SIXTH INTERNATIONAL SCIENTIFIC-BUSINESS CONFERENCE
LIMEN 2020

Leadership, Innovation, Management and Economics:
Integrated Politics of Research

SELECTED PAPERS

Online-Virtual
November 26, 2020

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TESTING THE WEAK FORM OF EFFICIENT MARKET HYPOTHESIS: EMPIRICAL EVIDENCE IN THE CONTEXT OF THE COVID-19 PANDEMIC

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Abstract: *The COVID-19 outbreak caused several concerns all over the world. On January 30, 2020, the World Health Organization (WHO) declared it a global health emergency. This outbreak leads to a drastic change in people's lifestyles, causing lots of job losses all over the world and threaten the livelihood of millions of people since the firms closed to avoid virus propagation. In general, all economic activities were interrupted, and the stock markets had significant breaks. Due to these events, this essay pretends to analyse the efficiency, in its weak form, in the stock market indexes of France (CAC40), China (SSEC), South Korea (KOSPI), Germany (DAX 30), Italy (FTSE MID), Portugal (PSI 20), and Spain (IBEX 35), in the period of December 31, 2019, to August 10, 2020. To accomplish this research, different approaches were taken to analyse whether: (i) the countries affected by the global pandemic (COVID-19) caused (in) efficiency in their stock markets? The results suggest that the hypothesis of random walk in all the markets under study was rejected. Variance ratios' values are, in all cases, lower than the unity, which implies that the returns are auto correlated over time, and there is a reversion to the mean, in all indexes. The exponents Detrended Fluctuation Analysis (DFA), indicate significant long memories, i.e. they validate the results of the non-parametric test of Wright (2000), which comprises two types of tests, the Position test (Rankings) for homoscedastic series, and the Signal test for heteroscedastic series. These findings show that prices do not fully reflect the information available and that changes in prices are not independent and identically distributed. This situation has implications for investors since some returns can be expectable, creating opportunities for arbitrage and abnormal earnings. These conclusions also open space for market regulators to take measures to ensure better information in these regional markets.*

Keywords: *Global pandemic, Efficiency, Arbitrage.*

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1. INTRODUCTION

In the last months, international financial markets have been seeing numerous successions of many setbacks, triggered by the COVID-19, followed by a series of collapses, the oil war, and currency fluctuations. The economic turbulence related to the pandemic of coronavirus in 2019-2020 has severe repercussions in the financial markets, specifically in the

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stock market, bonds, and commodities (including crude oil and gold). The main events were the oil price war between Russia and Saudi Arabia after the failure to reach an OPEC agreement, which led to the collapse of oil prices, and a significant fall in the stock markets in March (G.Sudha and V.Sornaganesh, 2020).

Investors who buy stocks in domestic and foreign markets seek to reduce risk through international diversification. Risk reduction occurs if the various markets are not perfectly correlated. The increasing correlation between markets during and after crises has restricted the possibilities for international diversification. From the investor's point of view, knowledge of the form and intensity of interdependence between different financial markets is vital for efficient hedging decisions to minimize the adverse effect of uncertainty on expected investment returns. Similarly, understanding the interdependence relationships between international stock markets facilitates the identification of diversification opportunities. The demise of barriers to investment in recent years has meant that many countries have undergone the process of integration both financially and economically. This leads to the benefits of international diversification being called into question mainly due to the various financial crises that have plagued financial markets around the world (Alexandre, Dias, and Heliodoro, 2020a; Alexandre et al., 2020b; Alexandre, Heliodoro, and Dias, 2019; Dias et al., 2020; Dias and Carvalho, 2020; Dias, da Silva, et al., 2019; Dias, Heliodoro, and Alexandre, 2020, 2019; Dias, Heliodoro, Alexandre, Santos, and Farinha, 2021; Dias, Heliodoro, Teixeira, and Godinho, 2020; Dias, Pardal, Teixeira, and Machová, 2020; Dias, Heliodoro, Alexandre, and Vasco, 2020b; Dias, Heliodoro, Alexandre, et al., 2020a; Dias and Pereira, 2021; Heliodoro, P., Dias, R., Alexandre, P., and Vasco, 2020; Heliodoro, P., Dias, R. and Alexandre, 2020; Heliodoro, Dias, and Alexandre, 2020; Pardal, P., Dias, R., Šuleř, P., Teixeira, N., and Krulický, 2020; Santos and Dias, 2020).

According to Şenol and Zeren (2020), the new coronavirus (Covid-19), puts human health at risk, increasing the perception of risk in financial markets. The impact of the 2020 pandemic causes big drops in the stock markets in a short period, the companies lost value, and the stock prices dropped. Because of these events, it is pertinent to study market efficiency, in its weak form, and test the predictability of stock market indexes in France (CAC40), China (SSEC), South Korea (KOSPI), Germany (DAX 30), Italy (FTSE MID), Portugal (PSI 20), and Spain (IBEX 35), from December 31, 2019, to August 10, 2020. The results reject the *random walk* hypothesis in all markets. Variance ratios are, in all cases, lower than the unit, which implies that the returns are auto correlated over time and, there is a reversion to the mean, in all indexes. The exponents *Detrended Fluctuation Analysis (DFA),* indicate significant long memories, i.e. they validate the results of the non-parametric test of Wright (2000).

This investigation adds contributions to the literature, namely in the study on market efficiency, in its weak form, in-stock indexes from different regions, such as Asia and Europe. As far as we know, this is the first study that crosses European and Asian markets and estimates the possibility that these markets will have long memories, which may cause opportunities for arbitrage and abnormal earnings, without the investors incurring additional risk. Additionally, we identified studies that investigated the impact of the 2020 global pandemic on financial markets, namely from authors as He, Liu, Wang, and Yu (2020), Sansa (2020), Corbet, Larkin, and Lucey (2020), Ali, Alam, and Rizvi (2020), Naidenova, Parshakov, and Shakina (2020). However, their approach was very different from the one that we will follow in this essay.

In terms of structure, this essay consists of 5 sections. Section 2 presents a Literature Review regarding articles on the hypothesis of an efficient market in international financial markets.

Section 3 describes the methodology and data. Section 4 contains the results and section 5 concludes.

2. LITERATURE REVIEW

The theme regarding the efficient market hypothesis (EMH) has motivated several studies to analyse the implications on the efficient market hypothesis, according to which the current price of the assets reflects all the information available, at a given moment. The price adjusts quickly, as new and unforeseen information comes to the market (Fama and French, 1988).

Ayentimi, Mensah, and Naa-Idar (2013), El Khamlichi, Sarkar, Arouri, and Teulon (2014), Sümer (2016) tested the *random walk* hypothesis in the financial markets. Ayentimi, Mensah, and Naa-Idar (2013) analysed the efficiency, in their weak form, in Ghana's value stock market (GSE), and show that the financial market data series exhibits volatility associated with GSE inefficiency. El Khamlichi et al. (2014) show that Islamic indices have the same level of (in) efficiency as benchmarks, but the MSCI and FTSE indices are less inefficient. Sümer (2016), on the other hand, shows that Turkey's financial markets, shares, foreign exchange, and the price of gold is efficient, in their weak form.

Robinson (2016), Fusthane and M (2017), Filipovski and Tevdovski (2018), Fernando and Gunasekara (2018), Chaker and Sabah (2018), shows signals of (in) efficiency, in their weak form in the financial markets. Robinson (2016) analysed the Jamaican stock market (JSE), and make clear that the *random walk* hypothesis was rejected. Fusthane and M (2017) examined the Johannesburg stock market in terms of market efficiency. The authors indicate hybrid results. Filipovski and Tevdovski (2018) looked into ten European financial markets, and their findings show that these markets show characteristics of inefficiency in specific periods. Fernando and Gunasekara (2018) examined the CSE market (All Share Price Index), and show that this market shows signs of inefficiency. Chaker and Sabah (2018) tested the efficiency, in their weak form, in the markets of the United Arad Emirates (UAE), Saudi Arabia, Oman, Kuwait and Bahrain, showing that none of the analysed markets follow the *random walk* hypothesis.

Atac and Tas (2019), Olubiyi and Olopade (2019), Mphoeng (2019) examined the market efficiency, in its weak form. Atac and Tas (2019) investigated the Istanbul stock exchange, and have shown that the efficiency hypothesis is rejected. Olubiyi and Olopade (2019)) researched the stock markets of OPEC member countries. The authors demonstrate through parametric and non-parametric tests that only the Qatar stock market is efficient, in its weak form. Mphoeng (2019) tests the efficient market hypothesis (EMH) on the Botswana stock exchange and indicates the (in) efficiency of this market.

He, Liu, Wang, and Yu (2020) examined the effects and repercussion of COVID-19 in the stock markets from the People's Republic of China, Italy, South Korea, France, Spain, Germany, Japan, and the United States. The authors show that COVID-19 has a negative shock in the short term, and that impact on stock exchanges causes bidirectional shocks between Asian, European, and American markets. Khan (2020) investigated the effect of the COVID-19 pandemic in the stock markets of sixteen different countries. However, once human-to-human transmissibility was confirmed, all stock exchanges reacted negatively to the news in both the short and long term. The authors argue that the Shanghai Composite Index market, which was severely affected by short-scale events, managed to readjust on long scales. This

indicates that the Chinese government's drastic measures to contain the spread of the pandemic have led to investors' confidence in the Shanghai stock exchange.

In summary, this work aims to contribute to the provision of information to investors and regulators in international stock markets, where individual and institutional investors seek diversification benefits, as well as helping to promote the implementation of policies that contribute to the efficiency of global markets. Therefore, the context of this work is to examine the market efficiency, in its weak form, and the predictability of these stock markets during the global pandemic (COVID-19).

3. METHODOLOGY

DATA

The analysed data are related to the stock indexes from France (CAC40), China (SSEC), South Korea (KOSPI), German (DAX 30), Italy (FTSE MID), Portugal (PSI 20), and Spain (IBEX 35), between the period of December 31, 2019, and August 10, 2020. The quotations are daily and obtained from the *Thomson Reuters* platform, and quoted in the local currency, to mitigate exchange rate distortions.

Table 1. The names of countries and their indices used in this paper

Country	Index
France	CAC 40
China	SSEC
South Korea	KOSPI
Germany	DAX 30
Italy	FTSE MID
Portugal	PSI 20
Spain	IBEX 35

Source: Own elaboration

METHODOLOGY

The development of this research took place through different stages. At the first stage, we used a descriptive statistic, as well as Jarque and Bera (1980) adherence test, to verify if the data follow a normal distribution. To estimate the evolution of the markets under analysis, we made graphics in terms of levels and returns, and additionally, we tested the stability of the residuals. To verify the possible existence of structural breaks, we used Clemente et al. (1998) test. To examine the *random walk* hypothesis we used the non-parametric test developed by Wright (2000) because it is a more resilient test to time series that do not show normality and is entirely consistent when they show a series correlation. This author's methodology consists of two types of tests, the Position test (Rankings) for homoscedastic series, and the Signal test for heteroscedastic series. The ratio of variances is given by the relationship between the variance of q periods and a single period, the same being equal to 1. Thus, in the test of the variance ratio, under the null hypothesis $VR(q) = 1$, the series follows a *random walk* type process. When the hypothesis of randomness is rejected and $VR(q) > 1$, the series indicates the existence of a positive correlation. When the null hypothesis is rejected and $VR(q) < 1$, the series shows a negative series correlation. In order to validate results, we will use *Detrended Fluctuation Analysis (DFA). DFA* is an analysis method that examines time dependency on non-stationary data series. This technique, assuming that the time series are non-stationary,

avoids spurious results when the analysis focuses on the relationships of the data series in the long run. The *Detrended Fluctuation Analysis (DFA)* presents the following interpretation:

Table 2. Detrended Fluctuation Analysis (DFA)

Exponent	Type of signal
$\alpha_{DFA} < 0.5$	long-range anti-persistent
$\alpha_{DFA} \simeq 0.5$	uncorrelated, white noise
$\alpha_{DFA} > 0.5$	long-range persistent

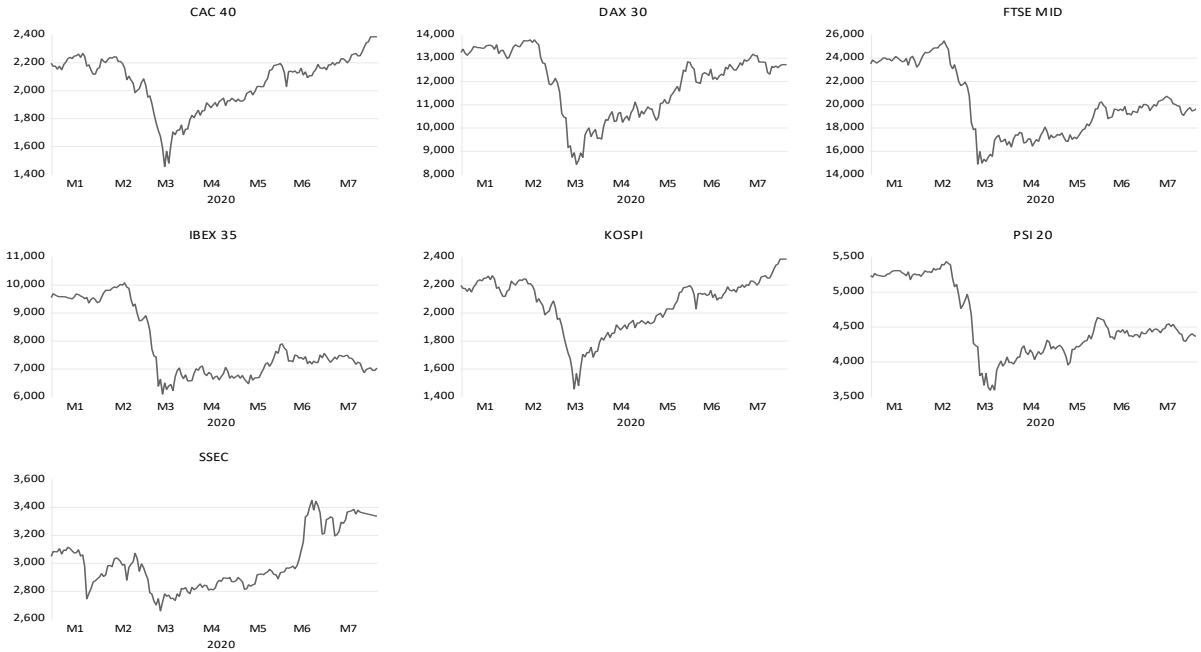
Source: Own elaboration

For a better analysis of the DFA methodology see the authors' articles Dias, da Silva, and Dionísio (2019), Dias, Heliodoro, Alexandre, and Vasco (2020), Dias, Heliodoro, and Alexandre (2020), Alexandre, Dias, and Heliodoro (2020), Santos and Dias (2020).

4. RESULTS

Figure 1 shows the evolution of the seven markets in the analysis by level. The data in the sample consists of the time-lapse between December 31, 2019, and August 10, 2020, which is a challenging period, due to understanding the outbreak of the global pandemic (COVID-19). Returns reveal volatility in February, March, and April 2020.

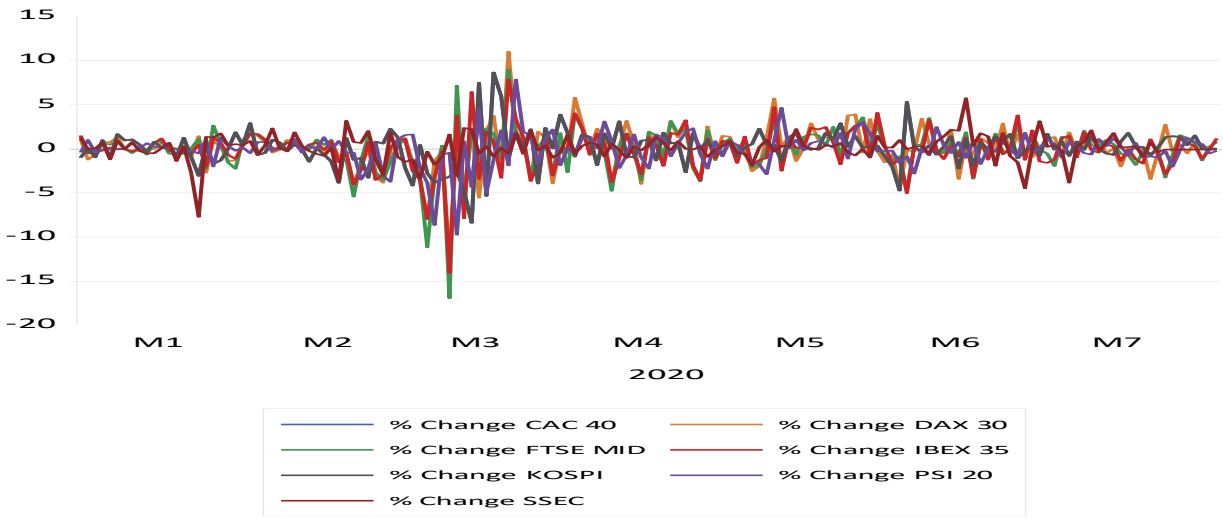
Figure 1. Evolution, in levels, of the 7 financial markets, in the period between 12/31/2019 to 8/10/2020.



