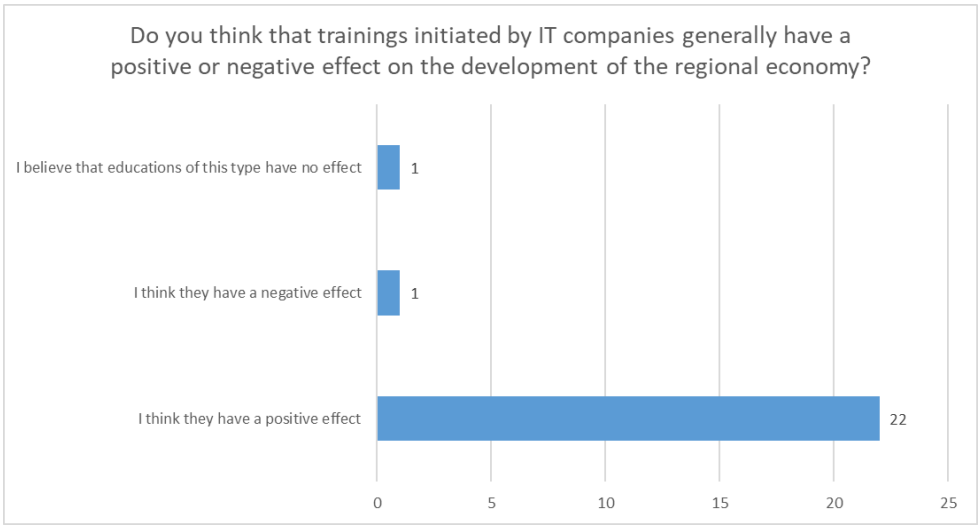

Figure 10: Effect
(Source: Authors research)

4. DISSCUSION

According to the research of the Croatian Chamber of Economy, the economy of the IT industry is growing from year to year. The northern region lags far behind Zagreb, and the situation is no better in other parts of Croatia. The main problem is the strong centralization of the IT industry, leading to a brain drain from other regions to the very center of the country. As a result, young startups find it difficult to find new staff, and larger companies are unable to expand their further business due to a lack of skilled labor in the region. The problem of staff shortages is being addressed by secondary schools and universities by launching and maintaining STEM programs, but this is not enough. Research has shown that not only is it not enough but it is often inadequate. Most respondents agree that formal education does not provide enough relevant knowledge that can be immediately applied to the labor market. This problem has also been taught by some companies that organize workshops and trainings for all those who want to build their careers in the IT industry. Research has shown that most people attend such educations to improve their knowledge which tells us that interest and desire for improvement exist. Therefore, it is necessary to continuously work, provide and support such initiatives because they make a real positive step in the economy and society in general. It turned out that attending such trainings helped the participants to land their first job. This is a good direction towards reducing unemployment, so a similar model could be applied to other industries. Such trainings also help individuals who volunteer as lecturers and mentors, thus improving their communication skills (Misko 2008). The social component of such education is important because it concentrates and connects people from the IT sector into one whole. In addition, trainings of this type can help create new business ventures, new managers, help better understand business in the IT sector or simply motivate others to get involved in working with new technologies. Such a whole is easier to follow and upgrade with new knowledge and insights exchanged by its stakeholders. In addition to this exchange, young people (who make up the majority of participants in these trainings) spend their free time better. Such societies also have a positive impact on the spread of digital literacy among the region's population and raise people's interest in new technologies. This research also showed a correlation between the desire of young people for new knowledge in the field of IT industry and Eurostat research on digital literacy of young Croats aged 18 to 24 who are at the top of digital literacy in Europe. The research confirms the hypothesis that trainings and workshops initiated by IT companies have a positive effect on the economic development of the regions in which they are held. Some of the people who attended the trainings successfully found their first job in the IT industry. A number of participants in such trainings have progressed at work, and most of them have improved their knowledge, which in turn reflects on the quality of work in the companies in which they work or will work. The assumption is that this allows companies to work on larger and more challenging projects that bring in more revenue. Further research on this topic should be expanded in this direction to obtain more concrete confirmations of this assumption. This research contradicts the views of *Neil Selwyn*, who argues that trainings run by IT companies from Solicia Valley do not work democratically because their proposals are always respected by the world's leading IT companies and whose ultimate interest is always profit. Thus, according to his views, politics is subordinated to private capital (Selwyn 2016). In an article for Forbes, American producer and journalist Gregory Richters states that this is the approach that companies use to help the economic development of individual regions and entire countries. As he said: "Think local and collaborate globally to share ideas" (Richters, 2021). The disadvantage of this research is that there is no broader picture and correlations between employment figures and the number of people completing formal education in the IT industry. Also, in the absence of more detailed information on the IT industry of each county in Croatia (except for total revenues), it was not possible to make a more precise survey.

The research showed that there is a generally positive attitude towards training initiated by IT companies and that they have had a positive effect on the majority of respondents. Part of the respondents thus managed to find their first job, and some progressed to their current jobs.

5. CONCLUSION

Research indicates that this type of education has a positive effect on economic development because it provides young people with new opportunities, and employing these people near the place where they live maintains a positive demographic picture and prevents "brain drain". This research opens the space for further, deeper analysis of the overall problem of IT sector development in Croatia with special emphasis on regional development and decentralization. This can be achieved by continuously monitoring the career paths of newly graduated high school students and alumni, examining the quality of formal education, and insight into the economic needs of each region. Such research would certainly help the timely response of state institutions and the real sector to labor market trends in the IT industry.

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A STEP CLOSER TO UNDERSTANDING RESEARCH TRENDS IN THE FIELD OF DIGITAL INCLUSION OF PERSONS WITH DISABILITIES IN HIGHER EDUCATION: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Higher education institutions have a strong potential to encourage society to make significant changes, preparing individuals for active and responsible participation in society. As one of the tasks of the higher education system is to take an active role in overcoming the challenges that affect certain parts of society, especially vulnerable groups, it should be able to provide equal opportunities for all students. Digital competences in education are crucial today, so the question arises as to whether sufficient investment is being made into research in this field. The aim of this paper is to offer a systematic literature review that focuses on two types of research currently conducted in the field of digital inclusion in education: (i) use and adaptation of digital educational tools for students with disabilities and (ii) digital competences of teachers. For the purposes of the research, the method of content analysis of recent scientific papers was used. The search analysis was conducted from March to April 2022, while the search of papers in Scopus and Web of Science databases was limited to the period from 2019 to 2022. Terms used in the search were as following: digital competencies, disabilities, higher education. This review includes an analysis of existing concepts of digital inclusion of persons with disabilities in the higher education process as well as proposed methods for assessing digital competencies of teachers in higher education and pursues three objectives: (i) to describe the concepts of digital inclusion, (ii) to provide an overview of trends and (iii) to identify challenges in assessing the digital competences of teachers in higher education related to digital inclusion. Through consideration of these goals, this paper presents an innovative approach to research in this field and emphasizes the need to conduct similar research to promote the development of higher education.

Keywords: *Digital competences, Digital inclusion, Higher education, Students with disabilities, Teachers*

1. INTRODUCTION

Importance of education isn't only reflected in the way it upholds individuals in developing critical thinking and acquiring new sets of problem-solving skills but can also be seen through the impact they have on the environment and the society in which they participate. Higher education institutions, in this instance, have a strong potential to encourage society to make significant changes, preparing individuals to become active and responsible citizens who can contribute to overcoming local and global challenges. One of the tasks of the higher education system is to take *an active* role in overcoming the challenges that affect certain parts of society, especially vulnerable groups by providing equal opportunities for all students, giving everyone an equal chance to thrive in today's social and economic climate. Information and communication technologies (ICT) have irreversibly changed the way we interact with technology and have been in the focus of public policies for years.

In the year 2006, the European Parliament and the Council of the European Union published *Recommendations on key competences for lifelong learning (2006/962/EC)*, recognizing digital competence as a set of skills in ICT an individual needs to "*retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet*" (EUR-Lex, 2006). To identify digital competence and to provide a common understanding of these skills, EU has developed the Digital Competence Framework for Citizens (current version DigComp 2.2) – a document that "*provides more than 250 new examples of knowledge, skills and attitudes that help citizens engage confidently, critically and safely with digital technologies*" (Vuorikari, Kluzer, Punie, 2022). The current version of the document aims to keep DigComp relevant and to serve as a support for different EU policies and objectives, especially those concerning digital transformation. One of the EU policy initiatives aimed to prepare and support education and training system for the digital age is *The Digital Education Action Plan (2021-2027)*. One of the key points of this renewed document adopted by the European Commission in its efforts for digital transition in Europe (the first version having been released in 2018) states that the aim is to „offer a long-term strategic vision for high-quality, inclusive and accessible European digital education". In this regard, digital competence has become especially crucial in the context of the *European Higher Education Area*, promising a more inclusive setting for vulnerable groups, understanding their right to obtain education without barriers. Not only do high education learners and teachers need to be digitally competent to meet the requirements of modern education system, but digital competence can help overcome certain educational barriers students with disabilities face, bringing to the forefront development of a high-quality digital education accessible to all students in the EU. The question arises as to whether sufficient investment is being made into research in this field and the aim of this paper is to offer a *systematic literature review* that focuses on two types of research currently conducted in the field of digital inclusion in education: (i) use and adaptation of digital educational tools for students with disabilities and (ii) digital competences of teachers. This review includes an analysis of existing concepts of digital inclusion of persons with disabilities in the higher education process as well as proposed methods for assessing digital competencies of teachers in higher education and pursues three objectives: (i) to describe the concepts of digital inclusion, (ii) to provide an overview of trends and (iii) to identify challenges in assessing the digital competences of teachers in higher education related to digital inclusion.

2. METHODOLOGY

The search analysis was performed from March to April 2022 and the search of papers was carried out in the largest interdisciplinary citation databases: Scopus and Web of Science. The search was limited to the period from the year 2019 to 2022. Combination of terms used in the search were the following: *digital competence, disabilities, higher education*. This literature review follows the basic idea of the Cochrane Handbook for Systematic Reviews of Interventions and the following eligibility criteria (Higgins et al., 2019) were determined with the aim of including and excluding papers from the search:

- Research focused on existing digital educational tools for students with disabilities and digital competences of the teaching staff
- Critical overviews on the matter of accessibility in the higher education environment
- The target groups were students with disabilities and teaching staff
- Papers had to be available in the open access publishing model
- Research on emotional impact of accessible technologies were excluded from the results
- Non-English-language papers were also excluded from the results

The initial search generated 903 results (888 results from Scopus and 15 from Web of Science) and the initial screening consisted of reading the titles and abstracts of these papers and the selection of relevant papers was based on the eligibility criteria mention above. After the initial screening, 884 were excluded for either not focusing on *digital inclusion* of persons with disabilities in *higher* education, not being available in the English language or simply having low relevance of papers based on eligibility criteria. The next phase of the screening included reading full texts of the remaining 19 papers. After reading these papers, 8 were excluded because they were focused more on accessibility in the educational environment, rather than the focusing on digital competences. Of the remaining 11 papers, 2 were excluded because they were presenting a systematic literature review, and 1 paper was excluded because it dealt specifically with psychological aspects of loneliness students with disabilities experience in online learning. Based on the search criteria, the literature screening process produced 8 relevant papers aimed at identifying research trends in the field of digital inclusion of persons with disabilities in higher education. The 8 papers generated by this search were then analysed according to the following criteria:

1) Author/s
2) Year published
3) Country
4) Year (data collection)
5) Targeted group (students with disabilities – teaching staff)
6) Sample size (number of faculty members involved)
7) Methodology
8) Assessment method

3. RESULTS

This paper aims to provide an overview of current research trends in the field of digital inclusion of persons with disabilities in higher education. Out of the 8 papers derived from this search the majority was published in the year 2021 with one published in 2020 and one in 2022. In order to get a clear overview of the subject, analysis criteria were developed that included location, year the study was conducted, targeted groups, number of respondents, methodology and assessment method used (Table 1.

Author/s	Year published	Country	Year data collection	Target Group	Sample size	Methodology used	Assessment method
Widyastuti, D.A.R. et al.	2021	Indonesia	-	Students with disabilities	-	qualitative	-
Fernández-Batanero, J.M. et al.	2022	Spain	2020 - 2021	Teaching staff	2072	quantitative	questionnaire
Silletti, F. et al	2021	Italy	2020	Students with disabilities	198	quantitative	questionnaire survey
Medina-García, M et al.	2021	Spain	2020	Teaching staff	142	qualitative	online survey
Arslantas, T.K. Gul, A.	2021	Turkey	-	Students with disabilities	60	mixed	online survey; semi-structured interview
Cabero-Almenara, J. et al.	2021	Spain	2019-2020	Teaching staff	1194	mixed	questionnaire
Boys, J.	2021	UK	-	Students with disabilities	-	critical review	-
Reinholz, D.L. Ridgway, S.V.	2021	USA	-	Students with disabilities	-	-	-

Table 1: Summary descriptions of studies according to the analysis criteria (Source: Authors)

The research generated papers that were then systematized into 3 main groups: *a) research focusing on digital competence of the teaching staff; b) research focusing on digital competence of students with disabilities and c) critical overviews outlining the importance of accessibility in the higher education environment*.

3.1. Research focusing on digital competence of the teaching staff

Entirety of the studies in this section were conducted in Spain and all recognized the importance of use of the ICT and teacher training in higher education, especially amid the COVID-19 pandemic, when both students and teachers had to resort solely to online teaching. This should not come as a surprise because Spain has introduced the imperative of supporting development of digital competence into several of its national policies. Data collection in all 3 studies was carried out either through an online survey or a questionnaire, from 2019/2020 to 2021. Another interesting thing to note here is that all the studies used a series of criteria from the Cabero-Almenara et al. (Cabero-Almenara et al., 2021) *instrument* (a means of measuring the level of digital competence of teachers). Authors of the first study (Medina-García et al., 2021) conducted qualitative research on the knowledge teachers on all educational stages have in ICT and disability and whether that knowledge would increase the use of technology as a teaching resource and the teacher's own motivation. Sample included 142 teachers from all educational stages, 19.7% of which taught at the university level. The results obtained stressed "*the potential of ICT in the education of students with disabilities and the importance of teacher training in order to ensure inclusion*", as stated by the authors. Both the knowledge about ICT and disability the increased use of technology as a teaching resource has a positive impact on the teacher's motivation. The results also show that teachers at lower education levels have a better understanding of disability but lack motivation in using ICT in teaching. The next study (Fernández-Batanero et al., 2022) was conducted with the aim to identify the degree of training and technological knowledge higher education teaching staff in the use of digital resources to support students with disabilities. Authors chose a cross-sectional research design (descriptive and predictive approach) and the sample consisted of 2072 teachers from different higher education institutions. The results obtained by this study showed teachers have a low level of digital competences training when it comes to the use of ICT with students with disabilities. The last study in this section (Cabero-Almenara et al., 2021) was conducted with the similar goal: to understand teacher's knowledge on digital resources as a way of ensuring inclusion for students with disabilities. A non-experimental design was used (qualitative and quantitative analysis) for this research and 1194 teachers from all educational stages from Andalusia participated in the questionnaire, 23.7% of which at the university level. The results obtained showed that the level of digital competence of teachers, though acceptable, need to be higher in order to ensure inclusion for students with disabilities.

3.2. Research focusing on digital competence of students with disabilities

A study in Italy was conducted (Silletti et al., 2021) with the aim of investigating the perspective on distance learning of students with disabilities. The sample consisted of 198 Italian university students with disabilities who had to fill in an online questionnaire and valuate their experience and perception of distance learning during the COVID-19 pandemic. The data collection was carried out in the academic year 2019/2020. The results obtained by this research showed differences of perception depending on the type of disability a student has, but also highlighted the positives in terms of participation in online activities and the negatives such as being socially isolated or experiencing technical issues. A study in Turkey (Arslantas, Gul, 2021) was conducted in order to explore the digital literacy skills of university students with visual impairment. A mixed methods design was used, collecting both quantitative and qualitative data through an online survey and semi-structured interviews. Sample included 60 participants.

The results showed that even though visually impaired students possessed certain digital literacy skills and their vision wasn't considered a barrier, they did "*face problems in digital content creation, critical information evaluation, and in working collaboratively*", as noted by the authors.