Source: Own elaboration

Figure 2 shows the evolution, in %, of the differences of the 7 financial markets in analyses. In all series, there is a relatively high dispersion around the mean, as well as a relatively synchronized behaviour between the data series. Through graphical analysis, there is high volatility, especially in February, March, and April 2020.

Figure 2. Evolution, in% of the differences, of the 7 financial markets, in the period between 12/31/2019 to 8/10/2020



Source: Own elaboration

Table 3 presents the main descriptive statistics of the financial market under analysis and allows us to verify that the returns of the financial markets in Germany (DAX30), Italy, (FTSE MID), Spain (IBEX 35) and Portugal (PSI 20) show positive means daily. On the other hand, the stock indexes from France (CAC 40), South Korea (KOSPI), and China (SSEC) show negative means. Asymmetry characteristics are negative, with a greater emphasis on the Italian market (-2.5187). Additionally, the asymmetry and kurtosis coefficients are statistically different from those of a normal distribution, and these indications corroborate with the Jarque and Bera test (1980) where the hypothesis that the data follow a normal distribution is rejected at the level of significance of 1%.

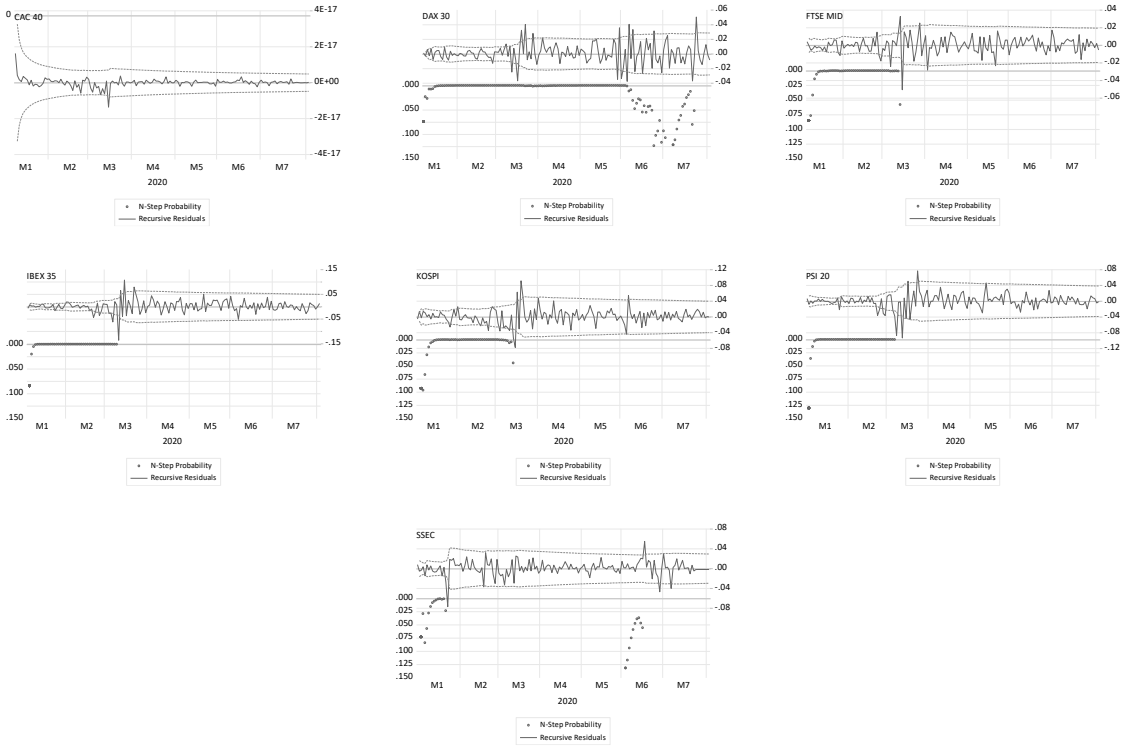
Table 3. Descriptive statistics, on returns, of the 7 financial markets under analysis, in the period between 12/31/2019 to 10/08/2020.

	CAC 40	DAX 30	FTSE MID	IBEX 35	KOSPI	PSI 20	SSEC
Mean	0.000528	-0.000258	-0.001146	-0.001963	0.000528	-0.001164	0.000577
Std. Dev.	0.020619	0.024387	0.026735	0.024760	0.020619	0.019281	0.014702
Skewness	-0.146481	-0.836405	-2.518785	-1.551275	-0.146481	-1.297632	-1.172333
Kurtosis	7.059304	9.846145	18.87769	11.86179	7.059304	11.16042	9.844528
Jarque-Bera	107.6646***	322.8419***	1803.609***	573.0211***	107.6646***	476.6305***	340.2427***
Sum	0.082380	-0.040262	-0.178760	-0.306157	0.082380	-0.181523	0.089949
Sum Sq. Dev.	0.065896	0.092182	0.110792	0.095020	0.065896	0.057624	0.033504
Observations	156	156	156	156	156	156	156

Source: Own elaboration

Figure 3 shows the stability tests carried out on the residuals of Europe's stock markets to corroborate the presence of structural breaks. The determination of the structural break is relevant, as it has a potentially unwanted effect on that of the unit-roots. Through graphical analysis, we can gauge the existence of disturbances in the variation. Additionally, when examining the graphs and the 95% probability limits, we verified the presence of a violation of the probability limits. Therefore, the time series show unstable behaviour.

Figure 3. Stability tests performed on the residuals of the 7 financial markets, in the period between 12/31/2019 to 10/08/2020.



Source: Own elaboration

Table 4 shows the results of the unit root tests with structure breaks, by Clemente et al. (1998), and we can easily see that the financial markets showed structural breaks in March 2020, except for the Chinese market. The results are in line with the findings of the authors Alexandre, Dias, and Heliodoro (2020), Heliodoro, P., Dias, R., Alexandre, P., and Vasco (2020), Dias, Heliodoro, Alexandre, and Vasco (2020), Dias, Heliodoro, Teixeira, and Godinho (2020), Dias, Heliodoro, and Alexandre (2020), G.Sudha and V.Sornaganesh (2020), Lahmiri and Bekiros (2020), which indicate sharp declines in the international financial markets, resulting from the global pandemic (COVID-19).

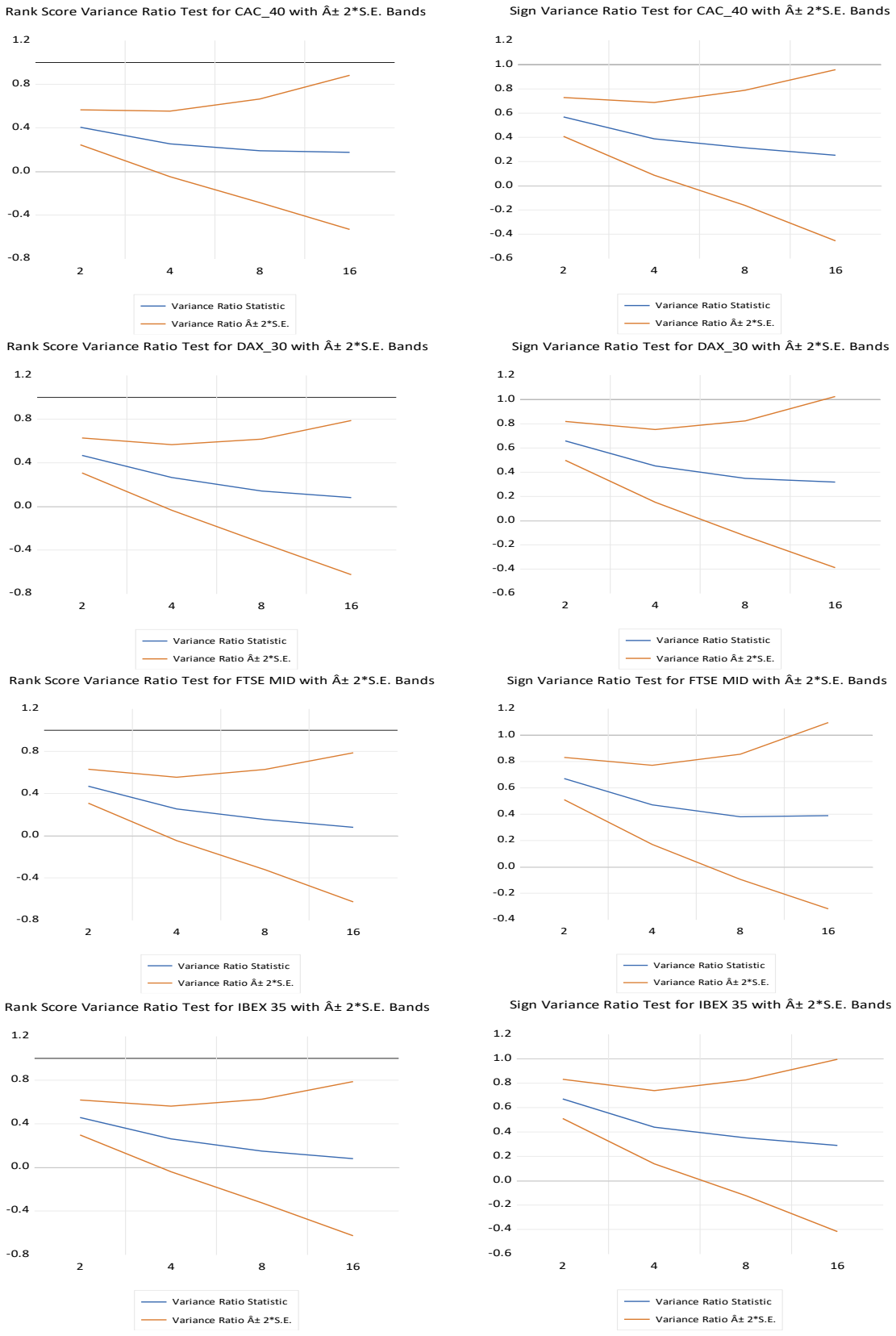
Table 4. Unit root tests, with structural breaks, by Clemente et al. (1998), referring to the 7 financial markets in the full period

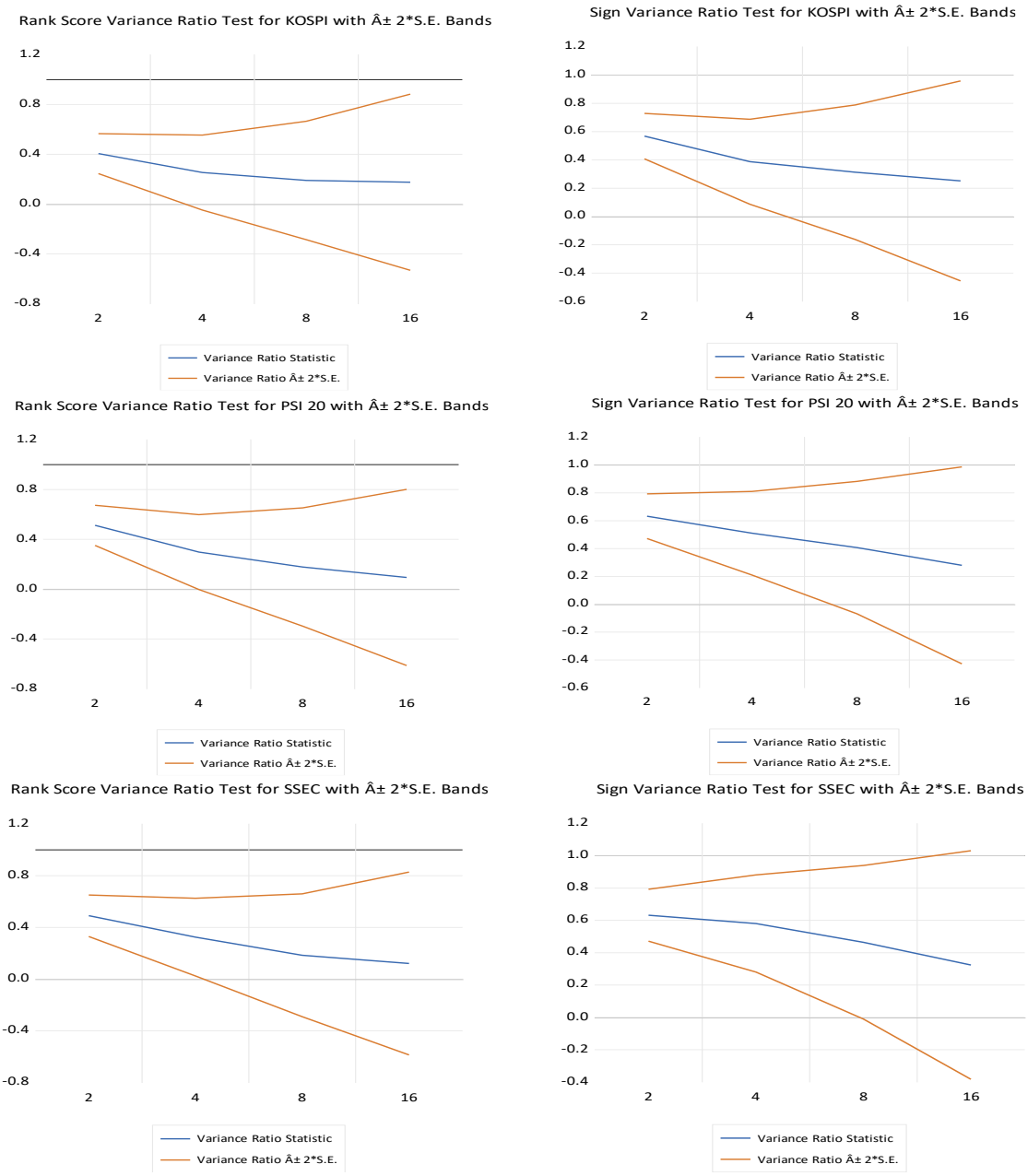
Index	t-stat	Break Date
CAC 40	-15.92(0)***	16/03/2020
SSEC	**-13.69(0)*** **	**23/01/2020**
KOSPI	-15.92(0)***	16/03/2020
DAX 30	-13.99(0)***	11/03/2020
FTSE MID	-16.59(0)***	11/03/2020
PSI 20	-13.41(0)***	09/03/2020
IBEX 35	-14.01(0)***	13/03/2020

Note: Lag Length (Automatic Length based on SIC). Break Selection: Minimize Dickey-Fuller t-statistic. The lateral values in parentheses refer to lags. ***. **. *. represent significance at 1%. 5% and 10%. respectively.

Source: Own elaboration

Figure 4. Wright's (2000) Variance Ratio test of Rankings and Signals, referring to the 7 financial markets, in the full period.





Source: Own elaboration

Wright's (2000) non-parametric methodology, which includes the Variance-Ratio tests using Ranks and Signs, were calculated between the period of December 2019 and July 2020 for 2,4,8 and 16 days lags. Taking into account the results of the variance test by Rankings of Wright (2000), the hypothesis of *random walk* is rejected in all indexes. In turn, the Signal test also corroborates a rejection of the *random walk* hypothesis, in all data series. The values of the variance ratios are, in all cases, lower than the unit, which implies that the returns are autocorrelated over time and, there is a reversion to the mean, in all indexes. The results obtained allow the rejection of the *random walk* hypothesis and the informational efficiency hypothesis of the financial markets, being consistent with those obtained in other studies, namely the authors Robinson (2016), Fusthane and M (2017), Filipovski and Tevdovski (2018), Fernando and Gunasekara (2018), Chaker and Sabah (2018), who show signs of (in) efficiency, in their weak form, in the financial markets.

The results of the DFA exponents, which we can see in table 5, can verify that all financial markets indicate long memories, that is, there is a propensity for the forecast of the stock market yields. These findings imply that prices do not fully reflect the information available and that changes in prices are not independent and identically distributed. These findings are in line with the evidence suggested by the authors Atac and Tas (2019), Olubiyi and Olopade (2019), Mphoeng (2019) that show inefficiency, in its weak form, which allows investors to have abnormal gains without incurring increased risk.

Table 5. DFA exponent for index and return. The values of the linear adjustments for α DFA always had R2 > 0.99.

Stock market	DFA exponent (Covid-19 period)
CAC 40	0.64 ≅ 0.0011***
SSEC	0.56 ≅ 0.0040***
KOSPI	0.63 ≅ 0.0059***
DAX 30	0.63 ≅ 0.0048***
FTSE MID	0.66 ≅ 0.0060***
PSI 20	0.67 ≅ 0.0002***
IBEX 35	0.63 ≅ 0.0064***

Note: The hypotheses are H_0: α = 0.5 and H_1: α ≠ 0.5**.** ***. **. *. represent significance at 1%. 5% and 10%. respectively.

Source: Own elaboration

5. CONCLUSION

The general conclusion to be retained and supported by the results obtained, through tests carried out with econometric and mathematical models, demonstrate that the global pandemic has a significant impact on the memory properties of the analysed markets. The results suggest the rejection of the *random walk* hypothesis in all markets. The values of the variance ratios are, in all cases, lower than the unit, which implies that the series of returns show a correlation in a negative series, and there is a reversion to the mean, in all indexes. The *Detrended Fluctuation Analysis* (*DFA*) exponents indicate significant long memories; that is, they validate the results of Wright (2000) non-parametric test. In conclusion, we consider that prices do not fully reflect the information available and that changes in prices are not independent and identically distributed. This situation has implications for investors since some returns can be expectable, creating opportunities for arbitrage and abnormal earnings. These conclusions also open space for market regulators to take steps to ensure better informational information in these regional markets.

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RISK DIVERSIFICATION IN ASEAN-5 FINANCIAL MARKETS: AN EMPIRICAL ANALYSIS IN THE CONTEXT OF THE GLOBAL PANDEMIC (COVID-19)

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Abstract: *The World Health Organization (WHO) has designated the new coronavirus infection as a global pandemic, based on the risk of contagion, and the number of confirmed cases in more than 195 countries. COVID-19 has an intense impact on the global economy, resulting from uncertainty and pessimism, with adverse effects on financial markets. Due to these events, this essay aims to estimate if the portfolio's diversification is feasible in the financial markets of Indonesia, Malaysia, Philippines, Singapore, and Thailand (ASEAN-5), in the context of the global pandemic (Covid-19), regarding the period of July 1, 2019, to July 22, 2020. To achieve such an analysis, is intended to provide answers for two questions, namely: i) the global pandemic (Covid-19) has accentuated financial integration between the ASEAN-5 markets? ii) If so, can the persistence of returns affect the risk diversification of portfolios? The results obtained suggest that those regional markets present accentuated levels of integration. However, the Singapore's stock market index does not show any level of integration, indicating that the implementation of portfolio's diversification strategies can be considered; however, the same can no longer be evident for the other ASEAN-5 markets. Additionally, we verified that the ASEAN-5 markets indicate persistence in returns, that is, the presence of accentuated long memories, except for the Singapore market (SGX). These findings show that prices do not fully reflect the information available and that changes in prices are not independent and identically distributed. This situation is found for investors, since some returns can be expected, creating opportunities for arbitrage and abnormal earnings. Corroborating the trendless cross-correlation coefficients (λ_{DCCA}), proven evidence coefficients, mostly, suggest the existence of risk transmission between markets. In conclusion, the authors seek that the implementation of an efficient diversification strategy for portfolios requires agreement with the controversial application. These conclusions also open space for the regulators of these regional markets to take measures to ensure better information between these markets and international markets.*

Keywords: *ASEAN 5, Covid-19, Financial integration, Portfolio risk diversification.*

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1. INTRODUCTION

The outbreak of COVID-19 has caused global concern. On January 30, WHO declared it a global health emergency. The natural spread of this virus has created uncertainty in the worldwide population. This epidemic has also changed people's lifestyles; caused job losses and threatened the livelihood of millions of people as companies closed to control the spread of the virus. Globally, the quick spread of the coronavirus (Covid-19) has had devastating impacts on the global economy, and consequently on financial markets worldwide (Zhang, Hu, and Ji, 2020; Ali, Alam, and Rizvi, 2020).

Globalization has accentuated the synchronization between international financial markets, which has shown that the correlation between international financial markets has increased, particularly in periods of extreme volatility. If a given stock market is strongly linked to the stock market of another country, the financial stability of the former depends, in part, on the financial stability of the latter. For this reason, a close or strong link between markets increases levels of vulnerability to external shocks and, as a result, influences the economic conditions and welfare levels of the respective countries, as well as the efficiency of the market itself (Alexandre, Dias, and Heliodoro, 2020a, 2020b; Alexandre, Heliodoro, and Dias, 2019; Dias et al., 2020; Dias and Carvalho, 2020; Dias, da Silva, and Dionísio, 2019; Dias, Heliodoro, and Alexandre, 2020a, 2019; Dias, Heliodoro, Alexandre, Santos, and Farinha, 2021; Dias, Heliodoro, Teixeira, and Godinho, 2020; Dias, Pardal, Teixeira, and Machová, 2020; Dias, Heliodoro, Alexandre, and Vasco, 2020b; Dias and Pereira, 2021; Heliodoro, P., Dias, R., Alexandre, P., and Vasco, 2020; Heliodoro, Dias, and Alexandre, 2020; Pardal, P., Dias, R., Šuleř, P., Teixeira, N., and Krulický, 2020; Santos and Dias, 2020).

The integration of global equity markets has been a topic that has been extensively analysed in recent decades, especially after the fall of stock exchanges, during the global financial crisis. Most studies have concentrated on developed markets, such as the USA, Western Europe and Japan, to the detriment of other regional markets, such as ASEAN-5 markets (Ben Rejeb and Boughrara, 2015; Dias, da Silva, and Dionísio, 2019).

The ASEAN represents the fourth largest commercial region in the world, the countries that makeup ASEAN-5 constitute 72.8% of ASEAN's population and 95.1% of its GDP. ASEAN's average annual rate of economic growth has been approximately 5% over the past two decades. China's recent economic growth and the signing of the Free Trade Agreement with ASEAN for the development of a single market has increased economic integration between ASEAN markets (Petri, Plummer and Zhai, 2012; Chachavalpongpun, 2018).

This investigation will test whether portfolio diversification is feasible in the financial markets of Indonesia, Malaysia, the Philippines, Singapore, and Thailand (ASEAN-5), in the context of the global pandemic (Covid-19), from July 1, 2019, to July 22, 2020. To achieve such an analysis, we intend to answer two questions, namely whether: i) the global pandemic (Covid-19) has accentuated financial integration between ASEAN-5 markets? ii) If so, can the persistence of returns undermine portfolio diversification? The results suggest that these regional markets have marked levels of integration, except for the Singapore stock market. Additionally, we found that the ASEAN-5 markets indicate persistence in returns, that is, the presence of long accentuated memories, except for the Singapore market (SGX). The trendless cross-correlation coefficients (λ_{DCCA}), show significant coefficients, mostly, suggesting the existence of risk transmission between markets. These results may call into question the implementation of efficient portfolio diversification strategies in these regional markets.

This research makes some contributions to the literature, namely the study on the diversification of portfolios in these regional markets (ASEAN-5), during the pandemic outbreak (Covid-19). As far as we know, this is the first study to analyse these financial markets in isolation. The preference for these ASEAN 5 financial markets can, therefore, be explained by the fact that they have unstable, rapidly developing economies and are thus linked by cultural heritage and some similar economic conditions. Besides that, after the recent financial crisis of 2008 in emerging international markets, and those of ASEAN-5, they have become a famous investment destination. In this context and bearing in mind the massive inflows of capital, it is of great importance to understand the interdependencies and links between these regional financial markets. However, there are recent studies that have investigated the impact of the global pandemic (Covid-19) on financial markets, namely studies by authors Ali, Alam, and Rizvi (2020), Sansa (2020), He, Liu, Wang, and Yu (2020), but the approach was different and fell on other financial markets.
This essay is structured in 5 sections. Section 2 presents the Literature Review regarding articles on integration in the financial markets, section 3 describes the methodology and the data, section 4 shows the results; finally, in section 5 the general conclusions of the work are presented.

2. LITERATURE REVIEW

The understanding of the international links between stock markets and investigation of the occurrence of financial integration phenomena, in the context of stock market crashes, is essential for investors, investment fund managers and academics in several aspects, namely in the diversification of portfolios in the context of international (Dias, da Silva, and Dionísio, 2019).

Oh et al. (2010) argue that the benefits of portfolio diversification in the ASEAN-5 markets are reduced as the markets increase their integration in the post-crisis. Auer and Mehrotra (2014) claim that the increase in integration caused moving emotions. The authors point out that true integration through the supply chain is essential for asset price dynamics in the Asia-Pacific region. However, authors Boubakri and Guillaumin (2015) develop that East Asian stock markets were partially segmented, except for Japan, until 2008. However, the last few years have been characterised by a marked level of integration financial.

Hung (2019), Wu (2019), Sanusi, Singagerda, and Septarina (2019), investigated risk diversification in Asian markets. Hung (2019) shows that the volatility of the Chinese market has had a significant impact on other markets, suggesting that the stock markets are more integrated due to the financial crisis. However, the authors Sanusi, Singagerda, and Septarina (2019) demonstrate the presence of long memories in ASEAN markets, which may be beneficial for investors, as these markets show some predictability. Wu (2019) suggests that integration is not accentuated in the stock markets of East and Southeast Asia, although the governments of that region are promoting financial integration in these regional markets.

Gulzar et al. (2019), Moagar-Poladian, Clichici, and Stanciu (2019), Jawadi, Chlibi, and Cheffou (2019), Salisu, Ndako, Adediran, and Swaray (2020) analysed the integration in the financial markets and tested the diversification hypothesis of wallets. Gulzar et al. (2019) examined the financial markets of India, China, Pakistan, Malaysia, Russia, South Korea, and the U.S., and evidenced the existence of long-term integration between the U.S. market and emerging stock markets, in the CFG post. Moagar-Poladian, Clichici, and Stanciu (2019) show that the Central and Eastern European markets have shown a significant level of integration

during the European financial crisis. However, the authors Jawadi, Chlibi, and Cheffou (2019) show that the MENA and BRIC´s markets are segmented with the North American market, while the G6 markets demonstrate integration. Salisu, Ndako, Adediran, and Swaray (2020) analysed integration in Islamic markets, and showed that markets are integrated, and that this behaviour can be influenced by global economic conditions.

Caporale, Gil-Alana, and Poza (2020), Milos, Hatiegan, Milos, Barna, and Botoc (2020) analysed the stock markets in Central Europe. Caporale, Gil-Alana, and Poza (2020) suggest that these regional markets have marked levels of integration, which may jeopardize the portfolio's diversification. Milos, Hatiegan, Milos, Barna, and Botoc (2020) verified the presence of long memories and long-term correlations, showing that the inefficient stock markets, in their weak form, have not yet reached a mature stage of development.

In summary, this work aims to contribute to the provision of information to investors and regulators in the ASEAN-5 markets, where individual and institutional investors seek to efficiently diversify their portfolios, in a period of uncertainty and lack of confidence due to the global pandemic (Covid-19).

3. METHODOLOGY

DATA

For this study, we used daily data on prices' indices of Indonesia, Malaysia, Thailand, Singapore, and the Philippines markets, in the period from July 1, 2019, to July 22, 2020. The data was obtained from the Thomson Reuters database and is quoted in a local currency, to mitigate distortions in exchange rates.

Table 1. The name of countries and their indices used in this paper.

Country / Region name	Index
INDONESIA / ASEAN-5	JKSE
MALAYSIA / ASEAN-5	KLSE
PHILIPPINES / ASEAN-5	PSI
SINGAPORE / ASEAN-5	SGX
THAILAND / ASEAN-5	SET

Source: Own elaboration.

MODEL

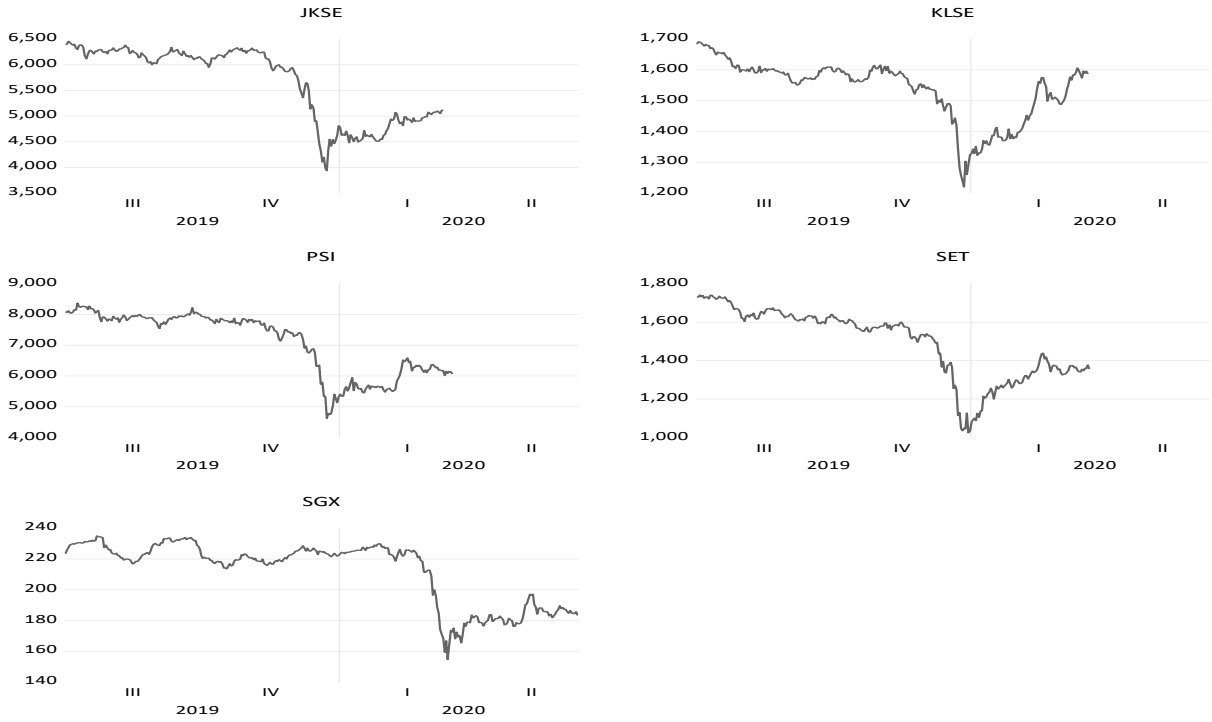
To assess the integration between the ASEAN-5 financial markets, we use the methodology of Gregory and Hansen (1996) that identifies breaks in structure. To validate results, we will use the method *Detrended Fluctuation Analysis* (DFA), and *Detrended Cross-Correlation Analysis* (DCCA). *DFA* is a method of analysis that examines the dependence of the temporal on nonstationary data series. This technique, assuming that the time series are nonstationary, avoids spurious results when the analysis focuses on the relationships of the data series in the long run. The *DFA* has the following interpretation: $0 < \alpha < 0{,}5$: anti-persistent series; $\alpha = 0{,}5$ series has a random walk; $0{,}5 < \alpha < 1$ persistent series. The function of this technique is to examine the relationship between the x_k and x_{k+t} values at different times (Guedes et al., 2018; Dias, da Silva, and Dionísio, 2019 Alexandre, Dias, and Heliodoro, 2020; Dias, Heliodoro, Alexandre, Santos, and Farinha, 2021; Dias, Heliodoro, and Alexandre, 2020; Dias, Heliodoro, Alexandre, and Vasco, 2020; Dias, Pardal, Teixeira, and Machová, 2020). The

Zebende (2011) non-trend cross-correlation coefficient is a method for quantifying the level of cross-correlation between two nonstationary time series. The coefficient is based on the *DFA* (Peng et al., 1994) and *DCCA* (Podobnik and Stanley, 2008) methods. The cross-correlation coefficient depends on the length of the box *s* (time scale). One of the advantages of this cross-correlation coefficient is centred on the possibility of measuring the correlations between two nonstationary time series at different time scales. The *DCCA* cross-correlation coefficient varies within the range $-1 \leq \rho DCCA \leq 1$, logically 1 means perfect cross-correlation, -1 means perfect anti-cross-correlation and 0 means that there is no correlation (Podobnik and Stanley, 2008).

RESULTS

Figure 1 shows the fluctuations, in levels, of the ASEAN-5 financial markets. The sample comprises the time horizon from July 1, 2019, to July 22, 2020, which is a period of considerable complexity, due to understanding the global pandemic (Covid-19). The financial market indices analysed to reveal the instability experienced in these markets in December 2019, February, and March 2020.

Figure 1. Evolution, in levels, of the 5 financial markets, in the full period



Source: Own elaboration.

Table 2 shows the main descriptive statistics for the ASEAN-5 markets, referring to the entire period of the sample. The average is negative in these stock indices, while the Philippine market (PSI) has the most accentuated standard deviation. Overall, the coefficients of asymmetry and kurtosis are statistically different from those of a normal distribution, being the same leptokurtic and asymmetric. Jarque-Bera test corroborated this evidence that rejected the null hypothesis, that is, the data series does not follow a normal distribution.