3.3. Research and critical overviews outlining the importance of accessibility in the higher education environment

We cannot have a conversation on inclusive higher educational system without touching on the subject of accessibility and even though the next 3 critical overviews are putting an emphasis on the importance of creating a suitable online setting, they also discuss the importance of creating an accessible physical environment for all students with disabilities. The first paper, a case study conducted in Indonesia (Widyastuti et al., 2021) focused on the efforts of creating a quality environment and education approach in the context of higher education and students with disabilities. It also lists challenges in creating such an environment. This qualitative research was conducted on the Universitas Atma Jaya Yogyakarta (UAJY) and it included the *Inclusive Participatory Action Research.* In order to determine what adjustments need to be done to make the University more inclusive, students with disabilities were actively involved in planning, implementing and evaluating the efforts made to do so. The results of this study highlight that higher education institutions should create a barrier free environment to ensure accessibility (both physical and virtual) for all students, giving them an active role in development and decision making. The next two papers present a unique perspective on disability and accessibility. A critical analysis essay (Reinholz, Ridgway, 2021) focuses on enhancing accessibility in science, technology, engineering, and mathematics (STEM) teaching on all educational levels by understanding the concept of *access needs* as a precursor to equality, stating that without the proper understanding of a person with a disability and without ensuring a completely accessible space in which an individual can fully participate, equality cannot be met. Authors emphasize the importance of normalizing discussions around access needs because they generally tend to focus more on physical access, ASL interpretation, and screen reading while leaving needs of other individuals less visible. To illustrate these ideas, authors discuss different scenarios of access needs in STEM education (disabled and nondisabled persons in laboratory spaces, classrooms and other spaces). Another critical overview focused on the higher education practices in the UK during the Covid-19 pandemic (Boys, 2021). The author observed the quick shift from a physical to an online educational setting and emphasized how it demonstrated a lack of experience in using technologies efficiently for students and teachers. However, in order to achieve good educational practices in higher education, especially for persons with disabilities, old educational norms need to be reviewed "*with diverse learners, teachers, curricula and contexts*" in mind, and the time of the pandemic may just be the right time to start considering these concepts, as stated by the author.

4. DISCUSSION

As stated in the Rome Ministerial Communiqué (EHEA, 2020) document, the pandemic brought with it a time of crisis that has greatly challenged higher education institutions in providing socially inclusive learning in terms of ensuring equal access to digital technologies for learning and teaching. During this time, digital competence gained even greater significance not just in digital transformation of our societies, but also in understanding the use of ICT as a medium for learning and teaching in educational environment. All three papers focusing on digital competence of the teaching staff in the higher education environment conducted qualitative research (including a cross-sectional research) on the existing knowledge teachers on all educational stages have in the use of ICT and their understanding of disability and whether, as seen in the first study, that knowledge would increase a teacher's own motivation

in using ICT as a teaching resource. The results of these studies mainly show that, even though the academic teaching staff has the highest level of knowledge in using ICT in teaching, they lack a better understanding of disability and how a good quality ICT teaching materials can contribute to an entirely inclusive education. It is interesting to see how these two concepts are interrelated. On one hand, digital competence, viewed as an ability to use basic digital tools and online platforms (Skov, 2016), can be easily achieved by additional education of the teaching staff. But, on the other, having a better understanding on how students with different disabilities use these tools presents a bigger problem, especially in the higher education environment. This brings us to the next two studies focusing on digital competence of students with disabilities and how they experience and perceive digital educational tools in their academic endeavours. What both studies have shown is that students will experience different ICT tools in teaching depending on the disability they have. This is a clear indication that in order to ensure inclusiveness in higher educational institutions, students with disabilities should actively participate in creation and/or adjustment of these tools. Another very important issue can be observed here is the fact that, certain tools, in this case distance learning, can heighten social isolation which is also one aspect of ICT that must be taken into account when developing these tools. The last research and the additional two critical overviews are focusing on the importance of accessibility in the higher education environment. The first study brings to the front *Inclusive Participatory Action Research,* emphasizing the importance of including students with disabilities in decision making around the concept of inclusion in the higher education environment. An interesting matter the first critical overview touches on is the fact that researchers tend to focus on only one type of a disability, according to which an assumption could be made that disabilities in general could also be viewed through trends. Whichever disability resonates most in the public space will be the disability covered by the future studies. The last overview in a way sums up this literature review. The author in this lengthy essay explains how the education system during the covid-19 pandemic was caught unprepared in delivering accessible content to students with disabilities, and how it demonstrated exactly where the weaknesses are and how to continue forward after the pandemic, with the emphasis on "how to improve curricula, resources, *modes of delivery and student experiences",* as stated by the author.

5. CONCLUSION

This literature review has been conducted on a smaller sample in order to attain a general overview of current research trends in the use and adaptation of digital educational tools for higher education students with disabilities and digital competences of educational professionals. The papers obtained by this review were all conducted and published in the years: 2020, 2021 and 2022, during the Covid-19 pandemic. What is evident from this literature review is that there needs to be a better understanding on how teacher motivation is connected not only to ICT, but also how it correlates to the matter of inclusion of students with disabilities, what the limiting factors are not just in higher education, but on all levels of learning. What the latest research showed is that teachers in general have an acceptable to a low-medium level of technological training and focus needs to be redirected in this area. On the other hand, in order to understand what impact digital competence has and how it can contribute to a more inclusive environment for vulnerable groups, we first need to understand how these groups or in this case, persons with disabilities, perceive and use technologies. Only when a clear understanding of the advantages and disadvantages of what is considered good quality education material is established and how students with different disabilities interact with the technological infrastructure will the development of higher education be able to rise to the challenge of ensuring inclusive education to all.

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CAUSAL RELATIONSHIP BETWEEN DIGITAL INTELLIGENCE QUOTIENT AND THE DIGITAL ECONOMY AND SOCIETY INDEX

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ABSTRACT

By communicating the activities of the European Union (EU) to the community in which they operate, 424 EUROPE DIRECT centers are extended hand of European institutions in the 27 member states. These centers, although operating in different social contexts, transmit the same messages to local communities, using digital communication channels. The purpose of this paper is to investigate the causal relationship between the Digital Economy and Society Index (DESI) of the EU states and the level of digital intelligence of the managers of these centers. The aim of this paper is to present the cause-and-effect relationship of the country's position on the DESI and the level of digital intelligence of the managers through the analysis of digital competence "Public and mass communication". This competence was chosen because the main role of these centers is to communicate. Does a higher index of digitalization of society means a higher level of observed competence, which then affects a higher quotient of digital competences - is a question that defines the analyzed problem. The research was conducted using the online survey on a sample of 136 managers, based on which indicators of digital competences in the observed competence were obtained at the level of each of the states. The sample of research consists of the managers, because each center must have a menager. In accordance with the obtained results, a causal relationship was established between the position of the state on the DESI and the analyzed digital competencies of the managers. The conclusions of this paper are an indicator of the relationship of the analyzed digital intelligence competence of the sample with the position of the state on the DESI, further research on digital intelligence of EUROPE DIRECT teams would provide a more comprehensive insight into the causal relationship.

Keywords: *DESI, Digital competencies, Digital intelligence, Public and mass communication*

1. INTRODUCTION

Transmitting default information about the European Union is one of the main roles played by EUROPE DIRECT centers in EU member states. According to the description, the active role of the EUROPE DIRECT centers is to help bring the European Union closer to its citizens. Their task is to provide answers to questions or refer interested citizens to relevant points to find information on EU policies, programs and priorities. In addition, they should proactively work with citizens and stakeholders to strengthen their sense of European belonging (European Union, 2021). Using Shannon's model of communication (Shannon, 1948) in the analysis of the communication of EUROPE DIRECT centers and their comparison, their constant is, apart from the name, diversity. EUROPE DIRECT it is not an independent organization, it can be a part of public institutions, civil society organizations, educational institutions or, for example, regional organizations or local communities. The channel through which the message will be transmitted is not given, the audience (recipients of the message) also differs. The communication process is also exposed to various noises. Different contexts and circumstances of work, and thus communication circumstances at each of the EUROPE DIRECT centers, were also pointed out in the Mid-term evaluation of the Europe Direct Information Centers (Kitchener, Ulcica, Bywater, Zotou, 2016). At the same time, all EUROPE DIRECTs must convey the European message to the environment in which they operate. In the 21st century, especially in pandemic circumstances, this communication is largely digital.

European institutions such as the European Commission and the European Parliament have recognized digital technologies as enormous growth potential for Europe (European Commission: Digital transition). The European Commission's published document "2030 Digital Compass: the European way for the Digital Decade" (European Commission, 2021) with the Commission's concrete plan to achieve Europe's digital transformation by 2030. The digitalization process does not take place in only one sphere, for example only in the economy, it encompasses the whole of society. An integral part of the digitization process is the process of systematizing digital skills, knowledge and attitudes of individuals. European Union Publication The Digital Competence Framework for Citizens. DigComp 2.2. (2022) "provides more than 250 new examples of knowledge, skills and attitudes that help citizens engage confidently, critically and safely with digital technologies, and new and emerging ones such as systems driven by artificial intelligence (AI)" (Vuorikari, Kluzer, Punie, 2022). Broader concept than digital competence, is the concept of digital intelligence. Extensive definition and clarification of digital intelligence is provided by The DQ Institute, an international think-tank with a mission to "set global standards for digital intelligence that ensures safety, empowerment, and well-being of individuals, organizations, and nations in the digital age" (DQ institute). The DQ framework was created by Dr. Yuhyun Park and presented in the publication The DQ Global Standards Report 2019 (Park, 2019). This model consists of 24 competencies that define an individual's level of digital intelligence. At the same time, digitalization leads to the erasure of the boundaries defined in the previously mentioned Shannon communication model, because a clear boundary between sender and receiver is lost, but the emphasis is on interaction (Škoda, Luić, Brlek, 2020). All this puts a great responsibility on the managers of the EUROPE DIRECT centers, who have to adapt to new circumstances. Similarly, school principals who, as responsible persons, have to adapt to new circumstances regardless of their level of digital competence (Svelec-Juričić, Luić 2021) and center managers have to adapt in order to be able to do their job. The mentioned diversity of circumstances in which the centers operate is also reflected in the position of the EU member state on the DESI. By definition "the Digital Economy and Society Index (DESI) summarizes indicators on Europe's digital performance and tracks the progress of EU countries" (European Commission: The Digital Economy and Society Index). This model was introduced in 2014 by the European Commission. By then, each year, DESI includes country profiles which support Member States in identifying areas requiring priority action as well as thematic chapters offering a European-level analysis across key digital areas, essential for underpinning policy decisions. The aim of this paper is to test the cause-and-effect relationship of the country's position on the DESI index and the level of digital intelligence of EUROPE DIRECT centers managers through the analysis of digital competence "Public and Mass Communication" from the previously mentioned DQ Institute model. This competence implies that individuals have knowledge, skills and attitudes about the way of working and using online communication channels and that they use them. As the main role of the EUROPE DIRECT centers is to communicate, this competence was intended as a logical choice for analysis. The question that arises is the relationship between the DESI and the level of observed competence, whether the higher competence of individuals conditions the higher level of the DESI of the country. Based on this, a research hypothesis was defined which claims that the levels of digital intelligence of the managers of EUROPE DIRECT centers affect the DESI of the EU member state.

2. METHODOLOGY

The research was conducted using the online questionnaire method on a sample of EUROPE DIRECT center managers. According to the program rules of the EUROPE DIRECT network, each center must have a manager, while other jobs / positions are filled in accordance with local needs.

Therefore, the position of the manager was taken as a sample because it is unambiguous and exists in all centers. The online survey questionnaire was created using the Google form. The survey was available to participants from April 22 to May 3, 2022. The link to the survey was sent to the publicly available official addresses of 424 EUROPE DIRECT centers with a request for managers to fill out a questionnaire. The population were the managers of EUROPE DIRECT centers in EU member states, and the sample consists of 136 managers who filled out a survey. In the introduction to the survey, participants were introduced to the purpose of the survey where it was pointed out that the survey is used to investigate the causal link between DESI of the EU member state and the level of digital competence of EUROPE DIRECT managers. The research was voluntary and anonymous, but it was announced that the dissemination of research results is expected in the form of a scientific article and oral presentation to the scientific, academic and general public. The terms used in this research, which have a gender meaning, are used neutrally and refer equally to males and females. The questionnaire consisted of 6 questions, and all questions were structured with offered answers. The first three relate to demographic characteristics (gender, age, country in which they work) of the participants, and the other 3 questions relate to their self-assessment of digital competence in the segment of public and mass communications, practice and digital competencies in the use of different communication channels, and the frequency of use of digital channels. The self-assessment scale was created according to European Framework for the Digital Competence of Educators: DigCompEdu (Punie, Redecker, 2017).

3. RESULTS

During the research, out of 424 EUROPE DIRECT, answers were received from 136 of them. In order to test the research hypothesis on how the level of digital intelligence of the manager of the EUROPE DIRECT centers affects the Digital Economy and Society Index (DESI) of the EU member state, four independent variables were set: gender, age of participants, country and self-assessment of digital competence in the segment "Public and mass communication".
Females make up a significantly higher share of the sample (93 participants), compared to Male (42 participants) and one person who does not want to declare herself.

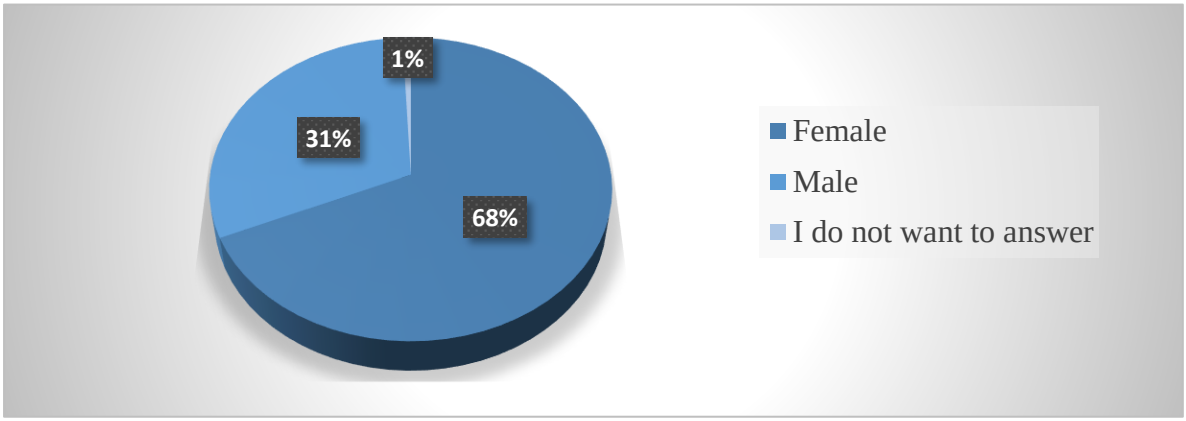

Figure 1: Distribution of participants by gender
(Source: Authors research)

Based on year of birth, participants were divided into two groups according to Prensky's dichotomy (Prensky, 2001) - Digital immigrants (born between 1955–1979) and Digital natives (born between: 1980–1998). The oldest participant was born in 1955, and the youngest in 1998, while 1980, according to Prenskie's theory, is taken as the dividing line between the two groups. The number of participants from both groups was equal, with a slightly higher number of digital natives (70 versus 66).

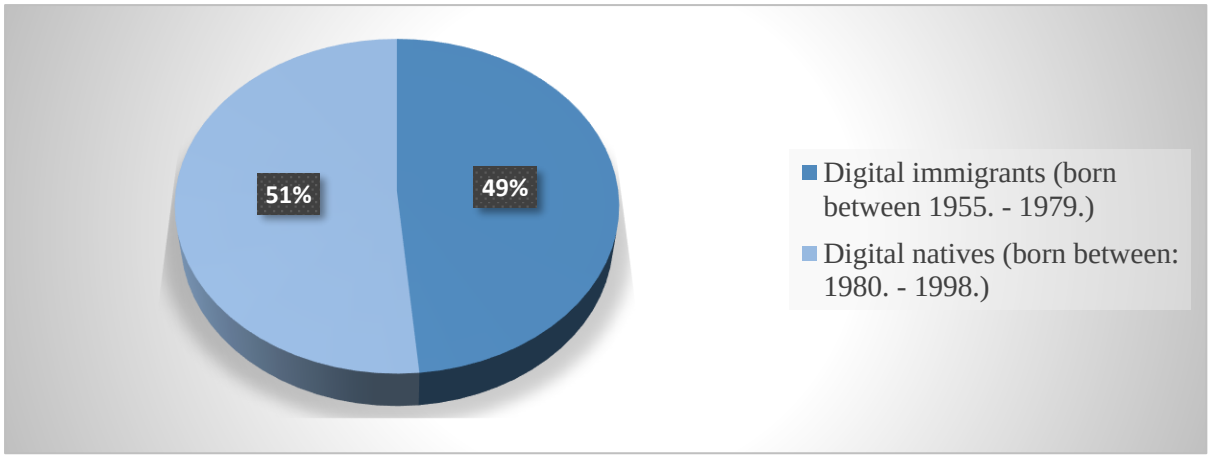

Figure 2: Distribution of participants by age
(Source: Authors research)

The network of the EUROPE DIRECT centers is distributed in all 27 countries of the EU. The number of centers in a member state is determined by its size and therefore the number varies from country to country. The sample includes managers from 24 member states who participated in the survey. A comparison between the number of EUROPE DIRECT centers and the number of participants is shown in Figure 3.