Table 2. Descriptive statistics, in returns, of the 5 financial markets, in the full period

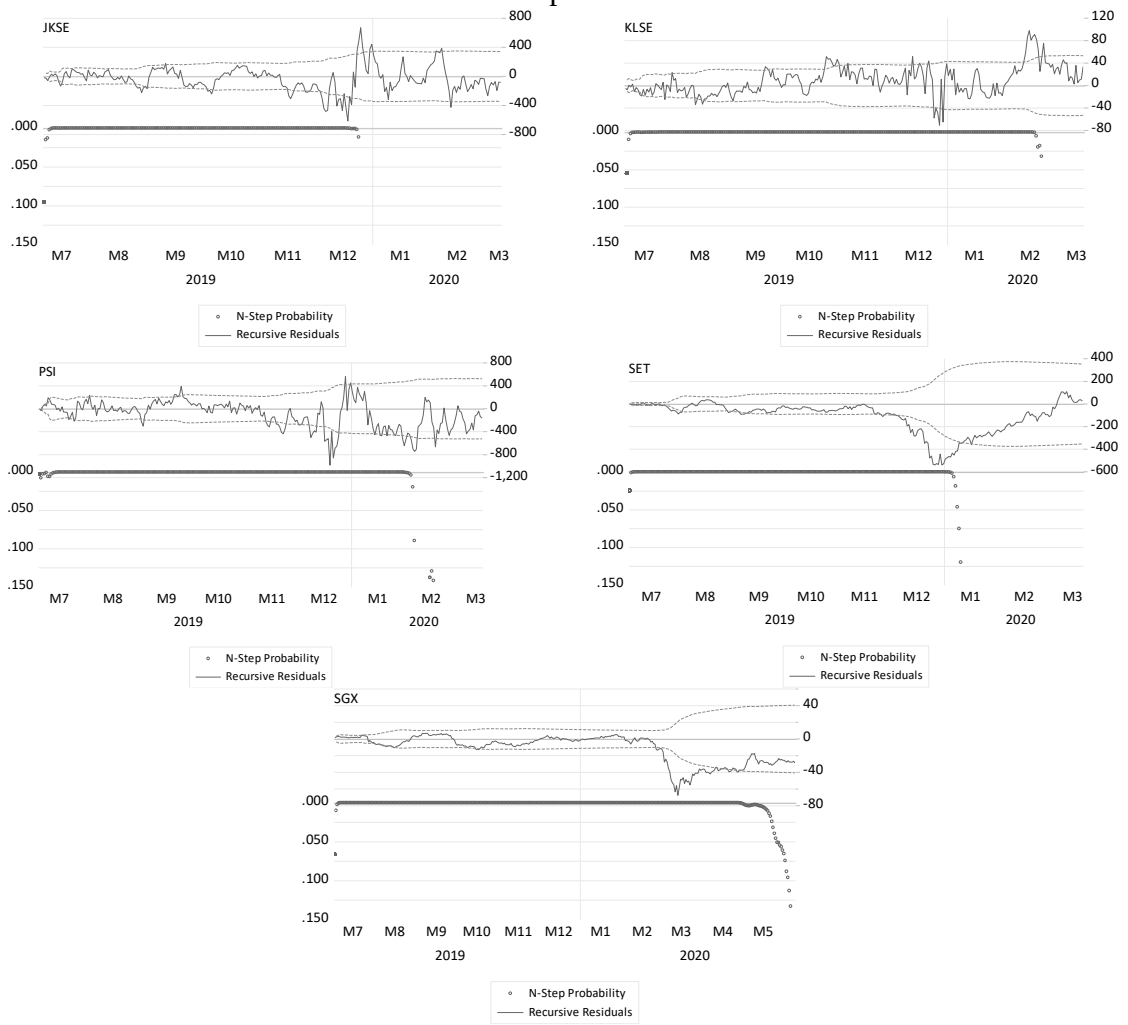
	JKSE	KLSE	PSI	SET	SGX
Mean	-0.000883	-0.000242	-0.001066	-0.000944	-0.001116
Std. Dev.	0.015270	0.010662	0.019986	0.017428	0.008801
Skewness	0.306405	-0.315486	-2.101792	-1.915440	-3.036991
Kurtosis	12.06136	13.01460	17.01937	17.34357	19.30368
Jarque-Bera	872.9533***	1065.640***	2267.086***	2332.710***	3203.609***
Sum	-0.224219	-0.061467	-0.270806	-0.239777	-0.283453
Sum Sq. Dev.	0.058989	0.028762	0.101057	0.076848	0.019597
Observations	263	263	263	263	263

Note: ***. **. represent significance at 1%, respectively.

Source: Own elaboration.

On figure 2 is shown the stability tests performed on the residues of the ASEAN-5 stock indexes, and it is easy to verify the presence of structural breaks. The existence of disturbances in the variance, and the failure to validate structural breaks in the data series, cause biased results in the estimation of the models, that is, there may be evidence of false positives and/or false positives. Also, we can assess the existence of a clear violation of the probability limits, which indicates the presence of stress in these stock markets.

Figure 2. Stability tests carried out on the residues of the ASEN-5 financial markets, in the full period



Source: Own elaboration.

Table 3 shows the results of the test by Clemente et al. (1998) that identifies structure breaks in the ASEAN-5 markets, in December 2019, that is, in the initial phase of the global pandemic (Covid-19), except for the Singapore market (SGX). The results are in line with the findings of the authors Ali, Alam, and Rizvi (2020), Ashraf (2020), which show significant structural breaks resulting from the global pandemic (Covid-19).

Table 3. Unit root tests, with structural breaks, referring to the ASEAN-5 financial markets, in the full period

Index	t-stat	Break Date
KLSE	-17.72(0)***	24/12/2019
PSI	-19.22(0)***	23/12/2019
JKSE	-15.20(0)***	24/12/2019
SGX	-19.01(0)***	15/03/2020
SET	-20.19(0)***	23/12/2019

Note: Lag Length (Automatic Length based on SIC). Break Selection: Minimize Dickey-Fuller t-statistic. The lateral values in parentheses refer to lags. ***. **. *. represent significance at 1%. 5% and 10%. respectively.

Source: Own elaboration.

Table 4. Gregory and Hansen integration tests, with structural breaks, referring to the ASEAN-5 financial markets, in the full period

Markets	t-statistic	Method	Lags	Break Date	Results
KLSE / PSI	-4.89*	Regime	2	21/04/2020	Integration
KLSE / JKSE	-5.33**	Trend	5	12/05/2020	Integration
KLSE / SET	-5.14**	Regime	1	27/05/2020	Integration
PSI / KLSE	-5.83***	Regime	4	27/02/2020	Integration
PSI / SGX	-4.78*	Regime	4	27/02/2020	Integration
PSI / SET	-5.87***	Trend	0	14/04/2020	Integration
JKSE / KLSE	-6.36***	Trend	5	21/02/2020	Integration
JKSE / PSI	-6.07***	Trend	2	21/02/2020	Integration
JKSE / SGX	-5.11**	Trend	5	21/02/2020	Integration
JKSE / SET	-5.77***	Trend	5	20/02/2020	Integration
SET / KLSE	-6.03***	Regime	5	27/05/2020	Integration
SET / PSI	-5.51***	Regime	3	14/04/2020	Integration
SET / JKSE	-5.15**	Trend	5	16/04/2020	Integration

Notes: The AIC information criterion was chosen. The critical values are found in Gregory and Hansen (1996). The asterisks ***, **, * indicate statistical significance at 1%, 5% and 10%, respectively.

Source: Own elaboration.

Table 4 shows the results of the Gregory-Hansen test (1996), and it is easy to detect 13 pairs of integrated markets (out of 20 possible). The Indonesian market (JKSE) is the stock index that most integrates (4 out of 4 possible), while the markets of Malaysia (KLSE), Philippines (PSI), and Thailand have 3 integrations (out of 4 possible). It should be noted that the Singapore market does not present any integration, which shows evidence regarding the implementation of efficient portfolio diversification strategies. The same can no longer be suggested for the remaining ASEAN-5 markets, which have robust levels of integrations. The breakdowns in the integration structure are different from the breakdowns seen in the markets themselves (December 2019), that is, the breakdowns occur in February, April, and May 2020. Studies corroborate these results by the authors Caporale, Gil -Alana, and Poza (2020), Milos, Hatiegan, Milos, Barna, and Botoc (2020), which show high levels of integration in the stock

markets, which calls into question the implementation of efficient trading strategies. These findings have important implications for the individual, institutional investors, portfolio managers, and policymakers.

Table 5 shows the results of the α *DFA* exponents, and we find that the ASEAN-5 markets indicate persistence in profitability, that is, the presence of long accentuated memories, except for the Singapore market (SGX). These findings show that prices do not fully reflect the information available and that changes in prices are not independent and identically distributed. This situation has implications for investors, since some returns can be expected, creating opportunities for arbitrage and abnormal earnings, contrary to assumed by the hypotheses of *random walk* and informational efficiency. These results are in line with the evidence suggested by the authors Sanusi, Singagerda, and Septarina (2019) that indicate the presence of long memories in the ASEAN markets, which may be beneficial for investors, as these markets show some predictability.

Table 5. DFA exponent for return. The values of the linear adjustments for α DFA always had $R^2 > 0.99$

Index	DFA exponent (Covid-19)
KLSE	0.60 ≅ 0.0019
PSI	0.61 ≅ 0.0026
JKSE	0.60 ≅ 0.0013
SGX	0.48 ≅ 0.0129
SET	0.62 ≅ 0.0012

Note: The hypotheses are H_0: α = 0.5 and H_1: α ≠ 0.5

Source: Own elaboration.

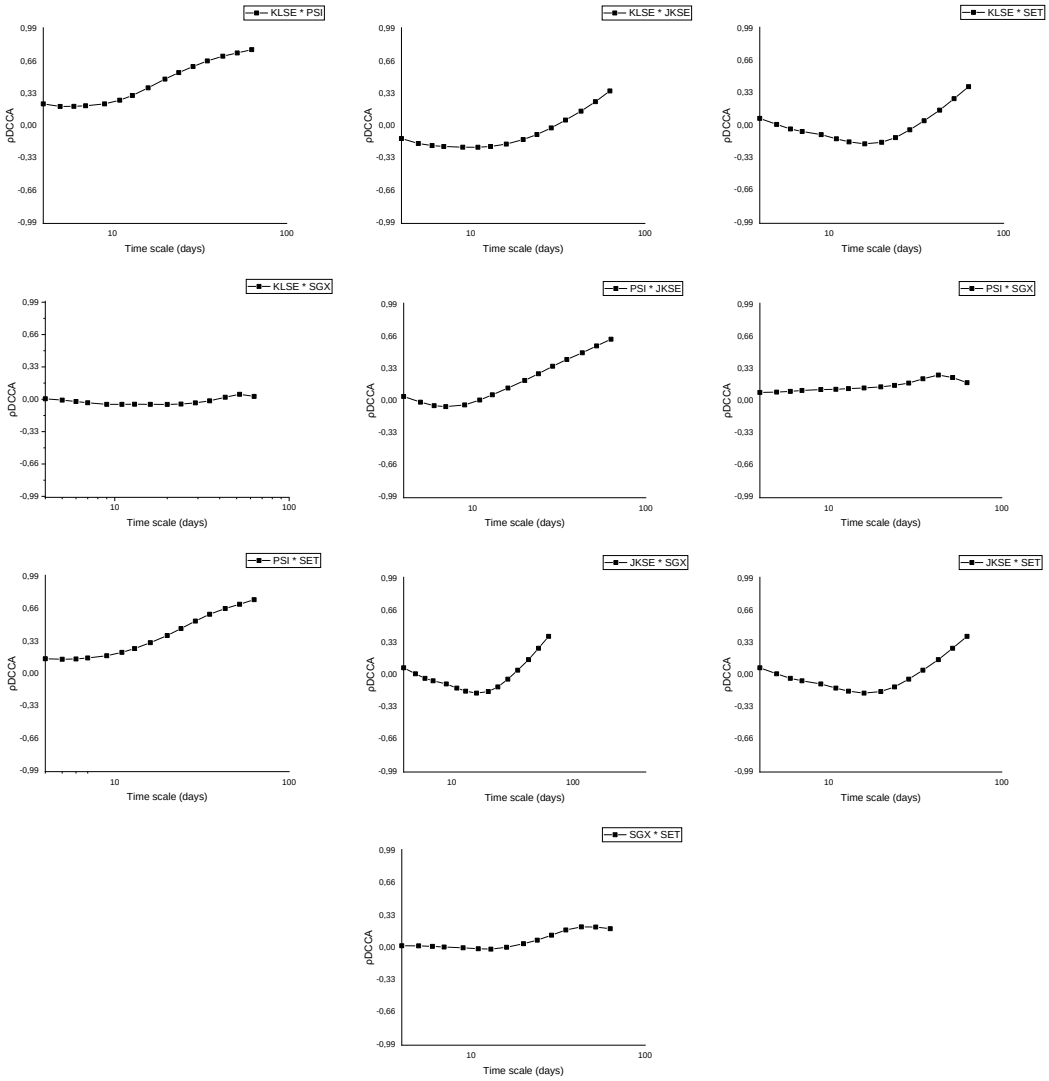
In table 6 we can see the cross-correlation coefficients without trend λ_{DCCA}, referring to the ASEAN-5 markets, from July 1, 2019, to July 22, 2020. The financial market pairs KLSE-PSI, KLSE-SET, PSI-JKSE, PSI-SET, have strong coefficients (λ_{DCCA}), while the pairs KLSE-JKSE, JKSE-SGX, JKSE-SET and SGX-SET have median correlation coefficients. This evidence may call into question the implementation of efficient portfolio diversification strategies. However, the stock market indices PSI-SGX, KLSE-SGX show a weak/null correlation, that is, the inverse of most markets (see figure 3).

Table 6. Summary table of the peaks ofλ_{DCCA}, coefficients, in the ASEAN-5 financial markets, in the full period

Index	Tendency	Time scale (days)	Index	Tendency	Time scale (days)
KLSE - PSI	Forte	n > 16	PSI / SGX	Weak	n > 16
KLSE - JKSE	Middle	n > 43	PSI / SET	Forte	n > 16
KLSE - SGX	Weak	n > 63	JKSE / SGX	Middle	n > 43
KLSE - SET	Forte	n > 43	JKSE / SET	Middle	n > 52
PSI / JKSE	Forte	n > 29	SGX / SET	Middle	n > 43

Source: Own elaboration

Figure 3. Evolution of the *Detrended Cross-Correlation Analysis* (DCCA) coefficients, of the ASEAN-5 in the full period



Source: Own elaboration.

5. CONCLUSION

The overall conclusion to keep, and sustained on the obtained results, through the tests made with econometric and mathematical models, suggests that these regional markets show high levels of integration. Despite that, Singapore's stock market index does not show any level of integration. In support of this, through the DFA model, we could verify that those regional markets show signs of market inefficiency, in their weak form. This situation brings implications to the investors, considering some returns may be expectable, raising arbitration and abnormal profits opportunities, against what is supposed by the random walk and the international efficiency hypotheses. The crossed correlation coefficient without tendency indicates, on its majority, significant coefficients, suggesting the existence of risk transmission between markets. Concluding, the authors suggest that the implementation of efficient wallet diversification strategies on these markets might be questionable. These conclusions also open a space for these regional markets' regulators to take actions to guarantee a better information exchange between these markets and the international markets.

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GREEN BONDS REPRESENTING GREEN FINANCE IN EUROPE – BASIC CHARACTERISTICS

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Abstract: *This study examines whether there is a negative green bond premium for investors in the secondary European market. To answer this question, the matched pairs method is applied, where the daily i-spreads of green bonds and the interpolated daily i-spreads of similar non-green bonds are compared. The bond sample contains 37 bond couples issued by corporations, financial institutions and governments between November 2019 and April 2020. The findings suggest that there is an average statistically significant negative very small green bond premium. The negative premium could be explained by investors' preferences for green financial instruments leading to excess demand. The negative green bond premium may also be a compensation for the issuer's external costs or reflect the internalization of environmental externalities. Further evidence shows that the negative green bond premium varies across industries and is not higher for lower rated investment grade bonds.*

Keywords*: Green, Bond, Green finance, Premium, Europe.*

INTRODUCTION

The fight against global warming and climate change is one of the greatest challenges humankind is facing in this century. The frequency of climate disasters and structural inequalities in the world are increased. To counteract climate change, the Paris Agreement was signed at the 21st Conference of Parties (COP21). Its main goal is to keep the global temperature well below 2 °C above pre-industrial levels. Thus, radical changes in energy, transport, construction and water infrastructure are needed, as these industries are responsible for over 60% of the greenhouse gases produced (OECD (2018)). The Organisation for Economic Co-operation and Development (OECD) estimates that investments in the region of USD $6.9 trillion will be needed for the global infrastructure to meet the sustainable development goals of the Paris Agreement. Government budgets are unable to produce or make available such sums on their own. Therefore, private investments are required. One option for funding such infrastructural changes is 'green finance' and herein green bonds (OECD (2018)).

Green bonds are playing an increasingly important role in the financial market and are actively contributing to the fight against climate change, which is of great interest to investors, bond issuers and policymakers. For these reasons, it is relevant to understand the nature of green bonds and to contrast them to conventional bonds, especially in terms of yield performance. The underlying research question of this study is: How do green bonds differ from conventional

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bonds? Previous green bond studies have shown that there is mostly a negative green bond premium, thus, investors forgive some returns if investing green. Preclaw and Bakashi (2015) and Ehlers and Packer (2017) suggest that there is a green bond premium of -17 basis points (bps) and -18 bps p.a., respectively. Zerbib (2019) documents a green bond premium of -2 bps p.a., whereas Hachenberg and Schiereck (2018) do not find a significant green bond premium. In contrast, Karpf and Mandel (2018) and Bachelet et al. (2019) determine a positive green bond premium ranging from 2.06 to 7.80 bps p.a. It can also be seen in Karp and Mandel (2018) that the green bond premium is switching from positive to negative over time. Thus, this study aims to investigate the differences between green and non-green bonds based on the most recent European data incorporating the effects of the beginning of the Corona-Pandemic. This is the first green bond study of its kind focusing on the European area, i.e. on green bond issuers incorporated in Europe. The green bonds are denominated in Euros and placed in the secondary market between November 1, 2019, and April 30, 2020.

Overall, the evidence confirms that green bonds are issued for different, in particular ethical climate change and wealth of nations oriented, reasons. Furthermore, a small negative green bond premium is observable. These results are highly relevant for policymakers, green issuers and investors and further contribute to the debate on sustainable development.

In the following, Section 2 provides a brief background on green finance and the performance of green bonds. Next, in section 3 data and methodology are described, before the results of testing the characteristics of green versus non-green bonds are discussed in section 4. Section 5 concludes the paper.