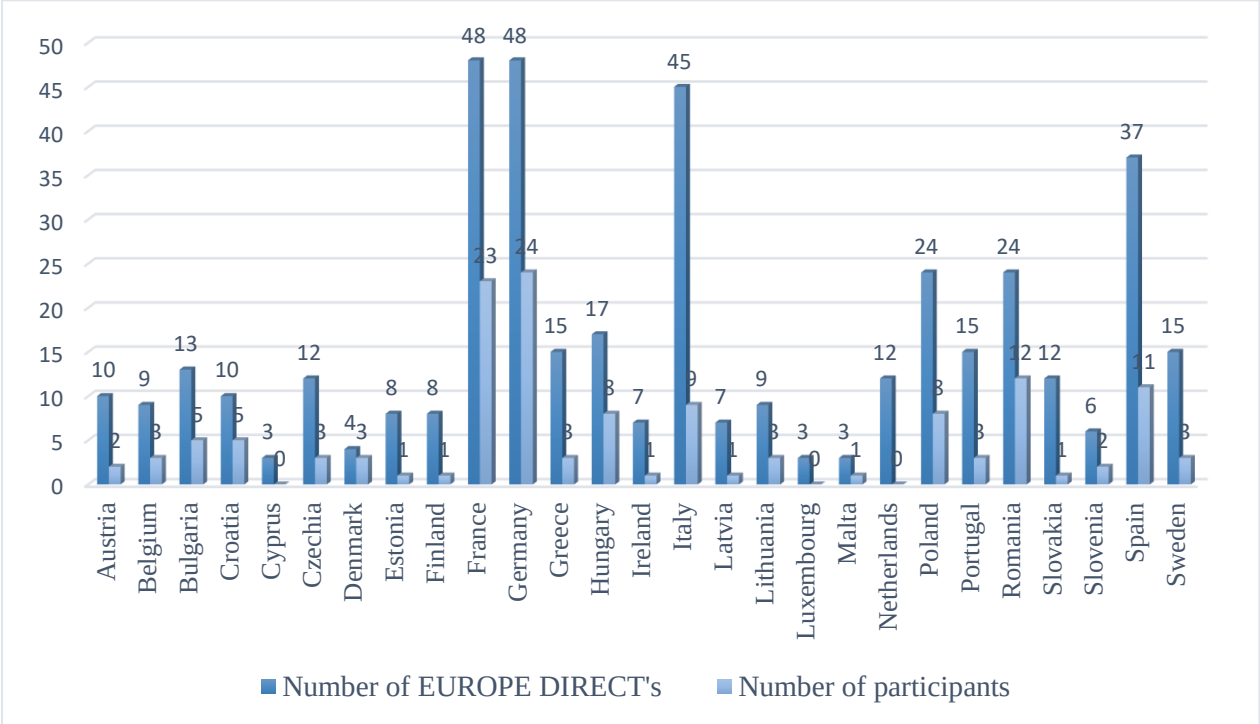

Figure 3: Geographical distribution of participants
(Source: Authors research)

The scale of the self-assess of current digital competencies in the Public and Mass Communication was created in the range form A1 to C2 (A1 was the lowest and C2 the highest level of self-assessment of current digital competence). None of the participants estimated that they were at the A1 level, while the largest number of them thought that they were at various B1 (47 participants) or B2 (51 participants).

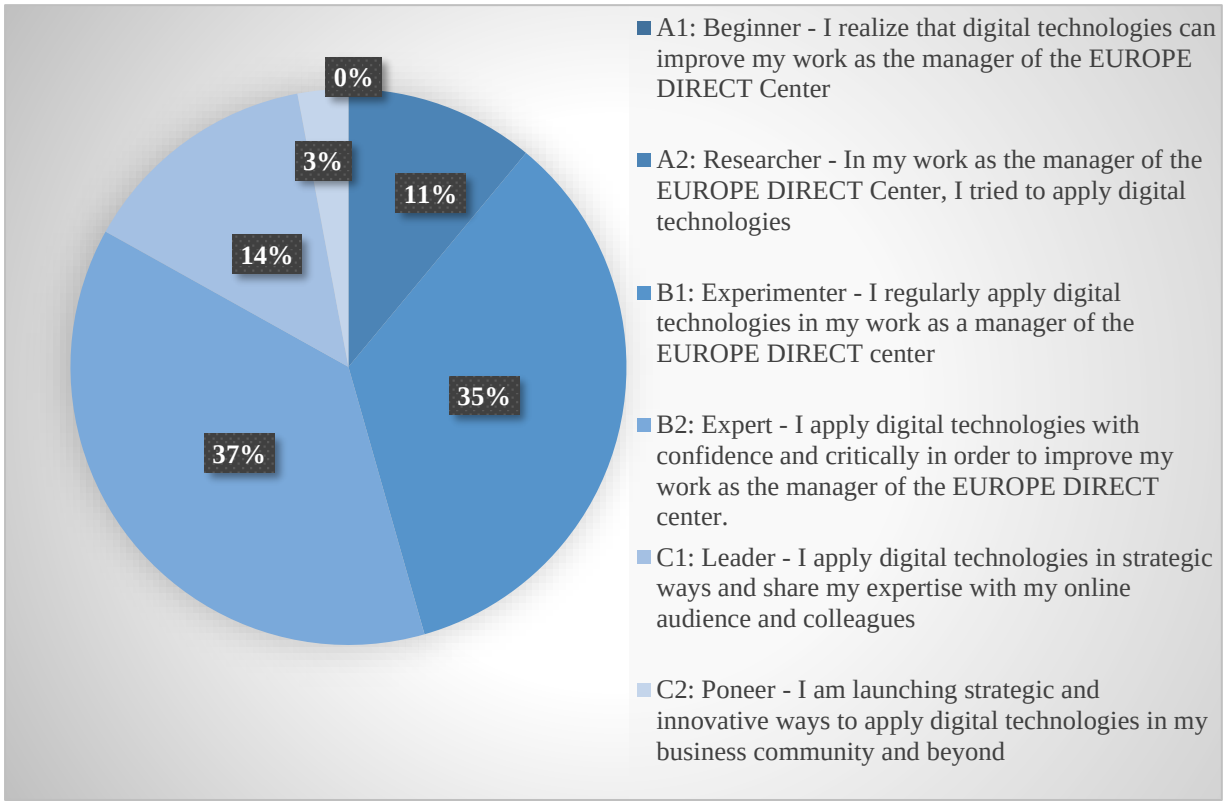

Figure 4: Self-assess of current digital competencies in the Public and Mass Communication (Source: Authors research)

4. DISSCUSION

The presented results were placed through statistical analysis in relation to the Digital Economy and Society Index (DESI) of each member state. In order to check the contribution of the age of the participants and the self-assessment of digital competence to the prediction of the DESI, a multilevel (two-level) regression model of random segments was calculated. This model was chosen because of the structure of the data itself. Namely, since the managers of centers from different countries participated in the research, and that several managers of centers participated in each country, the data structure is hierarchical. That is, participants are nested within the state. Therefore, the application of a multilevel model is needed to control the dependence of data within a particular cluster (country) when estimating parameters. The analyzes were conducted in the statistical package Mplus6.1 (Muthén and Muthén, 1998-2011). Data are clustered according to the country they come from. All variables in the analysis were treated as continuous. Parameter estimation was performed using the maximum likelihood robust algorithm (MLR). Given that the criterion variable included in the analysis was the DESI measured at the state level, the predictive contribution of participants age (measured as year of birth) and their self-assessment of digital competence (A1-C2 level) was calculated at the state level and L2 level. Also, at the level of participants (L1), the correlation between age and self-assessment of digital competence was calculated. A total of 18 clusters (states) with 130 participants were included in the analysis. Countries with only one participant were excluded from the analysis because it was not possible to assess variability within the cluster. Recorded values of intraclass correlation coefficients (ICC) for age variables (.19) and self-assessment of digital competence (.12) indicate that 19% of variability in age of participants can be explained by variability between countries, for example - that 12% of variability in self-assessment of digital competence of participants can be explained by variability between states. This justifies the application of a multilevel regression model as a method of data analysis.

The results of the analysis indicate that the age of the participants (β = .34, SE = 1.11, p> .05) and self-assessment of digital competence (β = -.25, SE = 1.21, p> .05) are not statistically significant predictors of the DESI. Also, the age of the participants and the self-assessment of digital competence (at the L1 level) were not statistically significantly related (r = 0.30, SE = 0.30, p> .05). When interpreting the results, a relatively small number of clusters (N = 18) should be taken into account, as well as a small number of participants per cluster (M = 7.2). Therefore, the estimated standard errors of the parameters are relatively high, which reduces the statistical power of the test, for example - the probability of detecting the effect when it is really present. An undetermined correlation led to the conclusion that there is no cause-and-effect relationship between self-assessment of digital competence and the DESI. The non-existence of a cause-and-effect relationship is also shown through Figure 5. A comparison of DESI and the arithmetic mean of the self-assessment is graphically presented. A numerical value was added to the self-assessment scale from A1 to C2. Answer A1 = 1, A2 = 2 and so on up to C2 = 6. Then the answer values at the country level are summed and this number is divided by the number of participants. The obtained arithmetic value was compared with DESI.

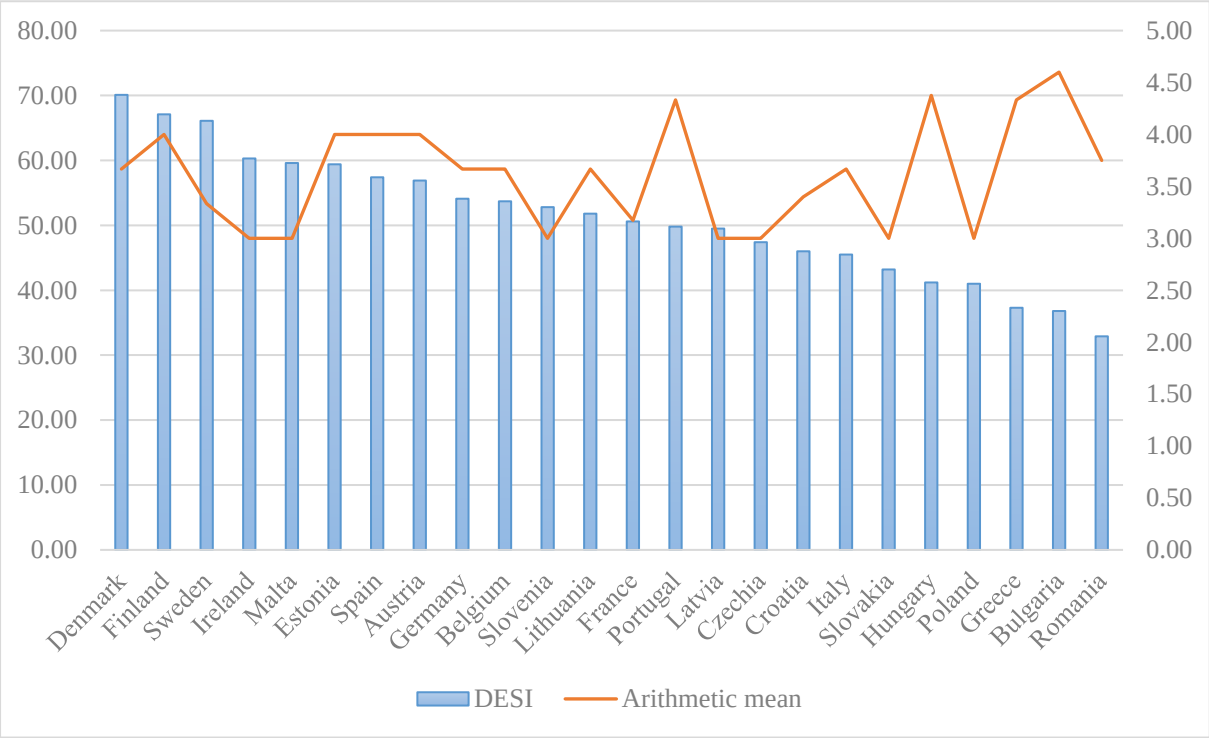

Figure 5: Digital Economy and Society Indeks and Arithmetic Mean of the Self-assessment of digital competence
(Source: European Commission. (2022). Digital Economy and Society Index (DESI) 2021 Thematic chapters and authors research)

The disadvantage of this research, which contributed to the impossibility of noticing the cause-and-effect relationship, is certainly the fact that a cross-sectional study was done through data collection at one point in time. A limitation of the research is certainly the fact that the participants are people who use computers and digital tools in their daily work, and it is to be assumed that they do not reflect the national average of DESI. Future research should certainly encourage the participation of a larger number of participants and all employees, not just the managers of EUROPE DIRECT centers. In further research on digital intelligence of EUROPE DIRECT teams, other competencies should be taken into account in order to gain a broader insight into the possible existence of a causal relationship.

5. CONCLUSION

Communication is the main activity of EUROPE DIRECT centers, the model and method of communication is decided by the managers of the centers. Given the public role of the centers and the fact that it seeks to reach as wide audience as possible, almost all communication between EUROPE DIRECT centers is public and mass, and largely mediated by digital channels and considering the importance and emphasis the EU places on digitalization, this segment is expected to continue to grow. As digitalization increases, so does the structure of the Member State's annual Digital Economy and Society Index. The digital competencies of the managers of EUROPE DIRECT centers certainly have a segment in this process - What kind? By what influence? Under what circumstances? - these questions and unknowns are the basis for further research. Although this research did not show a cause-and-effect relationship between self-assessment of digital competence and the DESI, this research has shown that assumptions that are not based on data but on impression are easily refuted by science and statistics and easily shown to be wrong.

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EDUCATION LEVEL EFFECT OF URBAN DIGITAL IMMIGRANTS TOWARDS THE LEVEL OF THEIR DIGITAL LITERACY

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ABSTRACT

Individuals born prior to the widespread use of digital technology and the digital era are faced with the adaptation challenge to the digital technologies-based tools used in everyday life. Named individuals, considering their forced transition to the digital era, are so called Digital Immigrants. Its members, living in the urban, city territories, are defined as Urban digital Immigrants. Subject of this paper is to consider and review the Urban Digital Immigrants adaptation differences to the digital era according to their education level. Research will establish if the educational level affects the level of digital literacy of those called Urban digital Immigrants. Research subject is the level of digital literacy of the population with any knowledge and use of digital skills, that has lived a specific life span without the modern technology interference. For the research sample size Urban Digital Immigrants were chosen, persons born prior to 1985, currently in the working population, up to age of 65, living in four largest urban centres in the Republic of Croatia. Nationally representative probability samples were calculated according to the final population census, distributed in equal proportions men and women, and evenly distributed by the age. Research was conducted via an online questionnaire distributed to the targeted population via Facebook social network. Research results show the connection between the level of the education and the level of digital literacy of the Urban digital Immigrants in the process to the digital era adaptation. New contribution to scientific research has been given on the impact of knowledge, skills and experience gained through predefined educational systems to a future life of the individuals that can be used as a guideline for possible research into the national qualifications frame.

Keywords: *Digital immigrants, Digital intelligence, Digital literacy, Education level*

1. INTRODUCTION

Individuals born prior to the digital era are faced with continuous challenges of digital technologies-based tools in everyday life. Named population, considering their transition to the digital era are defined as digital immigrants - terms “digital immigrants” as well as “digital natives” are developed by Prensky (2001) defining digital immigrants as individuals born prior to the digital technology development, while “digital natives” are individuals born after implementation of digital technologies ergo being exposed to the digital technologies influence in earlier life stages, mostly since birth. New (digital) tools and devices usage in today's life have many advantages compared to traditional, regardless to the demographic, social and economic differences, and individuals are required to develop adequate skill level in order to actively participate in their usage (Reddy et al., 2020). Precisely, the capability of the individual in using digital technologies and tools in everyday life aiming for the constructive social activity

was defined by Martin (2006) as digital literacy. Next to the capability of digital literacy, he states that views, attitudes and awareness of digital use, therefore digital literacy concept cannot be defined as permanent rather than temporary achievement especially if deprived of the continuous improvement of literacy constantly beeing attentive to changes of the environment one lives in. Eshet-Alkalai (2004) states that digital literacy can be defined as a skill necessary for the digital era survival. Digital literacy in today's world is an essential link in private life and public/business career of every individual, for it by itself provides competitiveness in the labour market, contemporary education, but also social engagement. In the paper „The importance of digital literacy in the labour market" by Bejakovic and Mrnjavac (2020) it has been established that there is a strong link between digital skills and employment rates, and the research indicates that the 54-65 years old population is required access to at least minimum level of digital literacy to avoid digital and social exclusion. According to DESI analysis (The Digital Economy and Society Indeks, 2018), every other person in Croatia is deprived of suitable digital knowledge and skills allowing them to create competitive value on the labor market. Digital literacy has high importance within the education. Best example can be described during the Covid-19 pandemic where many educational institutions embraced digital curriculum whereas with the pandemic experience special attention has been brought to the need of flexibility, but also the quality of the teaching (Skoda and Luic, 2020). However, and regardless of the pandemic, Skoda et al. (2021) states that, because of the growing digital education transformation trend more classes will take place online, through informational and communication technologies. Besides personal education, having a minimum level of digital literacy is important for the individuals in regards of their children's upbringing for digital literacy provides active participation in the teaching-learning process as well as in communication with educational institutions. In the research conducted by Brlek et al. (2019) new media impact to social skills has been examined. Results showed that new media impact in inevitable, and time spent with peer mates is replaced with media and technology. Authors are stating that is of great importance of the parents' involvement in time spending with their children and media. As an example of deprivation of social exclusion cases of psychophysically limited individuals can be used, where digital technology and digital literacy enables communication with other individuals and institutions. Zovko and Celizic (2020) emphasise the importance of internet usage using the example of mobility deprived older and mature individuals. Authors are stating that using digital tools can ease financial burden issues (example: on-line banking system), whilst online shopping can also be of great help for the elderly population. Digital technology usage within the elderly population can make them feel useful and content lowering the sense of social isolation and exclusion. This paper object is to review the differences in digital era adoption of the Urban Digital Immigrants according to their level of education, and the research will determine whether the educational level has the impact to the level of digital literacy of the mentioned group. Not all people are prone to changes, but there is a characteristic moment in the digital age proving that there is no alternative but to adopt. It is not the question if someone is prone to changes more or less, but the necessity of the change acceptance for the individual can actively participate in everyday society as the zealous member. Research will conclude to what level did the digital immigrants adopted considering the educational level, and based on stated the hypothesis has been formed: Croatian digital immigrants' level of digital literacy is in positive correlation with their education level.

2. METHODOLOGY / MATERIAL AND METHOD

Research was conducted on the sample of urban digital immigrants, specified ad individuals born prior to the year 1985., working population up to the age of 65 years considering the higher limit of the retirement in the Republic of Croatia, excluding the working population beyond named limit), living in four largest urban areas in the Republic of Croatia.

In the account was taken that the sample was distributed in urban areas in the Republic of Croatia through the cities as followed: Osijek - representing urban area of East Croatia, Zagreb - as urban area of Central Croatia, Split- as representative of urban area of South Croatia and Rijeka - as urban area representative of West Croatia. Nationally representative probability samples were calculated according to the final population census, distributed in equal proportions men and women, and evenly distributed through the years of age. As a measuring instrument, a survey was developed for the needs of this research, formed in a questionnaire consisting of 28 questions. First five questions were classification/elimination questions defining socio-demographic factors, such as sex, location, age and education level, but additionally time each respondent is spending in using digital tools, mainly smartphones and computers/laptops limited to answers: 1-3 hours, 3-5 hours, 5-7 hours, 7-9 hours and Other… The remaining 23 questions were formed to evaluate respondents' digital literacy using one way 6 points Likert scale. Each question had one commonly used and widely accessible digital activity, formed in a claim, asking respondents to self-report and evaluate their personal level of competence marking one of 6 points, whereby point 1 defines that the respondent cannot or does not know how to complete the activity, whilst point 6 defines that the respondent not only knows how to use the activity but can easily teach and transfer his knowledge to others helping them to independently use the activity. Activities are presented by the elements requiring minimal digital literacy therefore involvement of questions/claims of on-line systems usage such as banking and health care system, using smartphones applications (such as GPS, search engines etc.), as elements of activities commonly used in everyday business activities such as virtual meetings, sending, receiving and storing data files. A detailed questionnaire is available on demand. Points were specified as follows: 1 I cannot do that, 2 - I need help in doing that, 3 - I sometimes can do it by myself, 4 - I can usually do it by myself, 5 - I can always do it by myself, 6 - I can teach others to do it. Considering the scale used to grade the answers, the higher the number of the points marks the higher level of digital literacy. Therefore, digital literacy evaluation was scored in the following manner: 0-50% - insufficient knowledge (Level 1), 51-70% Basic knowledge (Level 2), 71-85% Satisfactory knowledge (Level 3), 86-95% High-level knowledge (Level 4), 96-100% Top-level knowledge (Level 5). Knowledge level was calculated as arithmetic mean of all question- s required in the survey. Points were defined by the percentage rate of required questions. Among the questions/claims five control questions/claims were used, that were, in case of opposite answers, scored with the minimum (1). Research questions were distributed via an online questionnaire using social networks, targeting specific locations (Zagreb, Split, Osijek and Rijeka) and required socio-demographic factors of the respondents. Participation of the respondents was voluntary and anonymous.

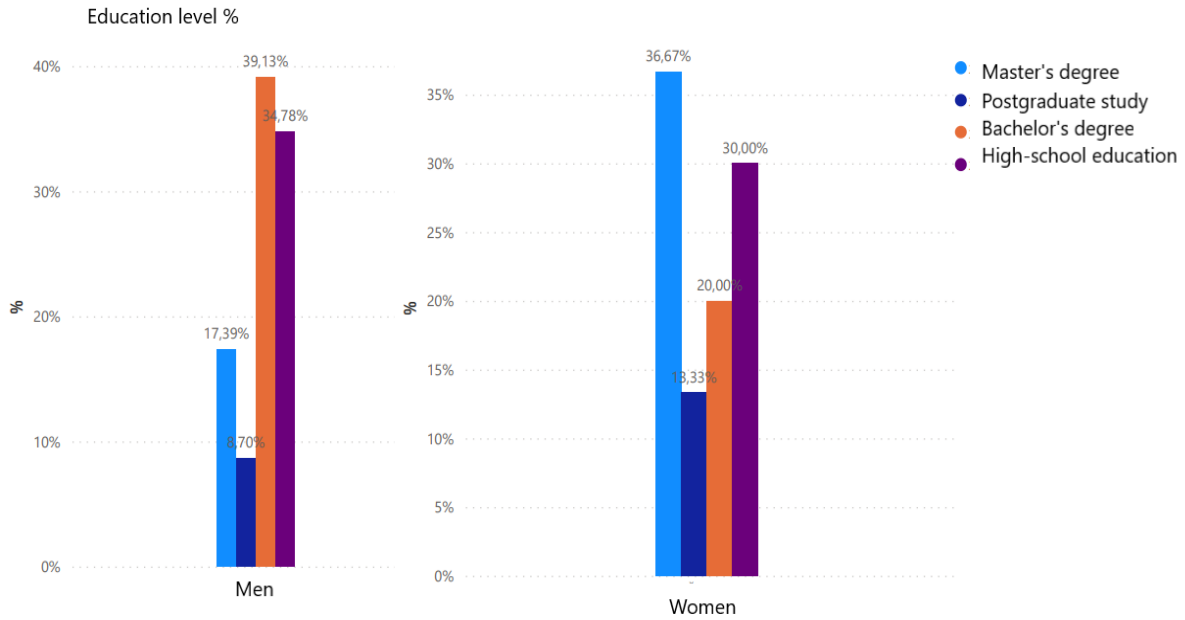
3. RESULTS

Total of 53 valid respondents were born prior to the year 1985., of which 30 were female respondents (56,60%) and 23 (43,40%) were male respondents. By the location, the most represented sample number is Zagreb with a total of 30 respondents (56,60%), followed by Split with a total of 11 respondents (20,75%), Osijek with a total of 9 respondents (16,98%) and Rijeka with a total of 3 respondents (5,66%). According to the age, respondents are classified in three age groups: 1975-1984; 1965-1974; 1964. and older. First group consist of respondents born from 1975. to 1984., currently aged between 38-47 years of age, in total of 29 respondents (54,72%). The second group is consisting of respondents born from 1965. to 1974., current age 48-57 years old, totalled 14 respondents (26,42%). The third group are respondents born in 1964. and older, aged more than 58 years old, 10 respondents in total (18,87%). The level of respondents' education is classified and formed in Table 1.

Education level	Number of respondents (N)	Respondents percentage (%)
High-school education	17	32,08
Bachelor's degree	15	28,30
Master's degree	15	28,30
Postgraduate study	6	11,32

Table 1: Education level of Urban Digital Immigrants
(Source: own research)

The questionnaire predicted a group with primary school education respondents, but none of the participants with that level of education participated which is a possible indicator of extensive Urban Digital Immigrants population coverage with minimum high-school education level, at least the part of the Urban Digital Immigrants with minimum level of digital literacy capable of completing the questionnaire. Urban Digital Immigrants educational level using sex analysis indicate that there is a difference in the respondents education level, showed in Graph 1.



Graph 1: Education level of Urban Digital Immigrants by sex
(Source: Authors' research)

Categories with the higher level of education (Masters and Postgraduate degree) are highly more represented in female population rather than male. Female respondents with Masters and Bachelor degree are most represented in the study, whilst Male respondents higher sample is within Bachelor degree level and high-school degree level. Table 2. is showing digital literacy scoring representation by the education level of Urban digital Immigrants.

Table following on the next page

Education level / Digital literacy score	Score 1	Score 2	Score 3	Score 4	Score 5
High-school education	47%	18%	29%	-	6%
Bachelor's degree	13%	60%	27%	-	-
Master's degree	13%	20%	33%	27%	7%
Postgraduate study degree	-	-	17%	50%	33%

Table 2: Digital literacy coring representation according to the education level of Urban Digital Immigrants
(Source: Authors' research)

There is a higher share of respondents with lower education level scoring lower on digital literacy and within the respondents with the higher level of education scoring is higher. The average digital literacy level score indicates towards the correlation between the level digital literacy and urban digital immigrants' education level. This can be observed in Table 3.

Education level	Average Score
Postgraduate study degree	4,17
Master's degree	2,93
Bachelor's degree	2,13
High-school education	2,00

Table 3: Urban digital immigrants' digital literacy average scoring level
(Source: Authors' research)

There are additional findings to the analysis showing that the average scoring of the digital literacy is dependent on the age category. Respondents born form 1975.-1984. scored on the average 2,86, while those born from 1965.-1974. scored on the average 2,43. Respondents born from 1964. and older, scored on the average 1,80. Comparing the respondents average score by sex, female respondents scored higher than males. The average urban digital immigrants' females scoring on digital literacy was 2,83 while the same among male respondents was 2,17. Total average score on all respondents, regardless of age, sex or education level is 2,55.

4. DISCUSSION

Research has measured the level of digital literacy of urban digital immigrants in way that all the respondents, regardless of their education level, completed the same survey to test the digital literacy level. Results showed that the higher scoring was obtained within the respondents with the higher education level, meaning that higher education level of digital immigrants is increasing the total average score of digital literacy level. By this conclusion the hypothesis: Croatian Digital immigrants' level of digital literacy is in positive correlation with their education level is confirmed. In addition, results have shown major differences presence in between to extreme groups - respondents with postgraduate degree and those with high-school degree. Almost half of the respondents (47%) with the high-school degree scored 1, that is the lowest score possible, and none of the postgraduate degree respondents scored 1.

At the same time, one third of the respondents (33%) with the postgraduate degree scored 5, and only 6% with high-school diploma scored the same. Even though the survey predicted, there were no respondents with only primary school degree, and considering the expressed positive correlation between the education level and digital literacy level of urban digital immigrants, the conclusion sets is the lack of named group digital literacy required to complete the survey. Apart from the degree, major impact is perceived within the age of the respondents. Therefore, only the youngest of the respondents (aged 38-47) scored above the average results, while the age of the respondents is rising, the average scoring in digital literacy is descending. This research is showing an adoption of digital immigrants to the digital era, so Zovko and Celizic (2020) are stating that even though they encountered digital technology in late or mature age, many elderly and mature age citizens could not imagine their life without it. Speed in what digital era is changing and developing, and especially the necessity of lifelong and continuous learning and additional adaptations is still a great issue for digital immigrants for they are aging and that makes it harder to keep up with the times. Bejakovic and Mrnjavac (2020) states that the Government, Educational institutions and employers should consider conceptualizing new forms of digital literacy assessment, but also implement intervention programs especially those designed for digital skills improvement.

5. CONCLUSION

Research results have shown the connection between education level and digital literacy level of urban digital immigrants in the process of digital era adoption, giving the contribution to scientific research on the impact of knowledge, skills and experience achieved through predefined educational system to the future life of individuals, that may be used as guidelines for future national classification frame researching. However, in the expectations that the digital era is far from its end, it is, by this research, of great importance to emphasize the importance of continuous upgrade to one's digital literacy. It cannot be expected that the individual will by him/herself be aware of the possible level drop in digital literacy, therefore the adult digital literacy program and support should be one of the priorities hoping to avoid national illiteracy in the future to come.

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RESEARCH AND CRITICAL EVALUATION IN THE DIGITAL EDUCATIONAL ENVIRONMENT

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ABSTRACT

Educators' attitudes towards their own research and critical evaluation in the digital environment influence information practices and the digital perspective in education as one of the social contexts. Based on the "Decision on the adoption of the curriculum for the interdisciplinary topic of the use of information and communication technology for primary and secondary schools in the Republic of Croatia" in January 2019, educators teach students research and critical evaluation in the digital environment. It is one of the domains (C domain) of this curriculum and the basis for self-assessment of educators' attitudes about research and critical evaluation. The authors believe that these attitudes correlate with the implementation of this curriculum in direct work with students, but also that the educator's educational area influences the formation of these attitudes. The rapid development of technology and available information requires educators to have developed information management, research and critical evaluation skills, in order to appropriately teach students in the C domain, regarding research and critical evaluation in the digital environment. The research sample consists of randomly selected educators, and is conducted using a quantitative research method of a survey questionnaire aimed at anonymously examining attitudes through a survey questionnaire designed in Google form, while the results were analysed using SPSS software to determine correlation. By analysing the data collected by the research, hypotheses on the impact of the educational field on the attitudes of educators about their own research and critical evaluation in the digital environment were tested. In this sense, this paper classifies educators 'attitudes towards their own digital literacy with regard to educational areas and recommends exploring educators' attitudes about research and critical evaluation in higher education due to the principle of vertical-spiral sequence and permanent development of digital competencies and digital intelligence.

Keywords: *Critical evaluation, Digital competences, Digital intelligence, Digital environment, Education*

1. INTRODUCTION

"Keeping up with the times" is an important and valuable thought in the modern sense because of the responsible work that educators do - they teach young people in elementary and secondary school. How can educators keep up with new information and communication practices, but without neglecting training in modern teaching strategies and in their educational area to which they teach students? In 2017, the DQ Institute (DQI) was created with the purpose of overcoming the digital intelligence (DQ) skills gap globally, with a focus on children. In addition to digital intelligence, the Institute has established global standards for digital literacy, digital skills and digital readiness. According to Topolovec, Marinović and Pavlić (2006) knowledge and skills for the 21st century represent basic social strategic guidelines that stimulate the process of learning and teaching. UNESCO states the importance of identifying information literacy indicators that should be applied in the education of educators (Catts and

Lau 2008). In addition to technological skills related to teaching work and the use of ICT, it is necessary to encourage a critical attitude towards these technologies in the teaching process. The fact that technology in the age in which we live has become known and accessible to all does not necessarily reflect the quality of its application in learning and teaching (Batarelo 2007; Catts and Lau 2008). If educators master the use of information and communication technology in teaching, and possess the necessary critical thinking and knowledge that implies digital literacy, they will be able to encourage students to develop their learning, encourage a higher level of thought and open up opportunities for students to construct and navigate knowledge in the digital environment. If younger educators come to school with developed information literacy, the assumption is that this will have a positive impact on other educational professionals in the school atmosphere (Vrkić Dimić 2013). Therefore, they influence information practices and the digital perspective in education as one of the social contexts. Critical thinking in the educational system forms an important part of positive development that suits the needs of the individual and society (Burberger 2012). Critical thinking, as an important predictor of the educational system in democratically developed countries (Miliša and Ćurko, 2010) has been discussed since the beginning of the 20th century. John Dewey is considered the first originator of the modern concept of critical thinking. He states the necessity for opinion to be part of the teaching process, and describes it as "the only immediate path to continuous improvement of teaching methods and learning consists in focusing on beliefs that require, develop, and examine opinion" (Dewey 1926). Critical thinking is a complex tool for achieving not only a different view of the world, but also better social relations based on appreciation and developed social skills (Zagorac, 2012). Higher forms of thinking include critical thinking for the necessary tool in assessing and evaluating information and dealing with it. In the information process, critical thinking is crucial, both in reflecting on the information problem, evaluating information and producing knowledge based on information, as well as in sharing information with others (Stričević and Perić 2017). Voogt and associates (according to Sadaf et al. 2020) believe that teachers and students must understand the impact of technology on society and be ready to observe it from a critical perspective, while maintaining independence from its influence and openness of mind to its benefits. Ehat-Alkalai et al, back in 2004. have noted that critical thinkers are constantly questioning and should take nothing for granted, both in the digital and pre-digital ages, and that information skills are becoming a 'survival skill' due to unlimited access to digital information. In addition, it apostrophes that only a few authors emphasized the importance of researching the cognitive and pedagogical aspects of information skills. Castellví et al. (2020) state that Freire and Macedo considered in 2004 overemphasizing the cognitivist aspect in the formation of critical thinking. They argued that critical thinking is not only a set of skills, but also an attitude towards information, a way of thinking and living, which should prepare us for action and social transformation. In 2019, a Decision was taken in the Republic of Croatia on the introduction of the cross-curricular topic Use of ICT and the educators are obliged to implement the expectations in their teaching subjects. In this cross-curricular topic, there are four interconnected domains. One of the domains is Research and Critical Evaluation in the Digital Environment. This domain includes the development of information and media literacy in the digital environment and fostering the research spirit through critical thinking and problem solving. Initially, the students are guided in the process of searching for information, using technology, in order to develop self-encouragement and information management skills. Educational expectations in the Curriculum are defined for each of the four domains at the cycle level. Each of the 5 cycles covers a specific developmental age of the student. Educational expectations, given the cycle, encourage creativity and social responsibility and develop critical and creative thinking in solving problems. The Curriculum states that the educator must 'use information and communication technology in a balanced and purposeful manner, appropriate to the teaching/didactic situation in any part of the class or

teaching process (motivating, learning, repetition, evaluation and self-evaluation), (Official Gazette, 2019). Bušljeta Kardum (2020) has shown with her research that the percentage of representation of expectations that encourage the development of critical thinking skills in the cross-curricular topic ICT is 50%.