BACKGROUND ON GREEN FINANCE AND GREEN BONDS

There is still no unique or commonly accepted definition of green finance. Definitions vary regarding scope and transparency (Migliorelli and Dessertine (2020)), but one of these definitions come from the G20 Green Finance Study Group (2016): "*Financing of investments that provide environmental benefits in the broader context of environmentally sustainable development (...). Beyond the financing of green investments, green finance also involves efforts to internalize environmental externalities and adjust risk perceptions in order to boost environmentally friendly investments and reduce environmentally harmful ones (...).*"[3] A closer look on various definitions reveals a common ground, which is that "*green finance provides a bridge between global environmental priorities and the financial system.*"[4]

Green finance is often described as *"the green pillar of sustainable finance."*[5] The main distinction between green and sustainable finance is that sustainable finance integrates all Environmental, Social and Governance (ESG) dimensions when it comes to evaluation. As the abbreviation ESG implies, three dimensions are connected to firms' environmental, social and governance operations. For instance, the environmental dimensions focus on how companies respond to problems such as climate change, pollution, waste and the allocation of scarce resources (Dorfleitner et al. (2015)). Polbennikova et al. (2016) analyse the effect of ESG ratings on bonds and find that bonds with better ESG ratings are rewarded with tighter spreads and better performance. The 193 countries that comprise the UN General Assembly agreed on the 2030 Agenda for Sustainable Development. This declaration contains 17 sustainable development goals (SDGs). Moreover, sustainable finance aims at the fulfillment of all SDGs,

3 G20 Green Study Group (2016), p. 3.
4 Green Finance Initiative (2016), p. 9.
5 Green Finance Initiative (2016), p. 9.

whereas green finance only addresses the environment-related SDGs (Kahlenborn et al. (2017)). Nine out of the 17 goals are linked to environmental protection. This is significant because green finance can support the achievement of more than half of the SDGs.

Green finance offers a wide range of products and services. However, green bonds are the main representatives and serve as a foundation for many other products and services. In 2019, the global green bond and green loan issuances achieved a new global record of $257.7 billion, of which $10 billion were green loans (4%). This was an increase of 51% from the previous year of $170.6 billion. A green bond is a fixed income product that allows investors to support the environment and help institutions and countries achieving their climate change adaptation and mitigation goals. There are also climate bonds in the green bond market, but they are not specifically labelled as such, hence, they are included under the label of green bonds (Bachelet, Becchetti and Manfredonia (2019)). In 2007, the European Investment Bank (EIB) launched the first green bond (the Climate Awareness Bond) with proceeds dedicated to energy efficiency and renewable energy projects. In the next year, the World Bank followed with a similar issuance (Migliorelli and Dessertine (2020)). From this point on, in most cases the issuers were multilateral development banks (MDBs) and sovereign supranational agencies (SSAs). After the launch of the green bond principles, new diverse issuers joined the green bond market including corporations, governments and banks. Since then, the green bond market and annual green bond issuances have gathered more attention and have grown rapidly year by year (Ketterer et al. (2019)).

The Climate Bonds Initiative reports 1,788 green bonds outstanding from 496 different issuers. In 2019, for the first time non-financial corporations held the lion's share of the green bond market followed by financial corporations (CBI (2020)). The most volume is driven by the European market, which represented 45% of the global issuance, while the second and third positions are held by the Asia-Pacific and North American markets, at 25% and 23%, respectively. One may get the impression that the green bond market is extremely large, but it still represents less than 1% of the global bond market (Ketterer et al. (2019)).

The aforementioned development was supported by establishing a framework with important criteria and standards for the green label (Preclaw and Bakshi (2015)). The most established and accepted guidelines are the Green Bond Principles (GBP) created in 2014 by the International Capital Market Association (ICMA). The guidelines outline four key aspects of the life of a green bond: the use of proceeds, the process for project evaluation and selection, the management of proceeds and reporting (Preclaw and Bakshi (2015)). As adherence to the GBP is voluntary, some market participants are concerned about potential problems that may arise when there are no strict rules or standards. External reviews are particularly important when it comes to labelling a green bond. To counteract asymmetric information between investors and issuers, a number of organisations focus on promoting transparency with regard to green bonds and their use of green bond proceeds. These external reviewers verify the performance of environmental projects and their effects. Roughly 60% of green bonds are additionally certified by an external party (Boulle et al. (2016)). The types of review (i.e. second-party opinion, third-party assurance report or green bond rating) can be performed either pre- or post-issuance. One example of a green bond-rating agency is S&P, which divides the rating into five classes: GB5 (poor), GB4 (fair), GB3 (good), GB2 (very good) and GB1 (excellent). The alignment with the GBP is particularly important in external reviews (Migliorelli and Dessertine (2020)). The transaction cost for a single issuance varies and depends on the type of green bond, the particular market, the issue size, the issuer and the frequency with which green bonds are issued. In 2016, (Ceci (2016)) estimated the external

costs for a 500 million (USD) green bond to range between 0.3 to 0.6 bps. These costs need to be taken into consideration by the issuers.

Investors generally focus on the trade-off between risk and return. Previous literature shows that green investors most often face a negative green bond premium (e.g. Preclaw and Bakashi (2015), Ehlers and Packers (2017) and Zerbib (2019)) and seldom a positive green bond premium (Karp and Mandel (2017) and Bachelet et al. (2019)). The occurrence of a negative green bond premium, meaning that investors forgive some yield for investing green, can be explained by excessive demand for green bonds reflected in oversubscription. Another reason could be the preference of investors and their willingness to accept lower yields to acquire indirect gains. Finally, it can also be viewed as compensation for the external costs or the internalisation of environmental externalities (Preclaw and Bakshi (2015)).

In Europe, the European Commission is attempting to structure a common foundation for green finance (Boracheva and Smorodinov (2017)). Most issuers realise that there will be at least reputational gains and CSR recognition. Examples of advantages could be lowered costs of green labelling or/and faster placements in a portfolio. To have a major impact on the environment, green finance needs to further develop from a niche to mainstream financing mode. This poses a major challenge to policymakers, as the burden of implementation would largely fall on them (Berensmann and Lindenberg (2019)). Another challenge is the international political commitment to fight climate change and support the environment. In addition, there are challenges specific to the green bond market. Problems arise due to a lack of standardized green bond ratings, indices and listings, domestic green investors, local green bond guidelines, and the lack of awareness of international practices and the advantages of green bonds. The cost of issuing a green bond is, for small issuers, a barrier and reduces the supply of green bonds available on the market. Other difficulties arise when international investors wish to join local markets due to the differences in green bond definitions and issues such as capital controls. The development of green finance and the green bond market has great potential, but there is still much to be done (Kahlenborn et al. (2017)).

DATA AND METHODOLOGY

In order to determine, whether there is any positive or negative green bond premium, 37 green bonds and 74 non-green bonds were collected from November 1, 2019, to April 30, 2020. The daily spreads of the non-green bonds were interpolated (i-spreads) to create a synthetic bond that is most equivalent to the respective green bond. The i-spreads are nominated in bps over a so-called ‘risk-free benchmark’. For the purposes of the analysis, the matched pair method was applied. The final sample contains 37 green and 37 non-green bonds (bond couples) issued by corporations, financial institutions and governments required to have ESG ratings from RobecoSAM or Sustainalytics. The sample shows that 21 issuers have an ESG rating from at least one of the two rating agencies. The data stems from Bloomberg.

Table 1 shows the results of pre-tests consisting of an analysis of Pearson Rank Sum Correlations of daily i-spreads used in the study and of Wilcoxon Signed-Rank Tests applied to them for each rating and industry category, respectively. The t-test analyses whether a negative green bond premium can be observed

Table 1. Wilcoxon signed-rank test and t-test for rating groups and industries

	Total Sample	AAA	AA	A	BBB
N daily i-spreads	9,250	2,000	1,750	3,250	2,250
p value signed rank test	0.000***	0.000***	0.006***	0.000***	0.000***
p value one-tailed t-test	0.000***	0.000***	0.000***	0.000***	0.000***
$r_{\text{green, non-green}}$	0.995	0.988	0.9956	0.994	0.992
	Total Sample	Government-related		Financials	Corporates
N daily i-spreads	9,250	1,000		4,000	4,250
p value signed rank test	0.000***	0.000***		0.000***	0.000***
p value one-tailed t-test	0.000***	0.000***		0.000***	0.000***
$r_{\text{green, non-green}}$	0.995	0.985		0.997	0.991

Significance levels at the 1%, 5%, 10% are indicated as ***, **, *

In sum, the *p*-values of both statistical hypothesis tests are highly statistically significant among all rating classes and industries confirming the existence of a negative green bond premium. Furthermore, **Table 1** presents the correlation coefficient between the daily i-spreads of the green bonds and the interpolated daily i-spreads of the non-green bonds. The two i-spreads are highly positively correlated for the total sample (as can also be seen in **Figure 1** and **2**), which confirms that the interpolation underlying the matched pairs method was accurately executed.

A negative green bond premium can have many possible causes. One is the strong demand for green bonds, which often exceeds the supply and becomes visible through oversubscription (Preclaw and Bakashi (2015) and Ehlers and Packers (2017)). Alternatively, investor might prefer to trade financial gains for non-financial gains (e.g., reputation or a good feeling as a result of supporting sustainability). For the first five years of their analysis of the US municipal bond market, Karp and Mandel (2018) found a green bond premium of 7.8 bps p.a., which became a negative premium in the last two years. The initially positive green bond premium could be due to the fact that the green bond sample was not aligned with the GBP (i.e. many of the bonds were greenwashed instead of being truly green). The researchers stated that the change in the green bond premium could be traced back to the improvements in credit quality, financial performance and herding behaviour. This would suggest that a negative green bond premium is due to the issuer's high credit quality and financial performance. As mentioned in section 2, most green bond issuers have to bear the cost of external reviews and transaction costs. Therefore, they might cover these costs by paying lower interest rates to investors.[6]

RESULTS

Table 2 presents the means, medians, standard deviations, minimums, maximums and number of daily i-spreads for the fixed-rate green bonds expressed in basis points. The sample of the daily i-spreads is sorted by the four rating classes of investment grade bonds. The arithmetic mean of the daily i-spreads of the green bonds increases as the rating gets lower. This is due to the increasing default risk premium investors demand for lower-rated bonds. There is a significant jump of more than 41 bps from AAA to AA followed by a moderate increase in each

[6] As mentioned before, the negative green bond premium could also reflect the internalisation of environmental externalities such as mitigating climate risk (Preclaw and Bakshi (2015)).

successive rating class. As can be seen, in the mean daily i-spread of AAA-rated bonds, the i-spread can also be negative. This is a result of the most recent phenomenon of the decade: negative interest rates. The -1.83 bps can be interpreted as the investor having to pay a 0.018% yield to invest his or her money into these bonds. The reason is that -0.018% of lost yield is still better than paying, for example, the current Euro-Bund-Future[7] with over -0.40% yield. The underlying assumption is that the investor wants to invest in a risk-free bond.

Table 2. Summary of the daily i-spreads of green bonds

Rating	Mean	Median	SD	Min	Max	n daily i-spreads
AAA	-1.830	-3.34	9.810	-25.715	26.839	1000
AA	39.325	27.37	36.685	-2.476	153.504	875
A	56.912	40.75	45.865	11.120	254.967	1625
BBB	82.588	82.58	65.478	23.423	373.340	1125
Total	47.129	33.29	54.089	-25.715	373.340	4625

Table 3 shows the means of the daily deltas between the daily i-spreads of the green bonds and the interpolated daily i-spreads of the non-green bonds. The bonds are evenly distributed among the rating classes. The tightest and widest daily means of the delta do not refer to tight and wide pricing in the market, but are equivalent to the minimum and maximum, respectively.

Table 3. Summary of the daily i-spread deltas of green and non-green bonds

Rating	n bonds	Tightest daily i_d	Widest daily i_d	Mean i_d	Median i_d	Mean i_g	Mean i_n
AAA	8	-11.98	4.30	-0.61	-0.54	-1.83	-1.22
AA	7	-10.78	10.87	-0.53	-0.07	39.32	39.85
A	13	-15.01	20.99	-0.80	-0.88	56.91	57.72
BBB	9	-64.47	11.75	-1.69	-1.52	82.58	84.28
Total	37	-64.47	20.99	-0.93	-0.61	47.12	48.05

The mean of i_d indicates whether there is an economically negative green bond premium. As can be observed in all four rating classes, there is a small negative premium for green bonds. BBB-rated green bonds have, on average, the highest negative premium of 1.69 bps p.a., followed by A-rated bonds with a negative premium of 0.80 bps p.a. Due to their higher rating, the AA-rated bonds have a lower negative premium of 0.53 bps p.a. Contrary to expectations, the AAA-rated green bonds have a green premium of -0.61 bps p.a., which is greater than that of the A-rated bonds. The total negative green bond premium equals 0.93 bps p.a., which is in economic terms, very low. If investors chose a green bond over a non-green bond, they would only forgo 0.0093% in yield on an annual basis.

Figures 1 and **2** illustrate the progress of the daily i-spreads of the green bonds and the interpolated daily i-spreads of the non-green bonds for AAA and BBB rating classes from November 1, 2019, to April 30, 2020. The vertical axis represents the i-spreads, and the horizontal axis represents the time. As the figures indicate, the i-spreads of green and non-green bonds move in the same direction and stick close together. It can be seen from all two figures that there is a sharp increase in the daily i-spreads from March onwards. The reason for this is the effect of the global coronavirus pandemic. The unknown risk of the coronavirus crisis has

[7] The Euro-Bund-Future is a fictitious German govt. bond with a coupon rate of 6% and a maturity of 10 years (Bösch (2020)).

created uncertainty in the bond market, which resulted in a strong market response (Fleming and Remolona (1999)). Higher trading activity and increased sales of bonds caused the i-spreads to rise. This triggered further sales because investors want to offload older bonds in anticipation of bonds with better yields. In addition, greater liquidity is needed due to the loss of revenue during the pandemic. Investors also demand higher interest rates due to the increased default risk that arises from the unknown economic consequences of the coronavirus crisis (Der Tagesspiegel (2020)).

Figure 1. Green vs. non-green bonds with AAA ratings

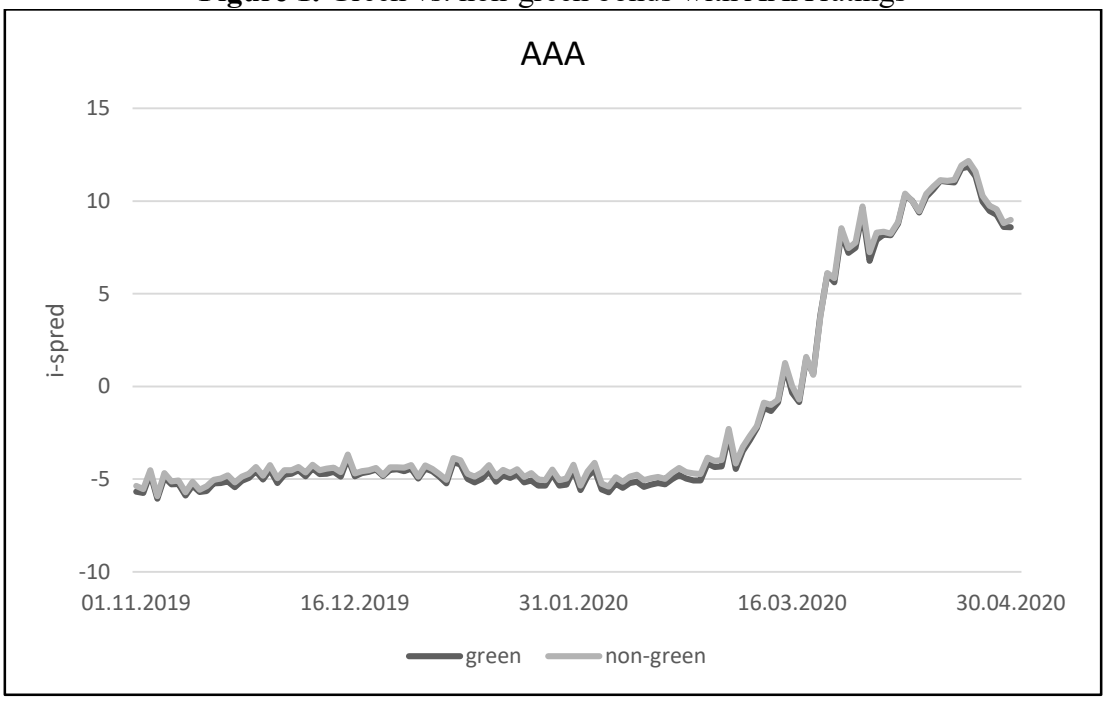
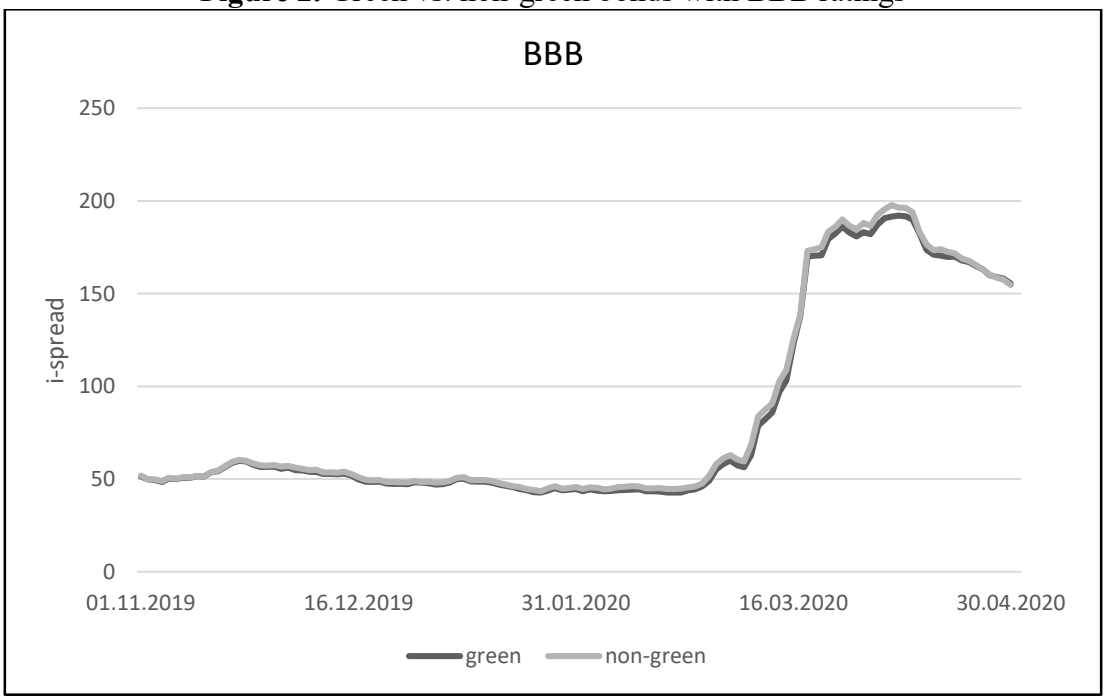


Figure 2. Green vs. non-green bonds with BBB ratings



The BBB-rated bonds are the affected of all the rating classes with an increase of close to 150 bps p.a. (1.50% yield). The cause of this is that the BBB rating is the last rating class of the investment grade type and investors are concerned about a possible downgrade to non-investment grade rating (Hachenberg and Schiereck (2018)). Moreover, this rating category contains mostly corporate bonds, which were hit hardest by the crisis. From BBB- to AAA-rated bonds, the bond market movement is less volatile. For AAA-rated bonds, the difference in i-spreads is only slightly more than 15 bps p.a. (0.15% yield). In short, the lower the default risk, the less the market movement affects yields.