2. METHODOLOGY

2.1. Research objectives and hypotheses

The aim of the study was to examine the attitudes of educators about their research and critical evaluation in the digital environment as expected in the C domain (Research and Critical Evaluation in the Digital Environment) of the cross-curriculum "The Use of Information and Communication Technology". The research verified the hypothesis about the impact of the educational area on educators' attitudes towards research and critical evaluation in the digital environment. In this sense, this paper classifies the attitudes of educators towards digital literacy with regard to educational areas.

2.2. Sample and instrument

The survey was conducted anonymously through a questionnaire drawn up in the form of a Google form. The questionnaire is divided into 6 blocks. The first block refers to a general set of questions related to information and critical evaluation, and the other five are created according to the C domain educational cycles presented in the Cross-Curriculum. The Curriculum predicts the expectations that students should achieve at a certain level of education. The authors transformed expectations into claims to see what educators' attitudes are about research and critical evaluation in the digital environment, or whether they feel they have the expectations that are predicted for students. For the purpose of analysing the results of the research, a correlation method was used.

2.3. Conducting research

The sample research consists of educators employed in primary and secondary schools in Croatia (N=333) because they contribute to the construction of information practices and digital perspectives in education through their attitude to their own media and information literacy. Of the total number of participants, the majority of them teach students in secondary schools (195 educators state one or more of secondary school types). For research purposes, the educators are grouped into 9 areas according to the questionnaire answers: first is language-communication area, second is mathematical area, third is area of natural science, technical and information area is forth area, socio-humanistic area is fifth area, art area is sixth area, physical and health area is seventh area, eight area is classroom teaching area and economic area is ninth area. The study was conducted using a quantitative research method of a survey questionnaire aimed at examining attitudes. The survey was conducted during April 2022. The study included 89.5% of women (n=298) and 10.5% of men (n=35). By years of work experience in school, the majority of participants are between 11 and 20 (n=106). With regard to the educational area to which students are taught, the largest number of participants in the research teach in the language-communication area (n=163). The participants of the survey come from 20 counties of the Republic of Croatia, while the largest number is from Koprivničko-križevačka County (n=86). The collected data were analysed by a statistical software data processing package, the SPSS.

3. RESULTS

When asked by educators if they are familiar with the cross-curricular topic The Use of Information and Communication Technology for Primary and Secondary schools, the largest percentage said they know and use it in their work (65.8%), while an extremely small

percentage of participants said they never heard of it (2.7%). 72.4% of educators (n=241) state that they distinguish information from media literacy (Table 1).

Descriptive Statistics			
		Assessment of information literacy	Assessment of media literacy
N	Valid	333	333
	Missing	0	0
Mean		3.88	3.96
Median		4.00	4.00
Mode		4	4
Std. Deviation		0.749	0.715
Minimum		2	1
Maximum		5	5

Table 1: Descriptive Statistic
(Source: Authors research)

The first cycle of the C domain refers to students attending 1st-3rd grade of elementary school. Educators express high attitudes towards their own adoption of these expectations. Students attending 3rd-5th grade of elementary school belong to the second cycle, and educators believe that attitudes from that cycle (completely or almost completely) apply to them. The third cycle is intended for students in the 6th-8th grade of elementary school. Although most educators express a high level of attitudes, lower-level attitudes are also observed for certain statements. In the fourth cycle, for students attending 1st and 2nd grade of four-year secondary school and 1st grade of three-year secondary school, educators choose a high level of attitude towards claims about research and critical evaluation in the digital environment. Students in 3rd and 4th grade of four-year and 2nd and 3rd grade of three-year secondary school are part of the 5th cycle. The attitudes of educators for this cycle are at a high level (Table 2).

Table following on the next page

Cycles	Summary Item Statistics								Cronbach's Alpha Based on Standardized Items
		Mean	Minimum	Maximum	Range	Maximum/ Minimum	Variance	N of Items	
	Item Means	4,113	3,859	4,420	,562	1,146	,046	9	.857
First cycle	Item Variances	,736	,461	1,049	,588	2,275	,030	9	
Second cycle	Item Means	4,215	3,925	4,622	,697	1,178	,088	5	.820
	Item Variances	,634	,393	,805	,412	2,050	,024	5	
Third cycle	Item Means	4,194	3,682	4,607	,925	1,251	,104	8	.882
	Item Variances	,634	,384	,995	,611	2,591	,053	8	
Fourth cycle	Item Means	4,208	3,955	4,631	,676	1,171	,050	7	.904
	Item Variances	,624	,384	,768	,384	1,999	,018	7	
Fifth cycle	Item Means	4,303	3,760	4,742	,982	1,261	,126	10	.893
	Item Variances	,604	,276	1,001	,724	3,620	,059	10	

Table 2: Summary Item Statistics
(Source: Authors research)

Complex research on the Internet is conducted by 47.7% (n=159) independently and on their own initiative, 33% independently (n=110), only on their own initiative 6.6% (n=22), and none of the above 12.6% (n=42). When asked whether they consider themselves a digital citizen, 65.8% (n=219) assessed in the affirmative, depending on the situation, 28.2% (n=94), while answering with perhaps not only 6% of survey participants. 79.6% (n=265) of educators are considered to be careful and critical in handling the information they find on the Internet. 82% of them (n=273) believe that they show prudence in checking the reliability and credibility of online information. Critically evaluate the search process and results, choosing the necessary information from the required 72.1%, independently evaluate the search process and results, choosing the necessary information from the required 61.1%, self-assess the search process and results, choosing the necessary information from the required 33.6%, and none of the above was answered by 4.2% of survey participants.

Prior to performing the Cronbach Alpha test, the last question, described in the previous sentence, was omitted for Cycle 5 (I evaluate the search process and results, selecting the required information from the required ones). The Cronbach Alpha coefficient shows that all scales in each of the 5 cycles hold up and are reliable (Table 2). This reliability test was necessary because it is a new scale authors of this paper developed. Therefore, the attitudes of educators towards the statements from the C domain of the curriculum The Use of Information and Communication Technology are presented in hereinafter (Table 3). These claims refer to the educational expectations that students should achieve in a particular cycle of education (1-5). According to them, the educators assessed how much the claims applied to them. In doing so, in Likert scales 1 marked the answer "does not apply to me at all" and 5 indicates "completely applies to me".

Descriptive Statistics						
	N Statistics	Minimum Statistic	Maximum Statistic	Mean		Std. Deviation Statistic
				Statistic	Std. Error	
First cycle	333	2,22	5,00	4,1128	,03179	,58014
Second cycle	333	2,00	5,00	4,2150	,03324	,60650
Third cycle	333	1,50	5,00	4,1937	,03196	,58326
Fourth cycle	333	1,71	5,00	4,2081	,03430	,62598
Fifth cycle	333	2,50	5,00	4,3030	,03032	,55324
Valid N (list wise)	333					

Table 3: Descriptive Statistics
(Source: Authors research)

Further, we tested the hypothesis that the educators' educational area impacts the formation of attitudes. From cycle 1 to cycle 3 there are no differences in educators' attitude and educational area, but in cycle 4 and 5 we found a significant difference in the attitude of educators from different educational areas. There was a statistically significant difference between groups as demonstrated by one-way ANOVA: for cycle 4 ANOVA F (8,324) = 1.985, p=.048) and for cycle 5 ANOVA F (8,324) = 2.06, p=.038). We have to mention that small and unequal group sizes of educators in certain educational areas might impact our test results (Table 4). Post hoc tests for multiple comparisons found that the mean attitude for cycle 4 and 5 among educators from the economical area was significantly lower compared to the mean score of educators in the technical and informational area (p=.003 for cycle 4, p=.002 for cycle 5) and the social-humanistic area (p=.014 for cycle 4, p=.002 for cycle 5). There was no statistically significant difference between educators' area and educators' attitude in cycle 1, cycle 2 and cycle 3.

Table following on the next page

Educational areas					
	Educational area	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**1. Language-communication area**	163	48,9	48,9	48,9
	2. Mathematical area	17	5,1	5,1	54,1
	3. Area of natural science	42	12,6	12,6	66,7
	4. Technical and information area	13	3,9	3,9	70,6
	5. Socio-humanistic area	31	9,3	9,3	79,9
	6. Art area	13	3,9	3,9	83,8
	7. Physical and health area	12	3,6	3,6	87,4
	8. Classroom teaching area	19	5,7	5,7	93,1
	9. Economic area	23	6,9	6,9	100,0
	Total	333	100,0	100,0	

Table 4: Educational areas
(Source: Authors research)

On a scale of 1-7, educators estimate that their attitudes about research and critical evaluation in the digital environment affect the feasibility of expectations from the C domain Research and Critical Evaluation of cross-curriculum Use of information and communication technology (Mean=5.162).

4. DISCUSSION

Attitudes in education have so far been researched in various ways, e.g. towards the Internet, digital technologies and digital literacy (Hong et al. 2003, Mata and Stoica 2021, Morse et al. 2011, Pratolo and Solikhati 2021, Tsai et al. 2001, Zhang 2007). Miočić and Miletić (2021) conclude from the analysis of the results that Croatian language educators and foreign language educators are motivated to use information and communication technologies in teaching. The authors believe that specific research is required for the educators' attitudes toward research and critical evaluation in the digital environment because critical thinking is an important component of activities in the digital educational environment, and these educators' attitudes are reflected in the teaching process, besides material possibilities of each individual school for quality digital technologies. In order to research the attitude of educators towards research and critical evaluation in education, a test of the reliability of the survey questionnaire was conducted. The reliability test shows that the survey questionnaire can be used in new research: attitudinal scales hold up and are reliable according to Chronbach Alpha test. The language-communication area is by far the largest group, but there are no significant differences between language-communication area and other educational areas.

One-way ANOVA compared the means for all cycle attitudes between the educators in all 9 different educational areas. Here we see significant differences for cycle 4 and cycle 5. Post hoc tests compared the means of the educators' attitudes from different educational area (one-on-one) and there is small significant differences between educators in economic area and educators in technical and information area and, to a lesser extent, also educators in the socio-humanistic area. It is a very small group size, but it gives a first indication, and more in depth research needed. Namely, the cross-sectional study does not allow a conclusion to be made about the cause-and-effect relationship.

5. CONCLUSION

Based on the conducted research and the obtained conclusion, we consider it necessary; in order to further verify the adoption of expectations from the C domain of the Curriculum, to conduct research aimed at examining the relationship between knowledge and attitudes of educators in the field of science. Also, given the potential subjectivity of research participants in solving the questionnaire (quantitative research methods), it is considered useful to conduct qualitative research related to examining educators' attitudes about digital literacy in order to gain deeper insight into their views of digital literacy related to research and critical evaluation in the digital environment. We believe that this would contribute to a better understanding of the attitudes of educators and the organization of various educations that would aim to encourage additional acquisition of competencies in this area. Also, this research provides a good guide for planning future research on the causal relationship between educators' attitudes and competencies on media and information literacy (pragmatic purpose) and recommends examining educators' attitudes about research and critical evaluation in higher education due to the vertical-spiral sequence. Thus, the research yielded results indicating that the Republic of Croatia employs educators who highly value their competencies in the field of research and critical thinking in the digital environment. This is a potential that needs to be recognized, and accordingly, educators need to be provided with resources that will enable them for quality use of digital technologies for the purpose of quality teaching.

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THE IMPACT OF DIGITAL LITERACY ON THE CYBER SECURITY OF DIGITAL CITIZENS

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ABSTRACT

Digital literacy focuses on individual's ability to understand multimedia texts and skills that help in searching the Internet, communicating through various online networks and provide a certain level of security in the digital space. The main subject of this paper is to determine the extent to which digital literacy affects the cyber security of an individual. The aim of the research was to examine whether there is a difference in the perception of the importance of digital literacy and how much its impact is on the cyber security of citizens. Furthermore, this paper presents the main features of digital literacy and cyber security in the digital age, their impact on the individual and potential fraud attempts, along with answering the research question - If age brings wisdom and experience, is it applicable when it comes to security in the digital space? The sample of participants was determined geographically, based on the total daily time spent on the Internet and divided into three age groups. Group A consists of younger participants between 18 - 40 years, group B consists of participants from 41 to 60 years, and group C participants older than 60 years. The research was conducted using the focus group method and structured type of interview that was recorded, in which the author encouraged participants to present their views, opinions and events in which they engaged, which are directly related to cyber security and to assess the impact of digital literacy on cyber security. The results were processed using descriptive analysis and it showed that the participants age is not the backbone of the level of digital literacy and cyber security knowledge and that there are differences between the research groups. The paper points out the importance of developing cyber security awareness regardless of age and opens a new chapter for further in-depth research aimed at designing a causal model of the digital literacy impact on personal cyber security, an application that is possible in lifelong learning.

Keywords: *Cyber security, Digital citizens, Digital intelligence, Digital literacy*

1. INTRODUCTION

Digital literacy as a concept and a term has many definitions but the main focus is on the individuals ability and skills to communicate on online networks, understand hypertext and multimedia texts as well as making judgements on online sources (Studentski Poduzetnički Inkubator, 2019). It has become a widely known term in the recent years as we as a society entered the age of digitalisation and our daily activities involve the use of digital means such as Internet. The American Library Association's digital-literacy task force defines digital literacy as the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills." (Loewus, 2016). "The ability to approach the information filtering biased and fake news is considered a key factor while evolving into the new generation of smart users." (Bosanac and Luić, 2021: 1041). The authors of the paper Informational aspect of digital literacy explain that "being digital literate means having access to a wide range of practices and resources that you can use digital tools, and this is the ability to create and share meaning in different formats; it also means creating, collaborating and effectively communicating and understanding how and when digital technologies can best be used to support these practices." (Škoda, Luić and Brlek, 2020: 3910). With that in mind, the role of cyber security in digital literacy is now more important as ever since security threats in the digital field have become a part of individuals daily interactions.

IBM (2022) has shown that the average cost of data breach in 2020 was over 3.8 million dollars globally which includes the expenses of discovering the cyber threat, responding to it, the cost of downtime and lost revenue as well as reputational damage to the individual and companies. IBM (2022) defines cyber security as the practice of protecting critical systems and sensitive information from digital attacks and CISCO (2022) makes it clear that every individual needs to know the basic data security principles including choosing strong passwords, being wary of attachments in email and backing up their data. One of the main types of cyber security threats are phishing, malware and social engineering. Cambridge Dictionary (2022) defines phishing as an attempt to trick someone into giving information over the internet or by email that would allow someone else to take money from them and it is one of the most common types of cyber attacks. IBM (2022) refers to malware as malicious software variants—such as worms, viruses, Trojans, and spyware—that provide unauthorized access or cause damage to a computer. CISCO (2022) explains social engineering is a tactic that adversaries use to trick an individual into revealing sensitive information and often use psychological manipulation to trick users into making security mistakes or giving away sensitive information. Previous research conducted by Tinmaz and others (2022) have shown a growing tendency towards digital literacy and the skills that needs to acquired are starting from a young age (especially in social media). The main purpose of this paper is to find how participants asses their knowledge on digital literacy and cyber security, can they define the two terms and if they have been in close contact with a potential cyber attack. The key research question is if age brings wisdom and experience, is it applicable when it comes to security in the digital space? The main hypotheses are as following:

- H1: Younger participants have more knowledge on digital literacy and cyber security
- H2: Older participants are at a higher risk of being potential cyber attacks victims than younger participants
- H3: Digital literacy has an important role in the awareness level of cyber security
- H4: Participants that have a higher education background can better distinguish potential cyber threats

2. METHODOLOGY

The research for this paper was conducted in the capital of Croatia, in Zagreb, where all the participants currently reside. The was qualitative method was used in the research with 12 participants (N=12) that was conducted in authors home because of the COVID-19 pandemic and the number of participants that needed to be in one place. The participants were divided into three age groups. Group A consists of younger participants between 18 - 40 years (4 participants), group B consists of participants from 41 to 60 years (4 participants), and group C participants older than 60 years (4 participants). The research method used for was a focus group as it encourages in-depth discussion which will investigate the values or attitudes of the participants towards a discussion topic and to understand and explain the meanings, beliefs, attitudes and behaviours of individuals (Skoko and Benković, 2009: 217). The moderator of the focus groups was the author conducting a structured type of interview with 4 socio demographic questions and 8 research questions that were recorded and transcribed. The first set of socio-demographic questions was the participants age, gender, highest level of education, employment, whereas the second group of questions consists of the following questions: *What is your daily average time you spend using the Internet?*; *Have you heard of digital literacy before this interview and if you did, how would you describe the term?*; *Have you heard of cyber security before this interview and if you did, how would you describe the term?*; *Do you think that digital literacy impacts on cyber security and if yes/no, why?*; *On a scale from 1 – 5 (1- I know nothing, 5- I know it all), how would you rate your cyber security knowledge?*; *Have you ever been a victim of a cyber attack and if you were what happened?*; *Have you ever heard of the following terms and if you did, can you describe them in your own words: phishing,*

malware and social engineering?; *Did you ever receive a phishing email and do you remember what did it say?*. Duration of the focus groups was 130 minutes total with one break of 10 minutes.

3. RESULTS

Results are processed using descriptive analysis divided in 3 groups based on participants age. The majority of participants were men (58%) and the majority has a university degree (75%) and are currently employed – 58% (in Group C, participants who aren't employed are on retirement). The following tables show the socio-demographic results based on each of the research group.

	Age	Gender	Education	Employment
Participant 1	22	F	SSS	No
Participant 2	33	M	VSS	Yes
Participant 3	28	F	VSS	Yes
Participant 4	34	M	VSS	Yes

Table 1: Group A (18 – 40 years)

	Age	Gender	Education	Employment
Participant 5	56	M	VSS	No
Participant 6	57	F	VSS	Yes
Participant 7	58	M	VSS	Yes
Participant 8	43	M	SSS	Yes

Table 2: Group B (41 – 60 years)

	Age	Gender	Education	Employment
Participant 9	62	M	SSS	Yes
Participant 10	65	F	VSS	No
Participant 11	65	F	VSS	No
Participant 12	67	M	VSS	No

Table 3: Group C (older than 60 years)

Participants from group A have an average of 8 hours minimum of using the Internet on a daily basis (Table 4.)

Participant 1	8 hours
Participant 2	at least 10 hours
Participant 3	8 hours
Participant 4	9 hours

Table 4: Daily average using the Internet (Group A)
(Source: Authors research)

Participants in group A have all heard the term digital literacy before this interview and had the following answers on the question about digital literacy*: It is a term which describes all aspects of Internet as well as downloading and uploading information on the Internet* (Participant 1). *It helps me with understanding what is fake and what isn't on the Internet, such as ads or fake news* (Participant 2). *I would say that digital literacy means understanding the multimedia texts such as online articles, videos and having the skills to use the Internet* (Participant 3).

Digital literacy is a persons knowledge and skills to use informational tools such as Internet, SPSS, Photoshop, phone applications (Participant 4).

When asked if they have heard of cyber security before, all participants said yes and described it as following: *Cyber security has all my personal information that I have on my phone not just the information I put out in the world and the cyber security would need to protect it* (Participant 1). *It is usually used to secure high confidential data for high profile people, banks government and everyday people don't have the proper means to se protect themselves* (Participant 2). *For me, cyber security is a persons ability to recognize potential malicious attacks and how to properly respond to them* (Participant 3). *Inability for someone to get your personal information such as contact lists, bank accounts* (Participant 4).

All participants think that digital literacy has an impact on cyber security in the form of recognizing some malicious attacks and agreed if that was a subject in elementary or high school that students would be better prepared for the dangers that are present when using the Internet. The average cyber security knowledge rate in group A was 3 (Table 5).

Participant 1	3
Participant 2	2
Participant 3	4
Participant 4	3

Table 5: Personal rate on cyber security knowledge (Group A) - (scale: 1 – I know nothing, 5-I know everything) (Source: Authors research)

When asked if the participants were victims of a cyber attack, all responded no except for two participants who said the following: *My personal information from their mobile phone was taken such as photos I didn't put online and still to this day I know how it happened. When I was in elementary school, there was a fake Facebook profile of me that somebody created and that was really scary to me* (Participant 1). *I got a mobile notification in 1 in the morning stating that somebody from China is trying to log into my Apple ID but luckily I have 1 Factor authentication so I just changed my passwords and a tragedy was avoided* (Participant 2).

When asked about phishing, malware and social engineering, the participants in group A said the following: *I have heard of all three types of these attacks, phishing is when somebody sends you an email with a weird link that you must not click on it, malware is some kind of bad software that can get on your computer and take your information and social engineering is when a person tries to steal the data directly, for example my grandmother got a call where they told her they were the police and asked how much money she has in her house* (Participant 1). *If we are talking about phishing emails, I know what they are, an email with suspicious link but I don't know the details on how they create it, I have heard of malware but I don't know anything except that there are hackers that use it to steal your information and social engineering is somebody is pretending to be someone they are not to steal your personal information over the phone* (Participant 2*). I can describe the 3 terms as a type of cyber attacks, the first one often uses emails with bad links to steal the data, malware is a virus that is on your phone/PC to steal the data and social engineering are people to use psychological tricks to trick you into giving sensitive information such as credit card information and others* (Participant 3). *I have seen phishing emails before and it is often like a security breach in the bank and you need to click on the link in the email to secure your data, malware is some kind of virus that gets on your PC when going to some weird sites and for social engineering I have an example from the Chinese government that uses social credit score to have their citizens obeying the rules* (Participant 4).

Only two participants got a phishing email that was from a person stating that they want to give them 1 million dollars because they inherited a fortune and that they have to click on the link. The other participant mentioned the same type of phishing email only the link was for the persons Wikipedia page and they asked in the email to send a reply if the participant wants the money. Participants from group B have an average of 6 hours minimum of using the Internet on a daily basis (Table 6.)

Participant 5	8 hours
Participant 6	7 hours
Participant 7	6 hours
Participant 8	5 hours

Table 6: Daily average using the Internet (Group B)
(Source: Authors research)

Participants in group B know about the term digital literacy and expressed the following opinions: *I would say that I am not very digitally literant but for me it means that you can use every aspect that a mobile phone or PC has to offer, from writing in Microsoft office to online shopping and communicating with your peer*s (Participant 5*). Digital literacy helps people to use the Internet* (Participant 6*). I would say that this involves skills on ow to use Internet and your computer such as Excel* (Participant 7). *I have to agree with other participants and just add that if you are digitally literant that it helps noticing fake news from the real information* (Participant 8).

When asked if they have heard of cyber security before, all participants said yes and described it as following: *The real cyber security can be divided in three categories, military, government and everyday people and the term describes how these categories use security measures to protect their valuable data from entities that want to access it* (Participant 5). *For me cyber security is a set off skills for the good guys on how to defend from the bad guys that are hacking our data* (Participant 6). *Cyber security helps governments, banks and corporations to have a secure network so that no hackers try to access and steal their clients information, I think a lot of money each year goes to cyber security* (Participant 7*). I would say that cyber security helps people to keep their digital information such as online pictures and information that are on the Internet and I agree with other participants that knowledge on cyber security helps us being safe in this digital era* (Participant 8)

All participants think that digital literacy has an impact on persons knowledge on cyber security. The average cyber security knowledge rate in group B was 3.5 (Table 7).

Participant 5	4
Participant 6	3
Participant 7	4
Participant 8	3

Table 7: Personal rate on cyber security knowledge
(Group B) – (scale: 1 – I know nothing, 5-I know everything)
(Source: Authors research)

Nobody from group B was a victim of a cyber attack. When asked about phishing, malware and social engineering the participants in group B said the following*: I have seen phishing emails often and it is usually a text stating your information was breached and that you need to click*

on the link to secure it, malware is a type of malicious software that hackers try to place on your PC or phone such as worms and Trojans and social engineering when somebody is pretending to be someone they are not in order to get valuable information from us (Participant 5*). I have seen phishing emails on my work email but I always delete them because I know that my bank would never send out that type of email and would call me directly if there was a security breach for example, malware is almost the same as ransomware where there is a bad virus implanted in your network to het information or to have leverage on you based on your personal information and social engineering happens when people try to deceive others by pretending they're someone they are not* (Participant 6). *I think phishing is also a form of like bad ads that pop up stating that you have won a money prize and that you need to follow the link below, I have heard of malware before but I know that is a virus you don't want to get and social engineering is a type of eye-to-eye hack, it is not distributed through emails or computers* (Participants 7*). So to keep to short, phishing is a type of hack where they are trying to lure you to click on a link through an email, malware is a type of virus that can take your personal information and social engineering is a hackers tactic in which he calls the potential victim trying to get out sensitive and useful information* (Participant 8).

Participants from group B said that they have received phishing emails before but often their email just filters them to junk or spam. Participants from group C have an average of 8 hours minimum of using the Internet on a daily basis (Table 8)

Participant 9	4 hours
Participant 10	2 hours
Participant 11	3 hours
Participant 12	2 hours

Table 8: Daily average using the Internet (Group C)
(Source: Authors research)

Participants in group C know about the term digital literacy and have stated the following: *I know that it is a part of being literate in the digital age and it involves a skill set to use the Internet and programs on the PC* (Participant 9*). I think it is knowledge about the digital world and how to use the Internet* (Participant 10). *It is a term that describes a persons ability to use digital means such as phone, Internet, smart TV* (Participant 11*). Digital literacy is when you know how to search the Internet to find something you need, to be present on social media and to use a PC* (Participant 12).

When asked if they have heard of cyber security before, all participants have heard of it and expressed their opinions as following*: I think it is a type of security that keeps all of our information on the Internet safe* (Participant 9). *It is mostly used by banks and big company's to keep the information safe* (Participant 10). *Cyber security is a term that describes all things necessary to keep a person safe in the digital era but I don't know the details* (Participant 11). *I would say that cyber security is a term in IT department that helps people who work in that department to keep their data safe, I don't think that we are safe on the Internet* (Participant 12).

All participants in Group C thinks that digital literacy has an impact on cyber security and if they had it a subject in school (which wasn't possible at that point in time), they would have more knowledge about the subject itself. The average cyber security knowledge rate in group C was 2 (Table 7).

Participant 9	2
Participant 10	3
Participant 11	1
Participant 12	2

Table 9: Personal rate on cyber security knowledge (Group C)- (scale: 1 – I know nothing, 5- I know everything) (Source: Authors research)

When asked if participants were a victim of cyber attacks, only one participant responded and said: *I have gotten a weird message on my iPhone that was written in big red words stating I had a virus that will corrupt all my data if I don't click on the link and I was in a panic mode and called my son who deleted that weird pop up window and I was back to being safe* (Participant 11).

When asked about phishing, malware and social engineering the participants in group B said the following: *I really don't know what phishing is unless we are going fishing, malware sounds like some bad software that is on your phone and social engineering is a way to manipulate the masses, example with the COVID-19 measures* (Participant 9). *I also don't know how to define phishing but each term sounds like some bad thing that happen on the Internet, my son has told me that malware is like a virus that can take your personal information from your phone and social engineering is a new term to me* (Participant 10*). I haven't heard of phishing before but I know that malware can get on your phone if you click on weird looking links on the Internet and social engineering is something that also helps the bad guys to take your personal information* (Participant 11). *I don't know much about these terms but I have heard on the news that we need to be careful when giving out our personal information about ourselves, I would say that is probably social engineering, when someone is trying to get some information out of us but I don't know how to describe phishing or malware* (Participant 12). Participants from group C said that they haven't received phishing emails.

4. DISCUSSION

All participants who were a part of this study are from Zagreb area, 5 women and 7 men, majority employed (58%) while in group C, unemployed are in retirement (75%) and with an university degree (75%). Regarding the daily average time spent on the Internet, the youngest participants that were a part of group A exceeded with the average above 8 hours per day (8,75 hours), group B with 6,5 hours and group C with 2,75 hours. Even though all the participants have heard of digital literacy before conducting the interviews, there is a difference between groups in the level of details provided. When asked about cyber security, all participants were familiar with the term, but the least knowledge has shown group C. All participants in this study have agreed that digital literacy has an impact on the knowledge level of cyber security with notation that if it was thought in school that participants would be more knowledgeable about it. Cyber security knowledge rate was a little bit surprising as the participants in group B have rate it higher than younger participants while as expected, group C thought they have the least knowledge on the subject. One participant from each group was a victim of cyber attacks in form of stolen personal information (created a fake social media account of the participant), attempt of identity theft and malware attempt. Regarding types of cyber attacks, as predicted, the group A had the most knowledge whereas the group C had the least. Nobody from group C received phishing emails which cause may be that they are spending far less time on the Internet n comparison with the participants in group B and A where some participants received that type of email.

- Hypothesis 1 - Younger participants have more knowledge on digital literacy and cyber security, has been confirmed the causal relationship about the amount of time they spend on the Internet and the fact they have been born in the digital era whereas the older participants have not.

- Hypothesis 2 – Older participants are at higher risk of being victims of potential cyber attacks has been denied because the study hasn't shown the oldest participants as the potential victims, rather the younger participants. The reason behind this could be the fact that older participants are more careful when diving into digital space as they don't know as much.

- Hypothesis 3 – Digital literacy has an important role in the awareness level of cyber security has been confirmed as all participants have shared the same opinion on the importance of digital literacy and having it as a part of a school subject.

- Hypothesis 4 – participants that have a higher education background can better distinguish potential cyber threats cannot be confirmed or denied as only 25% of participants have only finished high school.

Old age has a role in the impact of digital literacy on cyber security, which was shown in the research as the older participants weren't cyber attacks victims as it might be excepted before conducting the study. However, it is important to note that there is unambiguous answer to the main research question due to limitations of this study because of the small number of participants. This study has confirmed what has been shown in the research Tinmaz and others (2022) as it was shown that learning about digital literacy starts from young age. This research has shown that participants who weren't born into digital era (were born before the Internet) and are currently employed have shown similar knowledge and skills when it comes to digital literacy and cyber security. There is a visible difference between group A and group C and the cause for it is due to lack of involvement in the digital space from the young age. Regarding potential cyber attacks victims based on their age, this research hasn't shown that older participants are more prone to being victims of these attacks but the reason behind this result could be one of the limitations of this research which is a small number of participants.

5. CONCLUSION

Since we are living in a digital era in which we are almost completely intertwined with digital tools that we use on an everyday basis such as the Internet, mobile phones, GPS etc., and evidently digital literacy has an impact on individuals life. As there are many positive aspects regarding the digital space, there is also a big threat that lies under cyber security which are cyber attacks such phishing emails, malware and social engineering. These attacks are made to prevariety individuals and use the stolen information to their own advantage. On a global scale, in 2020, there was more than 3 million dollars lost due to data breaches and it is more important then ever that the society has the skills to recognize these types of attacks. The results of the study have shown that most participants have at least basic knowledge of digital literacy and cyber security but are still prone to become cyber attack victims due to lack of knowledge. Furthermore, all participants agreed that if there was a subject or a topic in school which dealt with digital literacy that they would have more knowledge than they do now, stating that their level of knowledge is they was it is because of individuals affinities for research and prevention. The research hasn't shown that older participants are more cyber security victims than the younger participants but there was a lack of knowledge in the older participants on the subject of the study.

Since this study has limitations because of the small number of participants, it is great start for future studies in which could increase number of participants and design a causal model of the digital literacy impact on personal cyber security. To conclude, in old age, a person better protects themselves from misfortune and in youth, better endures it (Schopenhauer).

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DIGITAL COMMUNICATION AND DIGITAL COMPETENCIES - PREREQUISITES FOR BUILDING THE ORGANIZATION'S DIGITAL IDENTITY

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ABSTRACT

Modern countries pay great attention to the development of digital communication of civil society organizations and the public, citizens, through various digital media and channels, of which social networks according to recent research are the most represented. For the purposes of this study, fire brigades were selected from a wide range of functionally different civil society organizations because of their presence in all societies, regardless of level of development and organization, and because of almost equal importance for the safety of citizens regardless of geographical and any other affiliation. Civil society organizations meet problems in communicating with the public on a daily basis: from up-to-date transmission of relevant information, how to transmit it and the selection of relevant media. The rapid development of digital technologies, and consequently the intensification of digital communication, has posed a challenge to civil society organizations on how to transmit relevant information to citizens through digital media and how to build the digital identity of the organization. Whether digital communication and digital competencies of civil society executives influence the creation of their organization's digital identity is a research question on which this study is based, the aim of which is to assess which variable, digital communication or digital competences and consequently on their dissemination in public, some of the questions were asked to the respondents in the survey questionnaire submitted to the heads of fire organizations. The research was conducted on a sample of fire brigades from one county in the Republic of Croatia, the analysis of the results of which showed that the factors of digital communication and digital competencies significantly affect the creation of digital identity of fire brigades. How citizens perceive this identity and whether their perception is in line with strategic projections of the implementation of social media in public relations of fire brigades are questions that require further research.