CONCLUSION

Since the introduction of the first green bond in 2008, green bonds contribute to the fight against climate change by providing funds for sustainable projects to achieve the goals of the Paris Agreement. The international community's commitment to achieving the SDGs and other environmental targets is essential for the further development of green markets. The underlying analysis of green bond characteristics and financing conditions in Europe is of great importance for investors, bond issuers, policymakers and the public. Additionally, the yield performance of green compared to non-green bonds significantly influences how many new green bonds are issued and demanded. Countries can enact structured policies that promote the demand and supply of green securities making sustainability and risks a component of financial decisions.

Previous green bond studies that investigated the green bond premium presented mixed findings, however, there is a tendency toward observing a negative green bond premium. This study adds to the existing literature by investigating the green bond premium with the most recent data, especially for issuers incorporated in Europe. The results of the analysis suggest that there is an average negative green bond premium of 0.93 bps p.a. in the secondary European market, which, in economic terms, is very small. It means that an investor investing green would have to forgive 0.0093% in yield p.a. In the observation period between November 1, 2019, and April 30, 2020, lower-rated bonds do not show a significantly higher negative green bond premium. Only BBB-rated green bonds had a significantly larger negative green bond premium in comparison to the other three rating groups. It also becomes visible that investors demanded higher yields at the beginning of the Corona-Pandemic due to the increased default risk arising from the unknown economic consequences of the coronavirus crisis at the end of March 2020.

The negative green bond premium creates an incentive for institutions and corporations alike to issue green bonds because they can refinance themselves at a discount when compared to brown bonds. An economically small negative green bond premium also attracts investors. Thus, policymakers can substantially support sustainable development by further promoting green bond markets which hopefully leads to the achievement of the Paris Agreement's goals.

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THE IMPACT OF THE ADOPTION OF INTERNATIONAL FINANCIAL REPORTING STANDARDS ON THE FINANCIAL SITUATION AND PERFORMANCE OF THE COMPANY

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Abstract: *This paper deals with the evaluation of the impact of the adoption of International Financial Reporting Standards (IFRS) on the financial situation and performance of the company. The Slovak Accounting Act allows accounting and reporting under IFRS for two types of entities - explicitly specified by law (e.g. banks, insurance companies, stock exchange); and those that meet specified size criteria. The analyzed company met the size criteria and IFRS has been applying since 2018. The transition from Slovak accounting procedures to IFRS has an impact on the classification of individual items of assets and liabilities, their structure, and the classification of related costs and revenues. The transition to IFRS thus has an impact on the company's financial position and performance. The paper set out two objectives of the research: 1) the transition to IFRS caused an insignificant change in the company's financial indicators; 2) the transition to IFRS caused a significant change in the company's financial indicators. The results of the analysis show changes in the structure of the company's assets and liabilities, the amount of income and expenses, and the less significant impact of the adoption of IFRS on financial indicators.*

Keywords*: Accounting, Reporting, Financial statements, Financial ratios.*

INTRODUCTION

The intention of adopting IFRS was to create a unified information base for entities that entered global capital markets. This intention is implemented by the IFRS Foundation and the International Accounting Standards Board (IASB) in a single set of globally accepted financial reporting standards. The European Union has adopted this reporting framework since 2005. Since this year, many countries in Asia, Africa, Europe, Latin America, Canada, and also in the US, have adopted IFRS for companies registered on the capital markets. Current International Financial Reporting Standards (IAS/IFRS) and their interpretations (SIC/IFRIC) are in force. Thus, the adoption of IFRS not only by the EU has become a link between accounting information providers and their users in the global market. The first adoption of IFRS is governed by a separate IFRS 1 First-time Adoption of International Financial Reporting Standards. When an entity is adopting IFRS for the first time, a lot of issues have to be resolved. These issues relate to recognition, classification, measurement, presentation and disclosure. In principle, IFRS 1 requires companies implementing international standards to apply retrospectively all IFRS effectively at the end of the company‘s first IFRS reporting period.

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However, the standard provides a number of mandatory exceptions and optional exemptions to the requirement for a full retrospective application of IFRS. Mandatory exceptions relate to estimates, de-recognition of non-derivative financial assets and non-derivative financial liabilities, hedge accounting and non-controlling interests. The exceptions are to prevent the situation that the cost of a full retrospective application of IFRS would exceed the potential benefit to users of the financial statements. According to Mackenzie et al., (2012): "Steps in transition to IFRS involves the following: selection of accounting policies that comply with IFRS; and preparation of opening IFRS balance sheet at the date of transition. It covers recognition of all accounting items whose recognition is required under IFRS, de-recognition of accounting items if IFRS does not permit such, reclassification and measuring of items according to principles outlined in IFRS" (p. 935).

Research on the adoption of IFRS can be oriented in two directions - on the economic context and the enterprise context. Fewer authors focus on the enterprise level, probably due to a smaller database and time base. This can be seen especially with entities in Central and Eastern European countries where capital companies and capital markets exist to a lesser extent. Although previous research has investigated the economic consequences of IFRS adoption, there is less evidence on the impact of IFRS adoption on key financial ratios. However, the Slovak Accounting Act defines the accounting units that are required to prepare financial statements following international standards. These are the following: banks, commercial insurance companies, pension companies, Railways of the Slovak Republic, Stock Exchange. Mandatory application is also if a business entity has met, in at least two successive accounting periods, no fewer than two of the following requirements: its total assets exceeded EUR 170 000 000; net turnover exceeded EUR 170 000 000; and the average number of employees exceeded 2000. An accounting entity, which has issued securities in the accounting period and these have been admitted to trading on a regulated market (Stock Exchange), shall prepare the individual financial statements according to IAS/IFRS and its optional decision. In case when an entity prepares consolidated financial statements, then IFRS is applicable mandatory.

LITERATURE REVIEW

Bryce, et al. (2015) examined whether accounting quality has improved following the adoption of IFRS. They investigated if audit committees are more effective in promoting accounting quality under IFRS. They used the Jones (1991) and Dechow et al. (1995) models to verify the hypotheses. The authors concluded that accounting quality is not significantly enhanced after the adoption of IFRS in Australia, and the audit committees are generally more effective in promoting accounting quality under IFRS than previous Australian GAAP (p. 180). Chua et al. (2012) examined the mandatory implementation of IFRS and its impact on the quality of accounting from three perspectives: earnings management, timely loss recognition, and value relevance. They concluded, that "the pervasiveness of earnings management by way of smoothing has reduced, while the timeliness of loss recognition has improved post-adoption. Additionally, the value relevance of financial statement information has improved, especially for non-financial firms" (p. 119). The impact of IFRS adoption on the quality of consolidated financial reporting was an interesting subject of research (Müller, 2014). He observed book value of equity per share and earnings per share of the parent company and confirmed: "A higher level of quality surplus (increment) supplied by group statements (as opposed to parent company financial statements) in the context of applying IFRS as opposed to applying national regulations for consolidated reporting" (p. 981). This author was "ascertained (according to predictions) that an increase in the quality surplus (increment) supplied by group financial

statements compared to parent company individual financial statements once the adoption of IFRS became mandatory for preparing consolidated financial statements" (p. 982).

The impact of IFRS adoption in Europe and Australia on the relevance of book value and earnings for equity valuation was examined by Clarkson et al. (2011). They considered an alternative non-linear "product model" which incorporates the cross-product of book value (book value per share) and earnings (earnings per share) into the model. According to Clarkson et al. (2011), "The use of Product model was justified and should be considered by future researchers when doing levels valuation research" (p. 16). Outa (2011) observed the impact of IFRS adopting with value relevance which "Tries to associate a firm´s value as expressed in stock prices to the reported income statement and balance sheet" (p. 220). The arguments used were around the fact that IFRS possibly improves the book values (valuation measurements) at the expense of net income (Outa, 2011). Blanchette, et al. (2013) made the comparison of accounting figures and financial ratios computed under IFRS and pre-changeover Canadian GAAP (CGAAP) for the same period using a sample of 150 companies listed on the Toronto Stock Exchange which mandatorily adopted IFRS. The research revealed, that "Central values of IFRS financial statement figures and ratios are not significantly different from those derived under CGAAP as the equality of means and the equality of medians are not statistically rejected for all figures and ratios, except one – net profit/loss" (p. 5).

Beneish, et al. (2015), stated, "IFRS adoption has a significantly greater effect on foreign debt than on foreign equity investment flows. This result is consistent with the notion that debt investors are greater consumers of financial statement information. We find that the increase in foreign equity investment around IFRS adoption is limited to countries that had higher governance quality, economic development, and creditor rights before IFRS adoption" (p. 24). DeFond et al. (2011) hypothesized, that the mandatory adoption of a uniform set of accounting standards, such as IFRS, attracts greater investment by foreign mutual funds if the standards increase financial reporting comparability. They found "that mandatory IFRS adoption results in a greater increase in foreign investment among companies in countries with strong implementation credibility that experience relatively large increases in uniformity" (p. 256). They also found "that these are the only firms with a significant increase in foreign mutual fund ownership" (p. 256). Similar research led Gordon et al. (2012). They examined the IFRS impact on the foreign direct investment (FDI) of developing and developed countries with a cross-sectional, time-series, benchmark model. Gordon et al. concluded, that "The overall FDI inflows are positively associated with a country's decision to adopt IFRS" (p. 393). They found support for the stated argument that "this support is statistically significant for those countries classified as developing economies, but not for countries classified as developed economies" (p. 393). As stated Lungu, et al. (2017): "The countries adopting IFRS are more likely to benefit from a higher increase in FDI inflows than the non-adopters" (p. 331).

Renders and Gaeremynck (2007) observed the impact of legal and voluntary investor protection in relation to IFRS adoption. They found that "IFRS adoption depends on the level of investor protection. Companies refrain from adopting IFRS before it becomes mandatory in 2005 because of opportunistic behavior by management in countries with weak investor protection". Furthermore, they found "that corporate governance recommendations have the same impact on IFRS adoption as hard laws and can compensate for the negative impact of weak laws" (p. 64). Similarly, Verriest et al. (2013) stated: "Results show that stronger governance firms disclose more information, comply more fully and use IAS 39's carve-out provision less opportunistically" (p. 39). Jiao et al. (2011) compared analyst data before and after the mandatory adoption of IFRS in nineteen European countries. They found, that "analyst

forecasts have become more accurate and less dispersed after the adoption of IFRS" (p. 62). Kim et al. (2012) researched the relationship between audit fees and mandatory adoption of the IFRS. They found, that "the IFRS-related audit fee premium increases with the increase in audit complexity brought about by IFRS adoption, and decreases with the improvement in financial reporting quality arising from IFRS adoption" (p. 2061).

Goodwill, research and development expenses, asset revaluation, the book value of equity, and earnings were observed by Aharony et al. (2010). They confirmed their hypothesis, that: "In the year before the mandatory adoption of the IFRS, the incremental value relevance to investors of the three domestic GAAP-based accounting items was greater in countries where the respective domestic standards were more compatible with the IFRS" (p. 535). Lantto and Sahlström, (2009) pointed out the significant impact of the adoption of IFRS on the key financial indicators of Finnish entities (p. 341). Similarly, Aubert and Grudnitski explored significant differences in return on assets (ROA) for firms computed under IFRS and local, generally accepted accounting principles. They concluded, that "Specifically, there was no statistical support for any of the samples that accounting information produced under IFRS was any more value relevant than the accounting information derived using local generally accepted accounting principles" (p. 1). Italian companies that have adopted IFRS have been reviewed by Cameran et al. (2014) to determine the impact on earnings quality. Their results pointed that: "IFRS adoption did not improve reporting quality among private companies but, on the contrary, decreased it" (p. 278). Research on the impact of mandatory IFRS adoption on initial public offer (IPO) underpricing led Hong et al. (2014). They found "a decrease in IPO underpricing and an increase in the relative proceeds from foreign markets following mandatory IFRS adoption" (p. 1365). Hakalová et al. (2017) analyzed globalization trends in financial accounting, especially IFRS. According to them, "Using IFRS as a basis for determining income tax base could bring a number of benefits, but of course, it is also associated with disadvantages" (617), also, Hakalová et al., (2014), (p. 193).

A review of the literature on the impact of IFRS adoption has made Zaidi and Paz, (2015). The authors conducted literary research on the adoption of IFRS for economic growth, and the harmonization of accounting information. Further, they reviewed literature sources on the relationship between IFRS and earnings, the cost of capital, and the qualitative aspect of accounting information. They commented on the benefits and drawbacks of the above findings.

METHODOLOGY

The subject of the analysis is a company that has adopted IFRS for size reasons. The date of the company's transition to IFRS was September 30, 2019. As of this date, the company has prepared financial statements following IFRS and national accounting legislation (NAL) as well. Differences between a reported asset and liability items were assessed for materiality. Materiality is defined in IAS 1 as: "Item presented in the financial statements if its omission or misstatement would influence or change the economic decisions of users made based on the financial statements" (Mackenzie, 2012, p. 42). Significance was set at 3% of the volume of assets (Arens et al., 2003, p. 210 €). That is, 3% of the sum of assets 146 577 thousand €, is 4,397 thousand €. The impact of the items was then reflected in the financial indicators. Changes in financial indicators were assessed in terms of their impact on user decision-making.

This paper set out two objectives of the research:
1) transition to IFRS caused an insignificant change on the company's financial indicators;
2) transition to IFRS caused a significant change on the company's financial indicators.

RESULTS

The analyzed company manufactures components for cars with a wide range of customers. It met the size criteria for the transition to IFRS as of September 30, 2018. Non-current assets under IFRS are higher by € 5 610 thousand €. It is a deferred tax asset and national legislation recognizes it in current assets. Accrual items (6 757 thousand €) were reported separately according to national legislation, under IFRS they belong to current assets. National legislation reports long-term provisions separately (257 thousand €), while IFRS includes them in noncurrent liabilities. Short term credits (2 570 thousand €) and short term provisions (17 462 thousand €), short term provisions and accruals (736 thousand €) were reported separately according to national legislation, under IFRS they belong to current liabilities. Changes in the classification of asset and liability items after the transition to IFRS did not affect the balance sheet total. Also, changes in the values of expenses and revenue did not affect the profit after tax.

Table 1. Impact of the transfer on the company's assets and liabilities

Statement of Financial Position as of 30.9.2019 (IFRS)		**Change**	**Balance Sheet as of 30.9.2019 under national legislation**		**Material change**
Assets	**thousands €**		**Assets**	**thousands €**	
Noncurrent assets	44 932	5 610	**Noncurrent assets**	39 322	yes
Current assets	101 645	1 147	**Current assets**	100 498	no
			Accruals	6 757	yes
Total assets	146 577	0	**Total assets**	146 577	none
Equity and liabilities	**thousands €**		**Equity and liabilities**	**thousands €**	
Equity	2 083	0	**Equity**	2 083	
Noncurrent liabilities	50 422	167	**Noncurrent liabilities**	50 255	no
			Long term provisions	257	
Current liabilities	94 072	20 885	**Current liabilities**	73 187	yes
			Short term credits	2 597	
			Short term provisions	17 462	
Total liabilities	144 494	736	**Total liabilities**	143 758	no
			Accruals	736	no
Total equity and liabilities	146 577	0	**Total equity and liabilities**	146 577	none

Source: Own computation based on financial statements

Following the transition to IFRS, the company reported revenues from continuing operations in the amount of 345 656 thousand €. According to NAL, the value of these revenues was 347 709 thousand €. The decrease of 2 053 thousand € is due to the fact that IFRS in the income from continuing operations include only revenue from the main activity, while revenue according to NAL also includes revenue from the sale of assets. Reduction of production expenses is related to other divisions according to IFRS - for selling and administrative expenses. Under IFRS, financial revenue does not include foreign exchange gains and financial expenses do not include foreign exchange losses. Foreign exchange gains and losses are included in other revenue and other expenses (IFRS).

Table 2. Impact of the transfer on the company's revenues and expenses, in thousand EUR

Statement of Comprehensive Income for year ended September 30, 2019 (IFRS)		**Change**	**Income Statement for year ended September 30, 2019 under national accounting legislation**		**Material change**
Continuing operations					
Revenue	345 656	2 053	**Operating revenues**	347 709	no
Operating expenses	-285 690	59 892	**Operating expenses**	-344 972	yes
Selling and administrative expenses	-57 905				
Other income	2 061				
Other expenses	-1 543				
Profit/loss from operating activities	2 579	158	**Profit/loss from operating activities**	2 737	no
Finance revenue	28	156	**Finance revenue**	184	no
Finance costs	-3 386	313	**Finance costs**	-3 699	no
Profit/loss before tax	-779	0	**Profit/loss before tax**	-779	
Tax expense	2 740	0	**Tax expense**	2 740	
Profit after tax from continuing operations	1 961	0	**Profit after tax**	1 961	none

Source: Own computation based on financial statements

Liquidity, indebtedness, activity and profitability ratios did not change significantly after the adoption of IFRS. Liquidity ratios are below the recommended values due to low cash. The company is too indebted (98,58%). Activity indicators are at an average level. Earnings before interest, taxes, depreciation and amortization (EBITDA) are presented favorably.

Table 3. Impact of the transfer on the company's indicators

	IFRS 2019	National accounting legislation 2019
Cash ratio	0,08	0,08
Quick ratio	0,90	0,85
Current ratio	1,08	1,08
Debt ratio	98,58%	98,08%
Receivables collection period	43,8 days	40,1 days
Payables outstanding period	65,5 days	65,5 days
Inventories turnover period	24,8 days	24,8 days
EAT	1 961 thousand €	1 961 thousand €
EBITDA	8 738 thousand €	8 738 thousand €

Source: Own computation based on financial statements

CONCLUSION

Research on the adoption of IFRS can be oriented in two directions - on the economic context and the enterprise context. Many authors have examined the impact of the adoption of IFRS on value relevance and earning management. Fewer authors focused on the enterprise level, probably due to a smaller database and time base. This can be seen especially with entities in Central and Eastern European countries where capital companies and capital markets exist to a lesser extent. Although previous research has investigated the economic consequences of IFRS adoption, there is less evidence on the impact of IFRS adoption on key financial ratios. It was an interesting finding that almost all cited authors (except Hakalová) dealt with entities in Western Europe, Canada, respectively in Australia. This indicates an insufficiently researched issue in the case of Central and Eastern European entities.

The paper aimed to observe if the transition to IFRS caused an insignificant or significant change on the company's financial indicators. The transition to IFRS reporting did not result in significant changes in the financial situation or performance of the company. Slight changes in ratios were due to the reclassification of certain types of assets and liabilities to IFRS requirements. Significant changes were only partial, in the reporting of individual items, where IFRS differs from the national accounting legislation. The focus of future research may be to examine the impact of the adoption of IFRS on the corporate level of new members of the European Union.

ACKNOWLEDGMENT

This research was supported by the project VEGA no. 1/0866/21: The use of analytical tools to detect manipulation in the financial statements of state and local government entities in the context of a true and fair view of accounting.

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INNOVATION CLUSTERS AS AN ASSOCIATION MODEL OF THE SMALL AND MEDIUM-SIZED ENTERPRISES: THE CONTEXT OF REGIONAL DEVELOPMENT

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Abstract: *Numerous empirical studies have long been indicated the importance of business infrastructure for economic and regional development. Ensuring long-term economic growth, as well as the creation and development of small and medium enterprises (SMEs), as key drivers of the development of modern economies, requires a high level of efficiency and flexibility of business infrastructure. In the Western Balkans, the absence of a coherent business infrastructure network is the biggest obstacle to the rapid growth of their economies. For this reason, the activities of the Western Balkan governments in the future should be aimed at developing a network of business infrastructure in order to increase the share of the knowledge and services sector with high added value in the economic structure. This paper aims to point out the role of innovative clusters as a model of associating SMEs in the context of regional development.*

Keywords*: Clusters, SMEs, Innovations, Regional development, Business infrastructure.*

INTRODUCTION

The importance of business infrastructure for a country, in terms of enabling economic growth, providing opportunities for the development of small and medium enterprises, influencing the greater inflow of foreign direct investment and the introduction of modern technologies in regional and local communities, is undeniable. Business infrastructure is developed through mapping, construction and equipping of industrial zones, industrial parks, business incubators, clusters, logistics and business centers, as well as tourist infrastructure. Clusters stand out as a particularly important form of business infrastructure. The competitiveness of certain industries, especially mature and traditional ones, based on the experience of EU countries, can be significantly increased by connecting companies into clusters. The EU institutions, which in various ways supported a large number of project initiatives in Serbia, as well as many international agencies and organizations have contributed to their support programs and the development of clusters in the Republic of Serbia.

The trend of connecting small and medium enterprises, encouraged by changes in modern business conditions is becoming increasingly significant. Clustering can provide SMEs with progress and prosperity, in terms of increasing their competitiveness, but also achieving sustainable growth and business. Clusters are formed, primarily, due to the necessity of survival of small and medium enterprises. Through mergers, small and medium-sized enterprises imitate the work of large enterprises, while retaining legal and business independence. In this

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way, clusters become competitors or collaborators of large business systems (Bošković and Jovanović, 2009). Companies grouped into clusters have a comparative advantage, which is based on their specialization, cooperation, greater flexibility and diversification (Gligorijević and Kostadinović, 2012). The focus on innovative clusters is based on the belief that innovation is the key to competitive economic growth, which according to Simmie and Sennett (1999), can be the basis of more competitive cities and regions. Innovation clusters are defined as „groupings of independent undertakings - innovative start-ups, small, medium and large undertakings as well as research organizations - operating in a particular sector and region and designed to stimulate innovative activity by promoting intensive interactions, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to technology transfer, networking and information dissemination among the undertakings in the cluster" ([3], p.10). The difference between innovation clusters and other forms of integration of small and medium enterprises (Burdina, Kaloshina & Chizhik, 2017; Ablaev, 2018) is that companies that are within the cluster do not go for a complete merger (Lee, Lee & Oh, 2017; Ablaev, 2018), but they create an interaction mechanism that allows them to maintain the status of a legal entity and at the same time cooperate with other companies that make up the second cluster (Yoon, 2017).

Numerous studies indicate the important role of clusters in the planning and implementation of activities aimed at regional development. This is further evidenced by the policies of the most developed EU member states, which strongly encourage the development of national clusters (Tijanić, 2009). Most of the economic events in the Republic of Serbia take place in the capital Belgrade and its surroundings, and two or three other larger urban areas, but to a much lesser extent. Uneven regional development is a feature of the Republic of Serbia (Kostadinović and Stanković, 2020). The consequence is that most of the national territory remains insufficiently valorized and economically exploited. When considering the economic growth and development of the region, it is necessary to keep in mind the dual territorial (spatial or geographical) and relational basis of the constitution of the region (Župan, 2016). Both of these dimensions play an important role in the concept of regional competitiveness, a very important concept in the light of thinking about the conditions for achieving economic growth and development. According to Stopper (1997), both regional and local competitiveness are defined as the ability of subnational economies to attract and retain firms with stable or growing market shares, while maintaining a stable or growing standard of living of business process participants.

Generally speaking, all entities benefit from being in a cluster, in terms of, for example, easier access to information, knowledge exchange, better cooperation with the public sector and research institutions, participation in research projects (Pasha, 2019; Derlukiewicz et al., 2020). Clusters can also be useful for government policy if the government wants to increase innovation, spread technology and knowledge, or in a situation where it wants to increase competitive advantage and even conquer a new market (Ozkanli and Akdeve, 2006). On the other hand, if there is an economic downturn in a particular industry, with excessive concentration and scale of cluster activity, there is a risk that the region will be too dependent on one industry, which may lead to an imbalance in the structure of the economy. Then, regardless of the fact that the cluster contributes to the development of the region, the collapse of the market in which it operates can lead to a regional crisis (Derlukiewicz et al., 2020).

[3] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2006:323:0001:0026:EN:PDF (accessed: 11.10.2020.)

The results of various studies indicate that the strength of local clusters strongly influences the performance of regional economies. Spencer et al. (2010), based on an analysis of data on Canadian urban regions, as well as Delgado et al. (2014), in the context of American regions, indicate that industries, which are located in an urban region with a critical mass of related industries, tend to generate not only higher revenues, but also employment growth rates. Delgado et al. (2014) also pointed out that regionally leading clusters contribute to the growth of patents of other clusters in the region. On the other hand, Feser et al. (2008), found no evidence of the impact of technology-based clusters in the U.S. Appalachian region on employment growth. The findings of a study conducted by McDonald et al. (2007) suggest that, although established clusters in the UK are associated with employment growth, clusters with deep cooperation networks are not.

RESEARCH METHODOLOGY

The subject of this study is innovative clusters, as a model of association of small and medium enterprises in the context of regional development. The study aims to explore the relationship between the goals of small and medium enterprises, which operate through technological branches, which are accepted as innovative clusters, innovation perception and regional development. Following the aim of the research, the following hypotheses were set:

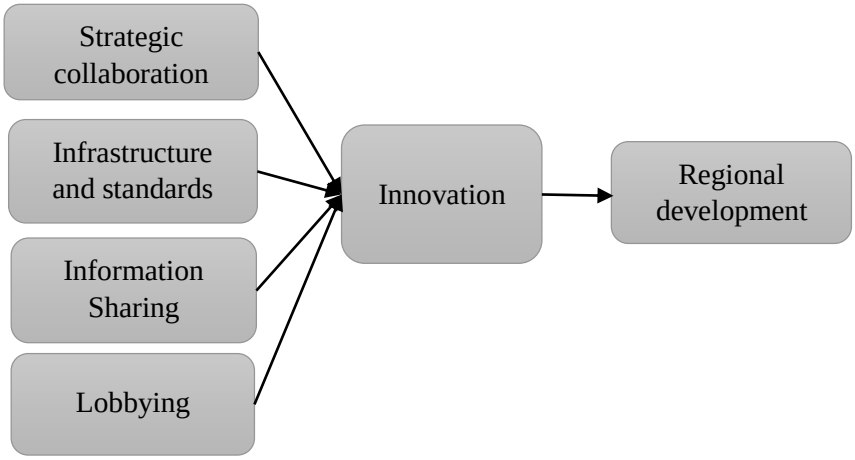
Hypothesis One: Desire of clustered firms for making strategic cooperation has a direct positive effect on innovation.
Hypothesis Two: Desire of clustered firms for infrastructure and standards has a direct positive effect on innovation.
Hypothesis Three: Desire of clustered firms for information sharing has a direct positive effect on innovation.
Hypothesis Four: Desire of clustered firms for lobbying has a direct positive effect on innovation.
Hypothesis Five: Innovation has a direct positive effect on regional development.

In order to achieve the goal, a survey was conducted which included 350 respondents, employed in 144 companies in the Republic of Serbia, of which 65% are small companies, while 35% are medium-sized companies. The largest percentage of companies employing respondents belong to the automotive cluster of Serbia (36%), the ICT cluster of central Serbia (28.2%), the ICT cluster of Vojvodina (19.3%), the Vojvodina Metal Cluster (16.5%) and the FACTS cluster. The sample included 54.6% of male respondents and 45.4% of female respondents. Of the total number of surveyed subjects, 39.6% of respondents have a university degree, 19.4% have a college degree, and 41% of respondents have a high school education. Among the respondents, most respondents are 35-45 years old (37%), over 45 years old are 34% of respondents, while the lowest percentage of respondents in the sample under the age of 35 is 29%. The largest number of employees has been working in the current company for less than 5 years (46%), 38% of respondents have been working in the same company for 5-10 years, while 16% of respondents have been working for more than 10 years.

A questionnaire was used as a data collection tool, which contained open-ended and closed-ended questions. The questionnaire is designed in seven parts. The questions from the first part referred to the socio-demographic characteristics of the respondents (gender, age, education, work experience). The instrument for measuring regional development, in the second part of the questionnaire, was developed after reviewing the literature relevant to regional development (Stoper, 1997; McDonald et al., 2007; Spencer et al., 2010; Delgado et al., 2014;

Evgeny et al., 2016; Župan, 2016; Derlukiewicz et al., 2020). The questionnaire was reviewed by three professors, experts in the research area, in order to more precisely formulate the items and the survey structure of the questionnaire. After their answer, two attitudes were corrected, and then the final form of the regional development scale was created - RD, which contains 5 items. The scale Strategic collaboration - SC (4 items), in the third part of the questionnaire, was developed based on Vučić (2010), the scale Information Sharing - IS (3 items), in the fourth part of the questionnaire, was developed based on Ismalin (2011). Scales Innovation - I (4 items), in the fifth part of the questionnaire, Lobbying - L (4 items), in the sixth part of the questionnaire and Infrastructure and standards - IaS (3 items), in the seventh part of the questionnaire, were taken from Anić et al. (2019). Respondents expressed their views on a 5-point Likert scale (1 - strongly disagree; 5 - absolutely agree). The questionnaire, in electronic form, was distributed via e-mail. Each questionnaire contained a cover letter, informing the respondents about the needs of the research, the identity of the researcher and the anonymity of the survey. The research, including the pilot test, was conducted in the period February - May 2020. The conceptual model of the research is shown in Figure 1.

Figure 1. The conceptual model



Source: Authors

In the first step, the reliability and validity of the measurement model were tested, followed by the significance of the structural path between the latent variables of the proposed model, based on the two-step approach in estimating the structural equation model proposed by Chin (1998). The measurement model was evaluated based on reliability, convergent validity and discriminant validity. Reliability was assessed based on Cronbach's alpha coefficient and composite reliability. Convergent validity was assessed based on mean isolated variance (AVE), while discriminant validity was assessed based on Fornell-Larker criteria (Fornell and Larcker, 1981). The demographic structure of the respondents was presented using frequency analysis and descriptive statistics. Data were analyzed using statistical software IBM SPSS 21 and AMOS graphics.

RESEARCH RESULTS

The exploratory factor analysis indicated six factors whose value of the inherent characteristic root is greater than 1. Reliability, as one of the first indicators of the quality of the measuring instrument, was measured by the Cronbach's alpha coefficient. The value of Cronbach's alpha is over 0.7 for each of the six constructs, indicating good internal consistency of the scale. Internal consistency is a necessary, but not a sufficient condition for the validity of the scale,

so that, in the next step, the psychometric validity of the scale was assessed by applying confirmatory factor analysis. Kaiser-Meyer-Olkin (KMO) is 0.854, while the value of Bartlett's Test of Sphericity is 1478.185 (df = 253; $p < 0.00$). The results of confirmatory factor analysis confirmed six factors, and the total variance explained by these six factors was 73.42%.

Table 1. Psychometric properties of measurement model

Items	Constructs	Loadings	Cronbach's alpha
	Regional Development		
V1	Our cluster has increased earnings in the region	.855	.924
V2	Our cluster has increased the development and patents growth of other clusters in region	.842	
V3	Our cluster has contributed to increasing employment in the region	.843	
V4	Our cluster has increased the living standards of the region's population	.824	
V5	Our cluster has contributed to increasing the level of economic development of the region	.840	
	Strategic collaboration		.864
V6	Our cluster had an EU financed project	.801	
V7	There is a project that our company had worked on with other companies within the cluster	.774	
V8	Our enterprise cooperated with the other enterprises from the same cluster	.739	
V9	Our enterprise cooperated with the other enterprises from the other cluster	.796	
	Innovation		.881
V10	Facilitate higher innovativeness	.734	
V11	Diffuse technology within the cluster/sector	.722	
V12	Attract new firms and talent to sector/industry	.738	
V13	Enhance production processes	.830	
	Infrastructure and Standards		.726
V14	Conduct private infrastructure projects	.824	
V15	Establish technical standards	.823	
V16	Co-ordinate purchasing	.671	
	Lobbying		.755
V17	Lobby government for infrastructure	.652	
V18	Improve regulatory policy	.689	
V19	Lobby for subsidies	.766	
V20	Improve FDI incentives	.777	
	Information Sharing		.904
V21	Sharing of information on technology	.868	
V22	Sharing of information on products	.807	
V23	Sharing of information on markets	.889	

Source: Own calculation

To estimate the fitting of the model, the $\chi 2$ value was first calculated. The obtained value of the $\chi 2$ test is not statistically significant ($\chi 2$ (218) = 248.299; $p > 0.001$), which indicates a good fit for the model. The normalized value of χ 2 test, which in this case is $\chi 2$ /df=1.139,

indicates a good specification of the model. The obtained values of CFI, SRMR, RMSEA, GFI, IFI and TLI indices, indicate a good fit of the model.