Keywords: *Civil society organizations, Digital communication, Digital competences, Digital identity, Fire brigade*

1. INTRODUCTION

Digital identity is a term that is very often used in the virtual world of the 21st century and is closely related to media literacy. Tafra-Vlahović (Tafra-Vlahović, 2012) lists three key criteria that an organization must meet in order to form its digital identity: central position (features of key identities for the organization recognized through the appearance of the virtual profile); diversity (compared to other organizations, and meet the need of members of the organization to stand out); continuity (features of virtual identity that make it resistant to time and possible changes). Organizations (companies, institutions, associations) that have a serious business intention and a long-term vision of advancing their activities, greatly invest their financial and human resources in building a positive digital reputation. To build a positive digital reputation, it is important that real and visual identities are equal. It is the only way for an organization to gain the trust of its customers in its primary business through the virtual and digital spheres. Gaining the trust of users through virtual reality is a great challenge for all producers of certain information. The challenge is for several reasons: the constant movement and change of the digital world, the rapid flow and exchange of information, demanding and critical consumers

who demand that all information is available at any time and in any place. Research has shown that younger users of digital platforms, those who continuously learn about media literacy in education systems, have digital competencies and successfully manage and control the digital identity of themselves as individuals and are aware of the belonging and impact of their digital footprints on the virtual community (Škoda, Luić, Brlek, 2020). Media and social networks bring their consumers into virtual relationships and situations that are equal to real situations. They are no longer just a tool for transmitting information. They are part of the daily life of every modern man (Bauer, 2007). Given that the demand for information and the speed of progress are related, it is obvious what intensity and quality of available information today's Internet consumers are looking for. Modern information exchange and interactive digital communication are no longer limited in separate types of roles: journalist-audience-public-private, but all roles are mixed, everything must be present everywhere. Private life is no longer private. It becomes a social event, while public society becomes a private event. In the modern digital world, mutual boundaries have been lost. The influence of social networks is of great importance on the life of the individual, but also society in general. Today, the connection of people, thanks to digitalization and social networks, is the greatest in history. Thanks to global connectivity, every individual can receive countless information in a very short time. Media literacy is extremely important when communicating through social media. Media literacy as well as dealing with the media is not something that is taken for granted but is trained and learned. This competence should be possessed by all heads of organizations as well as those in charge of public relations and media. New technologies enable consumers to connect with organizations through the virtual world, communicate with them, seek answers to their questions, and it is understood that organizations are ready and adapted to new challenges and requirements. But if they are not? Will this affect the less positive or even negative digital and then the real reputation of the organization? Are the leaders of organizations aware of their competencies that influence the development of the digital identity of the organizations they represent? Nowadays, social networks are an area of the virtual world in which events are as frequent and widespread as in the real world. Among the most widespread and most used social networks are: Facebook, Twitter and Instagram (Zečević, Miletić, Luić, 2020). The identity of the organization is the personality of the organization that is formed in the new virtual world based on the logo, website, behavior and culture of the site owner, message and mode of communication (one-way and two-way) (Tomić, 2016). The purpose of this research is to measure the responsiveness of civil society organizations in terms of communication through social networks on the example of fire organizations in Virovitica-Podravina County. The aim of this paper is to analyse the results of the research to determine the situational readiness of civil society organizations, on a representative example of fire brigades, to use social networks and check their readiness to inform the public through social networks. Are the leaders of civil society organizations aware of their influence in building the digital identity of the organization they represent? The environment and speed of information exchange affect the extremely rapid progress of technology, but are the people involved in this exchange competent and media literate enough to critically accept and provide information, especially when in the digital world they represent a particular organization that carries out social activities?

2. METHODOLOGY/ MATERIAL AND METHOD

2.1. Respondents (participants)

The survey was attended by the heads of fire organizations of Virovitica-Podravina County. There are 54 fire departments in the county. 43 of them responded to the survey in the period from March to May 2022. 93%, approached the survey online, while 7% of the respondents approached the survey on paper due, while they have to low media literacy.

Fire brigades are the most numerous civil society organizations in the Republic of Croatia, and the research was purposefully conducted on this sample.

2.2. Procedure

The paper combines qualitative and quantitative research methods. The questions for the survey were taken from Wendling, Radisch and Jacobzone (Wendling, Radisch, Jacobzone, 2013), and they relate to checking the situational readiness to use social networks and checking the readiness to address the public via social networks.

Hypothesis: Civil society organizations are unprepared to present their official information on activities and scope of work through social networks.

3. RESULTS

3.1. Checking the situational readiness to use social networks

The results of the research showed how competent civil society organizations are to use social networks in order to inform the media and the public (Wendling, Radisch, Jacobzone, 2013).

		Yes	No
1.	Do you have a blog, Facebook page or Twitter with a group of people who follow your interventions and activities, and at some point, they could help you solve a problem at the intervention?	77%	23%
2.	Does your organization regularly follow social media related to activities related to the profession?	82%	18%
3.	Do you use analytics and measurement of visits to your website, social media pages in order to notice certain trends of visits and focus on a certain topic?	30%	70%
4.	Do you have the methodology or tools to monitor the flow of information exchanged on social media?	23%	77%
5.	Do you encourage citizens to report and inform through social media during some lengthy firefighting intervention? (floods, earthquakes, storms, large fires, health crisis)	61%	39%
6.	Do you educate your members on how to use social networks constructively and affirmatively for the profession?	51%	49%
7.	Is social media integrated into your education and training?	61%	39%
8.	Do you use crisis mapping using social media data?	25%	75%

Table 1: Situational readiness checklist for the use of social networks (Source: Wendling, Radisch, Jacobzone, 2013; Author research)

3.2. Checking the readiness of fire organizations to address the public through social networks

Table following on the next page

		Yes	No
1.	Does your organization have guidelines on the use of social media for its members / employees?	32%	68%
2.	Does your organization have an RSS feed on its website?	0%	100%
3.	Is your organization on Twitter?	0%	100%
4.	Is your organization on Facebook?	73%	27%
5.	Is your organization on Instagram?	0%	100%
6.	Does your organization have ready hidden websites or other social media ready for use in crisis situations?	0%	100%
7.	Are you as the head of your organization on the Facebook page / Twitter / Instagram?	84%	15%
8.	Does your organization use social media to direct visitors to content-like sites?	43%	57%
9.	Does your organization use multimedia to communicate through social media?	45%	55%
10.	Does anyone else communicate with social media for your organization?	21%	79%
11.	Does your organization have a fast process for approving social media posts in crisis situations?	27%	72%
12.	Does your organization have a list of its followers on the Internet and their profiles?	45%	55%
13.	Are you trying to build a follower base and expand your reach on social media? Do you know who the influential people on social media are?	37%	63%
14.	Do you publish your organization's presence on social media through press releases with links to your social media pages?	34%	66%
15.	Do you have a strategy for developing your organization's social network?	20%	80%
16.	Has your organization tried to raise awareness of crises and certain dangers through social media? (sending weekly information and interesting facts, explanations of what to do in various situations, virtual campaigns on YouTube)?	41%	59%
17.	Does your organization monitor social communication and follower profile in real time?	36%	64%
18.	Does your organization have elaborated methods of coordination with other organizations to make certain information consistent and widely disseminated?	30%	70%
19.	Does your organization share other service information on its site?	48%	52%

Table 2: Presentation of the results of checking the readiness of fire organizations to address the public via social networks
(Source: Wendling, Radisch, Jacobzone, 2013; Author research)

4. DISSCUSION

The results of the research showed that, despite the great and intensive development of digital technology and the big step forward in expanding the virtual world after the crown of the crisis, there is still a large percentage of organizations that do not have blogs, Facebook or Twitter and do not follow hashtags. There is a large percentage of those who do not follow social media at all related to activities related to their profession, 18% of them.

Many organizations do not use analytics and measurement of visits to the organization's website in order to identify certain trends of visits and focus on a particular topic, which shows that organizations do not have information about the interest of consumers and users. This is confirmed by the result of research which shows that 80% of organizations do not have a strategy for the development of social networks. According to the share of social networks, Facebook is used by 72% of organizations, while Twitter and Instagram are not used by any organization, just as no organization has a hidden website or other social media ready for use in crisis situations. It is surprising that no organization has an RSS feed. These data are an indicator of the unwillingness of fire organizations for sudden, unexpected and unannounced events that are the primary job of firefighters to react and communicate with social media and through the digital platform in times of major disasters. It is encouraging that 61% of organizations report and inform through social media during a long firefighting intervention (floods, earthquakes, storms, health crises), but there are still a large number of others who do not (39%). Regarding the integration of social media in the education of fire organizations, 61% of them answered that the media are integrated, while 39% said that they do not use this advantage. Media literacy as one of the main prerequisites for digital competencies of organizational leaders is extremely important when using social networks. 51% of managers confirmed that they educate their members on how to use social networks constructively and affirmatively, while 49% of them do not. The research was conducted in civil society organizations on the example of fire brigades that are specific organizations and have hierarchical authority, obligations and powers prescribed by special laws. The results of some other civil society organizations may not necessarily be like this, and the people who manage them may be more competent in digital communication, and thus more positively build the digital identity of their organizations. These are all areas that need further research. Since the public and media consumers seek information about organizations through social networks, if the responsible persons in the organization do not provide the information in time and in the amount requested, they put pressure on organizations and it often happens that, under this pressure, comes to unplanned and incomplete information that is placed in the public. Public opinion on the identity of an organization has an important role and influence in modern society because it affects the formation of a public issue, its resolution, social impact on the organization and a number of other factors that affect the quality of work and development of the organization (Tomić, 2016).

5. CONCLUSION

Every organization has its own identity. Given the importance of digitalization and equalizing the importance of life in the virtual and real world, in addition to building a real identity, it is important to build a digital identity. Civil society organizations have recognized the importance of media literacy in building a digital identity. Although the work on building and forming the digital identity of some civil society organizations is extremely good and can serve as an example to others, it is still acting individually and there is a lack of a common development strategy for developing media literacy (Peruško, 2008). This was also shown by the above research, which confirmed the hypothesis: Civil society organizations are unprepared to present their official information on activities and scope of work through social networks. Since there is no national strategy for the development of civil society in the Republic of Croatia with components and emphasis on digital identity, the development and construction of each organization is left to non-professional individuals whose competencies and media literacy remain on the subjective progress of each. In order to build a digital identity of the organization that meets the challenging requirements of modern consumers, managers need to meet some of the strategic determinants based on the principle of convergence (Gavranović,2006): continuously produce and provide interesting content; produce forms of organization promotion

for all available media platforms; establishment of multimedia packages; establishing a single editorial system that unites all platforms of organizations with a common database for all users; identification of the most popular content based on visits and user impressions. At the same time, everyone who manages the organization, if he is also a person who places information in the public, must have managerial and journalistic skills, but must also be aware of the large number of social network users and continuously work on educating and educating their own media literacy. His own digital identity has to be as similar as possible to the real one, and then the organization he represents in the virtual world would have a positive digital footprint. This paper is a contribution to the field of communication and educational sciences and opens a number of other possibilities for further research into the communication of civil society organizations in the digital world.

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PERSONAL CYBER SECURITY MANAGEMENT: BASED ON THE EXAMPLE OF MASTERS OF EDUCATION

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ABSTRACT

The pandemic period of Covid-19 introduced numerous changes in the educational system almost overnight, and therefore, insufficiently prepared, the entire teaching process as well as communication among schools, teachers, and students has been transferred online. The extensive use of digital technology to meet the educational needs of students has exposed teachers to threats in cyberspace. Microsoft's Global Threat Activity Tracker recorded a significant increase in cyber attacks on the educational sector during this period, in an attempt to obtain personal data of students and teachers or to set up malaware. The educational system is still the most exposed because the level of protection is not strong enough and the number of online users is constantly increasing. The importance of developing cyber security awareness has been emphasized in the Council of Europe document "The Digital Competence Framework for Citizens DigComp 2.2" as one of five areas of digital competence development through eight proficiency levels. The authors of this paper aimed to determine which data protection and storage procedures, device protection, and informed behavior when using social networks are used by masters of education in their free time and how these behaviors differ in their business environment. The research question the authors answer in the paper is which behaviors of masters of education in virtual space pose a threat to their cyber security. A questionnaire was used to conduct the study, which was focused on masters of education in the primary education system from various parts of the Republic of Croatia. The results of the research show that two thirds of the respondents estimate that they pay more attention to cyber security when students' data is included than when it comes to their personal data. What raises major concerns in the results of the research is that one third of the respondents do not apply behaviors and actions in the virtual space that ensure the security of devices, personal data, and content. The findings of the study can be used to develop instructional programs for educators in the field of personal cyber security management.

Keywords: *Cyber attacks, Cyber security, Masters of education, Pandemic, Personal data*

1. INTRODUCTION

Regardless of the pandemic, cyber security has during the last decade become one of the major national security issues in the 21st century taking into account technological vulnerabilities and huge opportunities for its abuse, thus creating room for instability. High pace and extent of changes in digital technology lead to a wide range and tendency to use destructive cybernetic weapons for the achievement of certain goals and deliberate harm and damage (Dunn Cavelty, Wenger, 2022). Fast development of digital technologies and expansion of digital applications, tools for learning, transfer of knowledge, and communication in the educational sector have become even more intense during the Covid-19 pandemic, not only technologically but also regarding the plummeting number of users. Due to the unforeseen scenarios of Covid-19 and owing to the infrastructural capacity of the educational system of the Republic of Croatia, already established Internet networks as well as existing equipment, the transfer of the whole

teaching and learning process online overnight was made possible, without the previous preparation of teachers, learners and parents i.e. participants in the whole process of teaching, learning and communications. Such intensive activities in the virtual space address the aspect of cyber security, particularly in the educational system, which is public and transparent, whose users are the youngest and most vulnerable, and activities include teachers, professional associates, students, and parents. As the number of cyber attacks increases, cyber security becomes even more important implying all tools, policies, concepts, measures, activities, education, and technology which are used to protect the cyber environment and its users. (Karagozlu, 2020). The document of the Council of Europe *"The Digital Competence Framework for Citizens DigComp 2.2"* in a conceptual model of digital competence citizen development, as one of 5 key areas, envisages cyber security area, which includes acquiring knowledge with the aim of undertaking activities for the protection of devices, personal data, and content as well as health and environment. Cyber security as a specific segment of information security does not cover only eliminating threats but also understanding and managing risks. The fact that a person is the weakest element in the process of ensuring security, stresses the fact that cyber security should not be treated exclusively as technological protection, but we also have to understand and detect points of vulnerability (Laybatus, Tredinnick, 2016). In order to increase cyber security, it is necessary to dedicate more interventions to change the behavior of Internet users. These modifications will constantly be adapted and improved in accordance with specific and continuously changing methods of attack, types of perpetrators and victims, and targets of attack (Young, H. et al., 2018). Manipulating people to reveal confidential information or access content unavailable to predators, poses great challenges to cybersecurity experts, especially when it comes to activities and behaviors on social networks (Borovac, Velki, Šolić, 2018). Threats come in different forms, from different sources, and with different motives. Perpetrators from the outside always find system vulnerabilities and track user's digital clues as to how to obtain passwords using social engineering, password list, or operating system vulnerabilities (Datt, 2016). The European Commission's document "2030 Digital Compass: the European way for the Digital Decade" (European Commission, 2021) also emphasizes how the crisis, because of multiply increased frequencies and number of Internet users, has revealed all shortcomings and vulnerabilities in digital space and has led to an increase in cyber threats, attacks, and theft. One of the 6 rights and principles which the European Commission points out are security and protection and, in that sense, the directions and paths of digital transformation are envisaged with the aim of providing safe and protected digital space to all users, from children to the elderly. Cybernetic security, information security, digital competencies, and digital skills terms are strongly connected, high contextual and demand simultaneous development in all segments, the same dynamics, following constant technological development, quantity, and types of activities in digital space (Luić, Švelec-Juričić, Mišević, 2021). Everyone should care about cyber security, but it is not enough that employees in the education system only have a developed awareness of the necessity of cyber security, because even good practice does not guarantee one hundred percent security. The need to develop an awareness of teachers' cyber security is already given as they teach students and transfer their knowledge to them (Caparino, 2018). This work is based on assumptions that masters of education who work as primary school teachers in schools in the Republic of Croatia, with their behaviors in an online environment, endanger their own cyber security. The aim of the research was to determine which behaviors of masters of education in the virtual space represent a threat to their cyber security by determining the correlation between variables that determine masters of education behavior and variables used in examining the levels of their security in the virtual space.

Starting from the problem and defining the goal of the research, the question which we want to answer is to determine which protection procedures, data storage protection, informed behavior while using social media masters of education use in their free time and how much these behaviors differ in business environment.

2. METHODOLOGY

The research was conducted on a sample of masters of education who are primary school teachers in the Republic of Croatia using the questionnaire method. It was used to research the elements of personal cyber security that the masters of education apply in their free time as well as in the business environment in terms of data storage and protection, device protection, as well as informed behavior while using social media. In the introductory part of the survey, along with the identification of the researcher, the purpose and goal of the research are presented. Three questions about sociodemographic structure are included in the survey's 29 questions (gender, age, and the county in which they live). The closed-ended questions are a mix of multiple-choice and questions based on the notion of a five-degree interval scale (Likert scale), with 1 (one) being the lowest value and 5 (five) being the highest. The survey was created in a Google form. Between April 25 and May 6, 2022, a survey was conducted. A link to the survey was sent to masters of education to their official email addresses asking them to complete a questionnaire. The masters of education who are primary school teachers filled out the questionnaire of their own free will.

3. RESULTS AND DISCUSSION

245 masters of education (N = 245) who work as primary school teachers in the Republic of Croatia completed the survey, with 87% of women and 13% of men. Respondents came from all counties in the Republic of Croatia, with the majority hailing from the City of Zagreb (26%), Varaždin County (18%), and Split-Dalmatia County (18%). (14 percent). The majority of respondents (66%) are between the ages of 41 and 60, while 22% are between the ages of 31 and 40. The youngest respondents (7%) are under 30 years old, and the oldest are over 60 years old (5%).

3.1. Level of application of device protection security measures

When asked what strength of passwords they use to access services and applications, 64% of respondents answered that they use simple passwords composed of a combination of letters and numbers that do not provide the expected protection against cyber attacks. Only 13% of masters of education use a password composed of 10 characters with a combination of letters, numbers, and special characters, and 8% of respondents use a password consisting of more than 10-character combinations of letters, numbers, and special characters. Of the surveyed, 15% of them use the simplest passwords such as a personal name related to their family or words which provide extremely weak protection, making them vulnerable in the virtual space and possible targets of cyber attacks.

Table following on the next page

	f	%
a password made up of a combination of letters and numbers	**155**	**63,3**
10-character password a combination of letters, numbers, and special characters	32	13,1
my name and / or date of birth or details of my family members	32	13,1
password of more than 10 characters combinations of letters, numbers and special characters	20	8,2
a word in Croatian or English	6	2,4
Total	245	100,0

Table 1: Password strength for accessing services and applications used by masters of education
(Source: Authors' research)

When it comes to the level of security of using a password to access Internet services, almost two-thirds of respondents (69%) answer that they have several passwords that they use for many services and applications. Only 17% of masters of education apply the highest level of protection, access to each service or application with a different password. The weakest level of protection, the use of the same password for all services is applied by 15% of respondents. According to the results of the respondents on the frequency of changing the password, more than half of them (53%) change the password when they suspect the possible possibility of misuse. Almost a third of respondents (32%) do not change their password once while using a particular service or application, thus exposing themselves to the risk of any form of data misuse. A small proportion of respondents (15%) apply procedures and behaviors that provide a higher level of security such as changing the password every few months or once a year.

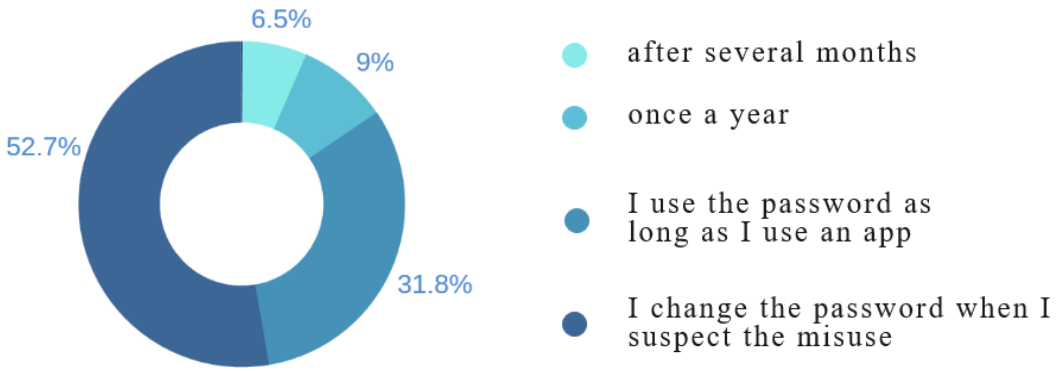

Figure 1: Password change frequency
(Source: Authors' research)

3.2. Level of application of data protection and storage security measures

When leaving a device in a room where they know people, in order to prevent unwanted access to their digital devices, less than half of respondents (45%) say that all their devices are password protected. As no one would be able to access their devices, 21% of respondents say they turn off the device when they leave the device in a room where people are familiar to them. Almost a third of respondents answer that they leave the device on because they trust their friends and acquaintances and thus allow unhindered unwanted access to their devices, content, and data.

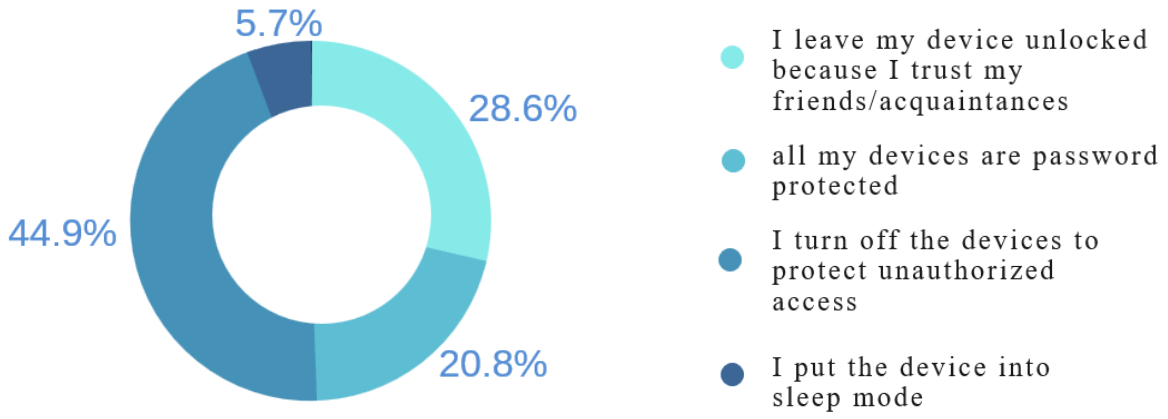

Figure 2: Preventing unauthorized access to digital devices
(Source: Authors' research)

When it comes to actions they take to preserve the content they are currently working on, 58% of respondents say that they save changes regularly, during their work. Less than a third of respondents (23%) include automatic cloud storage, while the weakest security measures, storage when finished, are used by 19% of respondents. When asked how often they back up the content they have on their computer, 46% of respondents answered that they do not back up content at all. On a weekly and monthly basis, 17% of masters of education work on backup content, thus protecting content from loss, unauthorized use, or compromise of content by viruses, while 37% of them say that they backup content several times or once a year.

	f	**%**
I don't do content backup	**112**	**45,7**
several times a year	46	18,8
once a year	44	18,0
monthly	27	11,0
weekly	16	6,5
Total	245	100,0

Table 2: Frequency of using safety back up
(Source: Authors' research)

3.3. The level of application of informed behaviour when using social media

Among the 245 masters of education who responded to the survey, 28 of them (11%) do not have a profile on social networks, while 15% answered that they do not use their full name on social networks. Three-quarters of respondents (74%) answered that they have a profile on social networks with their full name and surname. When asked which free social networks and applications for messaging they use, the most surveyed masters of education (91%) answered that they use WhatsApp, 79% use Viber, 70% Messenger, 61% Facebook, and 37% Instagram. Only 1% of respondents answered that they do not use any social network or application for free messaging. Based on the frequency of use of social networks and applications for free messaging, it can be concluded that the presence and activity of masters of education in virtual space in private and business environment is very high, which implies an increased need to raise cyber security.

	f	%
WhatsApp	**224**	**91,4**
Viber	194	79,2
Messenger	173	70,6
Facebook	149	60,8
Instagram	91	37,1

Table 3: The frequency of using social media and applications for free messaging (Source: Authors' research)

The frequency of certain activities on social networks and applications for free messaging was examined by estimating the scale from 1 (never) to 5 (very often) for activities such as messaging, sharing digital materials and documents, sharing photos, posting photos, writing posts on Facebook, engaging in discussions in Facebook groups and writing comments under a false name. Respondents give the highest scores for messaging activities via Viber, WhatsApp and Messenger (4.51), photo sharing (4.05), and digital material and document sharing (3.87). Masters of education are less likely to post photos on Facebook and Instagram (2.69) and write posts on Facebook (2.50). Respondents very rarely or never get involved in discussions on Facebook (1.91) and write comments under a false name (1.05) for which the activity of 95% of masters of education gave the lowest score 1.

	%					M	SD
	1	2	3	4	5		
messaging (Viber, Whatsapp, Messenger)	1,2	0,8	3,3	34,7	60,0	4,51	0,71
exchange of digital material and documents (Viber, Whatsapp, Messenger)	2,4	8,6	19,6	38,0	31,4	3,87	1,02
photo exchange	2,4	4,9	15,9	38,4	38,4	4,05	0,97
post photos (Facebook, Instagram)	20,4	24,9	28,6	15,9	10,2	2,69	1,24
writing posts on Facebook	27,7	24,5	25,7	13.9	8,2	2,50	1,25
engaging in discussions in Facebook groups	44,9	29,8	16,7	5,7	2,9	1,91	1,04
writing comments under a false name	96,0	2,4	1,6	0,0	0,0	1,05	0,29

Table 4: Frequency of activities of masters in social media and free messaging apps (Source: Authors' research)

3.4. Procedures for personal data protection applied by masters of education

In case of suspicion or detection of cyber attacks on personal data of respondents such as their name and surname, personal identification number, cell phone number, bank details via private e-mail address or private computer 65% of masters of education answered they would report such attacks to the police, and 22% would report it to the Personal Data Protection Agency, while 8% would inform all people from their mailing list. Only 4% of respondents would not do anything.

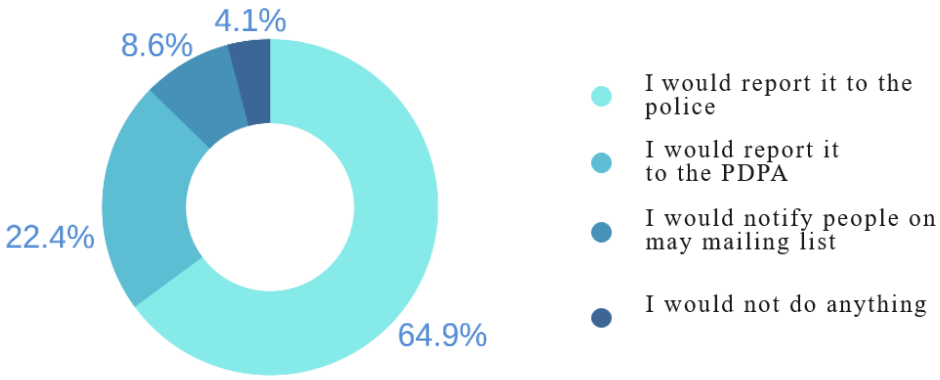

Figure 3: Procedures of masters of education in case of suspicion of cyber attacks on personal data
(Source: Authors' research)

When it comes to students' personal data and the suspicion or detection of cyber attacks with the risk of theft, threat, or misuse of students' personal data, more than a third of respondents (35%) would take at least 3 out of 5 actions. Almost 60% of respondents said they would report such an attack on students' cyber security to the principal, 42% would inform the student's parents, 40% would report to the school technical support expert, 37% would inform the school IT specialist, and 26% would report the case to the school's professional service. The results additionally show that more than half of the respondents would take at least two or more actions in case of suspicion or detection of cyber attacks on personal data of students, from which it can be concluded that the level of awareness of masters of education is very high. To the question of whether they protect students' personal data better than their own, masters of education on a scale from 1 (I do not agree at all) to 5 (I completely agree) answered with a high score of 4.25. Additionally, the data on the percentage of individual grades shows that 77% of masters of education claim that they protect students' personal data better than their own, giving a score of 4 and 5, which also contributes to the conclusion of high awareness of the need to protect students' personal data.

%					M	SD
1	2	3	4	5		
2,0	2,9	18,0	22,9	54,3	4,25	0,98

Table 5: Assessment of masters of education on student data protection in relation to their own
(Source: Authors' research)

When asked if they verify the security of their email account on the "Have I been pwned?" website, over a quarter of respondents (23%) say they are unaware of such a service, while 38% of masters of education say they do not check whether their email address has been compromised. A small percentage of respondents (21%) check when they detect an e-mail threat, and 14% of masters of education check when they receive an e-mail that appears to be threatening to them. Only 4% of masters of education who took part in the poll said they check their e-mail address for possible compromise on a regular basis.

Figure following on the next page

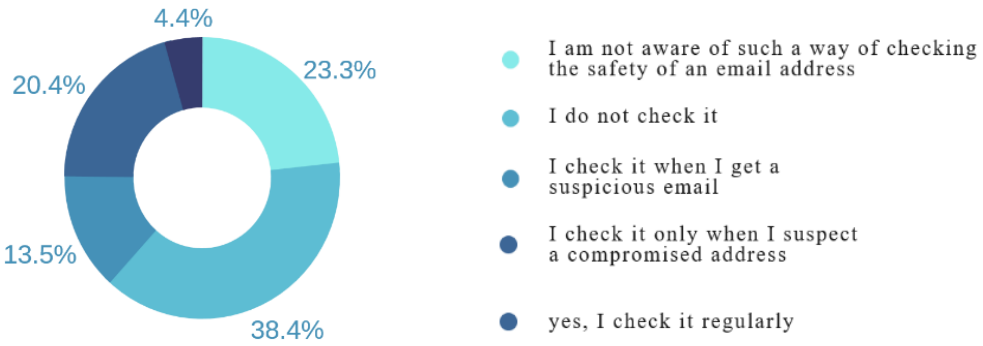

Figure 4: Compromised Email Address Check
(Source: Authors' research)

The majority of masters of education (70%) working in elementary schools in the Republic of Croatia who participated in the research were not victims of identity theft or any other type of data misuse, according to the results displayed in Figure 5. A small percentage of respondents (14%) are unsure whether they have been victims of personal data theft, while 16% say they have been victims of personal data, identity theft, or other forms of data misuse.

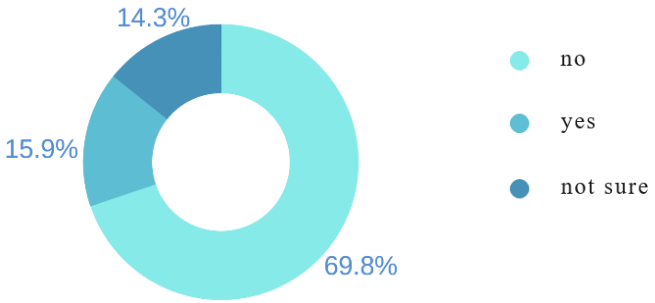

Figure 5: The percentage of responders who were victims of personal data theft
(Source: Authors' research)

3.5. Masters' of education knowledge and application of cyber security knowledge

The masters of education who took part in the study rated their understanding of cyber security on a scale of 1 to 5 (lowest to highest). The average ranking for their level of cyber security expertise is a poor 3.35. Furthermore, the percentage figures show that the majority of respondents (76%) evaluated their level of awareness regarding cyber security as 3 or 4, while only 9% believe their level of knowledge is the highest.

%					M	SD
1	2	3	4	5		
3,3	12,2	39,2	36,7	8,6	3,35	0,92

Table 6: Assessment of cyber security knowledge of masters of education
(Source: Authors' research)

When it comes to the application of cyber security knowledge, masters of education give assessments that are nearly indistinguishable from assessments of their degree of knowledge on a scale of 1 to 5.

The average score is 3.45, with the majority of respondents (75%) giving their knowledge application ratings of 4 or 5, and only 12% believing they fully apply their cyber security knowledge.

%					M	SD
1	2	3	4	5		
2,9	10,6	36,7	37,6	12,2	3,45	0,94

Table 7: Assessment of the application of cyber security knowledge of masters of education (Source: Authors' research)

4. CONCLUSION

The acts and behaviors in cyberspace, as well as their level of cyber security, were linked using the findings of a study of 245 masters of education who work as primary school teachers in the Republic of Croatia. Only one-fifth of the surveyed masters of education use passwords consisting of 10 or more characters of combinations of letters and numbers, from which it can be concluded that 80% of masters of education are exposed to cyber attacks every day by using weaker passwords thus becoming vulnerable and exposed to cyber attacks in virtual space. More than half of masters of education update their passwords only when they sense a probable threat, indicating that they do not pay enough attention to regular password changes. Regular content backup is a critical process for content protection that nearly half of the respondents do not practice at all, implying that they expose their data and content to cyber risks, attacks, and potential for compromise. Given the results that reveal the high frequency of activities of masters of education on social networks and applications for free messaging, insufficient implementation of security measures for the protection of devices and content provides a persistent risk of attack on their personal data. According to research, at least a third of masters of education engage in behaviors that leave them vulnerable and easy targets for cyber attacks, as indicated by the fact that 30% of them have been victims of identity theft or are unsure whether they have been victims of identity stolen data. The findings of the study reveal that masters of education have a high level of knowledge of the need to protect students' personal data as a result of legislation, as well as their willingness to act in the event of a threat to students' personal data. These findings demonstrate that masters of education are aware of their obligations and are highly professional. The results of the assessment of knowledge and application of knowledge on cyber security of masters of education obtained by this study are almost indistinguishable, but their average value indicates the need to include in systematic education that would be institutionalized and mandatory at the level of the entire education system with the aim of raising the level of cyber hygiene. The results of this research can form the basis for designing a conceptual framework for educational programs in the field of personal cyber security management of educators.

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