Table 2. Structural model fit indices

Obtained values	**χ2/df**	**CFI**	**SRMR**	**RMSEA**	**GFI**	**IFI**	**TLI**
	1.139	0.981	0.08	0.036	0.851	0.978	0.974

Source: Own calculation

Considering the satisfactory values of the fitting index, the validity of the concept was assessed, which implies the degree to which the set of statements represents the concept that is the subject of measurement, and is assessed based on convergent and discriminant validity (Hair et al., 2010). The fulfillment of the conditions of convergent validity is indicated by statistically significant factor loads greater than 0.50. The fulfillment of the conditions of convergent validity is also indicated by the values of the composite reliability coefficient (CR), which by factors exceed the lower acceptance threshold of 0.70. For the discriminant validity test, the square root of AVE was calculated. The square roots of the AVEs of all variables were greater than the correlations between the variables, thus confirming the discriminant validity. The results are shown in Table 3.

Table 3. Descriptive statistics, correlation and reliability analysis

Constructs	**M**	**SD**	**CR**	**RD**	**I**	**SC**	**IaS**	**IS**	**L**	**AVE**
RD	4.21	.60	.922	**.839***						.704
I	4.23	.60	.843	.334*	**.757***					.573
SC	4.07	.45	.813	.205*	.550*	**.723***				.523
IaS	3.94	.47	.818	.110*	.369*	.068*	**.776***			.602
IS	3.93	,47	.891	.373*	.535*	.455*	.138*	**.856****		.732
L	4.16	.56	.860	.561*	.543*	.383*	.047*	.338*	**.778****	.605

Notes: CR, composite reliability; *p< 0.01; **the square root of AVE.

Source: Own calculation

The research results, indicate a significant direct and positive effect on the impact of strategic collaboration on innovation (β = 0.305, p = 0.04), infrastructure and standards have a direct positive effect on innovation (β = 0.306, p = 0.001), information sharing has direct positive effect on innovation perception (β = 0.247, p = 0.010), and lobbying has a direct positive effect on innovation (β = 0.305, p = 0.0001). Also, the results indicate a positive direct effect of innovation on regional development (γ = 0.547, p = 0.0001), thus confirming the hypothesis H5. The table 4 shows the results of hypothesis testing.

Table 4. Hypotheses testing

Hypothesis	**Path**	**Standardized estimate**	**SE**	**CR**	**p**	**Det. coeff. (R^2)**	**Result**
H1	SC → I	.305	.140	2.844	.004		Supported
H2	IaS → I	.306	.139	3.193	.001		Supported
H3	IS → I	.247	.101	2.591	.010	R^2_I = .234	Supported
H4	L → I	.350	.105	3.692	.0001	R^2_{RD} = .234	Supported
H5	I → RD	.382	.103	3.710	.0001		Supported

Source: Own calculation

CONCLUSION

Enterprises have different expectations, goals and reasons when deciding to join a cluster. Anić et al. (2019), according to the goals of joining the cluster, listed three groups of members: lobbying oriented, networking oriented, and innovation-oriented. Yıldız and Zafer (2015) listed as desired goals of cluster members: qualified personnel employment, rivals' observation, strategic collaboration, and information sharing. The result of cluster formation should be the satisfaction of the needs and interests of members within the cluster (Mirković and Lukić, 2013). The study aimed to examine the relationship between the desired goals of the company, which joined the clusters, innovation and regional development.

The findings of the study suggest a significant effect of strategic collaboration on innovation. The obtained results are in accordance with the results of the study by Lopes et al. (2019), who examined how collaboration, in a competitive environment, can affect innovation and pointed out the importance of cooperation in the innovation process. Also, according to Un and Asakawa (2015), R&D collaboration with suppliers and universities has a positive impact on the innovation process. Collaboration enables companies to access external knowledge, which they can use to obtain innovative products (Un & Asakawa, 2015).

The findings of the study indicate a positive effect of infrastructure and standards on innovation. The results are in line with Mangiarotti and Riillo (2014), who examined the relationship between standardization and innovation and determined the positive impact of ISO 9000 certification on the likelihood of innovation, in a situation where, in the definition of an innovative company, organizational and marketing innovations are included. The authors point out that certification increases the propensity for innovation in production when the focus is on technological innovation. Feldman and Florida (1994) confirmed the hypothesis that innovation is a function of the technical infrastructure of a particular area. Frenz and Lambert (2012) point out that infrastructure is a key resource for the efficient functioning of innovation, with standards deeply embedded in the ways and styles of innovation practice in the industry.

The findings of the study point to the positive effect of information sharing on innovation. Yıldız and Zafer (2015), also, found a positive relationship between these two constructs. According to Karanasios (2018), tools that support the exchange of information and cooperation offer the possibility of overcoming long-term challenges in the work between companies.

The findings of the study point to the positive effect of lobbying on innovation. The results of a study conducted by Ozer et al. (2013), show that a larger network size will be even more effective in influencing company innovation, when a company invests in lobbying activities, i.e. that the extent to which networks enable the flow of information is a function of company investment in corporate lobbying.

The findings of the study indicate a positive direct impact of innovation on regional development. However, there is little empirical evidence on the connection between these two constructions, with which comparable results have been obtained. For example, Delgado et al. (2014), based on the results of their study, suggest the complementarity of the relationship between employment and innovation in regional clusters. Besides, the authors state that the strength of related clusters in the region and neighboring regions increases the regional growth of industry, with new industries appearing where there is a strong cluster. Njøs and Jakobsen

(2016) point out that cluster projects should be operationalized as sources of regional innovation platforms where both the market and technology serve as drivers of innovation.

The main limitation of the conducted study is related to the sample size, due to which generalization is almost impossible. The results indicate the need to increase empirical research, in the context of the relationship between clusters and regional development, which is a key implication of this research. In this regard, further research can be focused on finding cluster policies, which will, above all, support the development of clusters, which significantly contribute not only to regional but, also, to sustainable development.

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INNOVATIONS AND BUSINESS ACTIVITIES OF SLOVAK START-UP ENTERPRISES

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Abstract: *An essential part of the corporate sector is formed by small and highly innovative enterprises, the start-ups. They introduce highly innovative activities, new solutions, integrate research results into their activities, as well as apply new technologies in their everyday practice. Start-ups are increasingly popular in different sectors of the national economy since they are a vital part of the entrepreneurial environment. The entrepreneurial activity of start-ups focuses on highly innovative products or services with high added value for the target customer. The main goal of the current paper is to target the innovative activity of Slovak start-ups. The paper presents partial results of the research conducted by targeting Slovak start-ups. The research results conclude that innovative start-ups are the driving force of the entrepreneurial sector. The innovative activities of these businesses rank them among the highly competitive and successful players on the market, even in a challenging business environment.*

Keywords*: Enterprises, Business activities, Innovations, Start-up.*

INTRODUCTION

The market economy in every part of the world is established and subsequently shaped by business units. Businesses form a significant part of the economy by creating value, producing products, providing services, creating workplaces and development of regions where they conduct their activity. The business sector consists of several groups of companies. The largest group is formed by small enterprises. Companies with a high degree of innovation, flexibility and creativity, which we refer to as start-ups have an interesting position on the market. These types of business units are characterized by interesting and valuable ideas that can contribute to achieve success or turn the business activity prosperous. Start-ups are the key players of dynamic development all over the world as well as in the EU. Most of the start-ups operate in the service sector and provide their services offering new solutions improving our everyday life. Typically they are representing the sector of technologies, IT solutions, energetics, etc. They benefit from offering simple and flexible solutions to everyday problems.

The basis of any start-up business is a unique idea, which can be commercialized on the market. An entrepreneur with a good idea develops a business model, the viability of which is assessed. As start-ups focus to provide benefits by applying simple and new solutions, the viability of the business activity is presumed. Start-ups represent business strategies aimed at satisfying the new and future needs of potential customers. This should be mentioned as their unique feature compared to small businesses based on the classical model. Start-ups are based on unique and not presented ideas yet. These become significantly innovative and generate high demand on the market.

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It is essential to note that the basis for innovation and the establishment of start-ups is backed by the results of science, technology and development. It is difficult to imagine the existence of start-ups without this background. Therefore, the government and certain governmental bodies and further institutions should support the scientific-technological development and look for solutions that result in the desired effect important for the society. Although innovations are recognized as new ideas or solutions, their benefit goes beyond this definition. Innovation is also described as a change that contributes to the improvement of existing products or services, as well as there can come in form of organizational changes. Innovation can also be defined as an improved, enhanced quality of existing products or solutions.

THEORETICAL BACKGROUND

Although we speak about the small business sector, we should note that start-ups are business units with different features and character than the businesses in the SME sector. In terms of categorization, start-ups are small enterprises and belong to sub-group of micro-enterprises. Start-up is formed by 1-3 entrepreneurs, who come up with a brilliant idea or change supporting progress. Start-ups differ from the rest of enterprises by their life-cycle, business strategy or business model that enables them to enter, develop and maintain their activities on the target market.

The changing situation in the local and world market is significantly determined by the phenomenon of globalization. Globalization is strongly supporting the expansion of foreign direct investment, which means the investment is flowing beyond the borders, creating new business units, spreading innovation and expanding the existing business activities. This tendency results in the establishment of new forms of entrepreneurship, which need to be legally defined and recognized. The small and medium-sized enterprise sector in the majority of countries is also represented by start-ups. In the sector of larger companies, we are witnessing the expansion of a simple joint-stock company (Miloševičová and Treľová, 2018).

The challenging business conditions will shift a focus on sustainable entrepreneurship and the social responsibility of the business. Both on a domestic and international scale a changing business attitude can be detected, which in addition to internal priorities will also emphasize long-term sustainability. According to Agarwal et al (2018), this can be achieved by combining innovation and environmental policy. An integrated approach to the management of the business unit is established.

Although the business environment is very demanding in terms of competition and changing demands of customers, there remains a gap, where business motivation results in the establishment of new business units. However, only those businesses have a chance to succeed which are significantly different from the existing ones on the market. Differentiation offers an idea, improvement or satisfaction of need partially satisfied or not satisfied at all. This gap is filled by start-ups (Amorós, Cristi and Naudé, 2020). Motivated entrepreneurs will introduce products with high added value. This fact is approved by research conducted in 70 countries. Entrepreneurship contributes to satisfaction not only the customer but also the entrepreneur running the business.

The authors team of Estay, Durrieu and Akhter (2013) were interested to answer some important questions about the role of motivation in start-up enterprises. They wanted to know what is important to do when the business is started, how entrepreneurial motivation affects the start-up, and to what extent the project opportunities influence starting a new business. A

questionnaire survey was prepared for those entrepreneurs who were motivated to start a new business. The most motivating factors to start a business were the following: enter the market with a new product, project opportunities – focus on calls, innovations as adventure for enterprise, innovation of existing products or finding completely new solutions. The representatives of innovative enterprises believe that this kind of entrepreneurial activity will result in tangible financial benefit and satisfaction of being a pioneer in innovation.

At this stage, it is necessary to approach start-ups as a form of entrepreneurship. Slávik et al (2020) emphasize that start-up is a very young form of enterprise, where we can detect different organizational and personnel structure than in the case of other types of enterprises. The start-up is dominated by the founder building the network of business relationships. The author's team in their research found that age, qualification and reason to start a business as well as the quality of teamwork play an essential role. In the case of start-ups, it is about an intensive development of business with a special focus on innovation. They find it necessary to monitor the business ideas and the cycle of investments. According to authors, the founders of start-ups are better leaders than appointed managers, since the quality of leadership depends on the phase of the cycle the start-up is experiencing. Start-ups are struggling with limited opportunities and weaknesses associated with this type of business. However, the lack of experience is compensated with a high level of interest, enthusiasm, determination and hard work.

The context above shows that start-ups are an interesting and significant part of the business base in the economy. They are characterized by a high level of creativity, innovative ability, flexibility, opportunity to implement their ideas, effective work and implementation of their own business strategy. Mainly in younger market economies e.g. Slovakia, start-up initiatives play an essential role. They provide an opportunity to launch business ideas, develop entrepreneurial processes and launch new, innovative products on the market.

Bednar, Tariskova and Zagorsek (2018) consider start-ups to be rapidly developing business units and representatives of a modern business model. Generating ideas and investments are the core of this business model. The team of authors of this article is focusing to define the models used by Slovak start-ups. As a highly innovative businesses, start-ups can achieve not only success but can also generate a decent profit. According to the findings of the authors, there are different models present in Slovakia, where significant differences can be detected in prices, profit and economic indicators. Establishing a start-up is not automatically associated with success on the market.

Start-ups characterized by innovation represent significant potential for various changes in the industry sector and economic recovery. The scientific literature does not provide a detailed answer for the overall activities of start-ups. However, there are relatively systematic overviews about the existence of start-up businesses. Passaro, Quinto and Thomas (2020) warn the attention that the importance of these types of businesses will increase in relation to the restructuring of economies and the need to adapt to market changes. Chang, Kim, J.H, Kim, Y.S. (2020) add that costs, time and approaches can be the basic barriers for start-ups. Their results show that these barriers converge to reduced dispersion. This is later reflected in the regions they operate in.

Pitekova and Vrablikova (2019) focused their attention on examining the start-up initiatives concerning the regions of Slovakia. The regions characterized by the presence of innovative start-ups show a higher level of innovation and creativity, which leads to a higher standard of living. Human resources are a crucial aspect of start-ups. The ideas are generated by people,

which is the basis of start-ups to operate. Thus, creative potential is concentrating in individual regions of Slovakia. The authors compared the regions of Slovakia based on the following factors: frequency of start-up initiatives, implementation of innovations, level of employment in innovative and developing businesses, technological equipment, micro and macro environment of the business. They came to conclusion that a significant determinant for the functioning of the start-up is consulting – the basis for creative output.

It is clearly demonstrated that innovative and start-up businesses providing added value play a significant position in the development of the regional economy. They create and added value both for the company itself and the region they operate in.

Innovations and creative solutions are the comparative advantages of start-ups compared to other types of businesses. Innovations do not often require technologies as expected, more important aspect is the creative and high-quality human resources with adequate skills and innovative ideas to be implemented on the market (Vnoučková, 2018). Leaders among start-ups are technology oriented businesses representing different sectors of the economy. The research of the author pointed to significant results detected between the factor of age and creativity as well as the factor of creativity and the history of business. The author also emphasizes that professional training and qualification, professional assistance and project orientation are essential for start-ups.

AIM, MATERIAL AND METHODS

This article is addressing an interesting field of entrepreneurship, mainly the sector of small and medium enterprises, which are characterized by a high degree of innovative activity. These businesses introduce new solutions on a large scale of the national economy. Thematically, the article is addressing the start-ups. The article will focus on certain aspects of these types of businesses. The main goal of the article is to present some of the important partial research results as a part of project VEGA 1/0813/19 - "Managing the development of innovative and start-up forms of businesses in international environment and verification of INMARK concept". As a partial goal is defined to present the activity of a specific group of business units, such as the start-up companies. In order to provide adequate information about start-ups, it was necessary to introduce the theoretical background of start-ups and innovative entrepreneurship. Secondary sources are processed in the theoretical part of the article. Beside the secondary sources, primary data was also processed directly linked to the entrepreneurial environment. A questionnaire survey was applied. The questionnaires were distributed to a large number of companies operating in the small and medium-sized business sector in Slovakia. The presented research results are from the second partial ethap of the research, which was conducted in 2020. 238 businesses participated in the research, which fell into the categories of innovative business and start-ups (186). In addition to the questionnaire survey, some basic research methods were also applied e.g. cognitive methods.

RESULTS AND DISCUSSION

This part of the article is oriented at the presentation of the achieved results during the partial stage of the research VEGA 1/0813/19 - "Managing the development of innovative and start-up forms of businesses in international environment and verification of INMARK concept". Monitoring the results of business activities and measuring the business success were addressed by many scientists. When mapping the Slovak businesses, it is necessary to mention the

research team Bosáková et al. (2013). Start-ups as a specific form of micro-enterprises were addressed by Slavik et al (2020).

Part of the research task conducted by us during the implementation of VEGA is to obtain information about the current innovation activity of the Slovak businesses operating in the SME sector. The partial results in form of the most important attributes of innovative start-ups will be introduced.

The research sample consisted of 186 business units operating in Slovakia. As for the categorization of these business units, micro enterprises had the highest participation ratio, followed by small businesses. The smallest representation in the survey was detected in the case of medium-sized enterprises. The results are presented in Table 1.

Table 1. Types of companies participating in the research

	Absolute abundance	**Relative abundance**
Micro enterprise	81	43.55 %
Small enterprise	68	36.56 %
Medium-sized enterprise	37	19.89 %
Total number of enterprises participating in the research	186	100 %

Source: own research

As it was mentioned above, the smallest representation in our research, less than 1/5 was made by medium-sized companies. 37 medium-sized companies were involved in the research. A bit more than 1/3 of the businesses were small enterprises, altogether 68 small businesses were involved in the research sample. The highest ratio was represented by micro enterprises, 81 businesses participated in the research. It is micro enterprises that typically represent innovation in the business sector of Slovakia, so the ratio of their representation is not surprising.

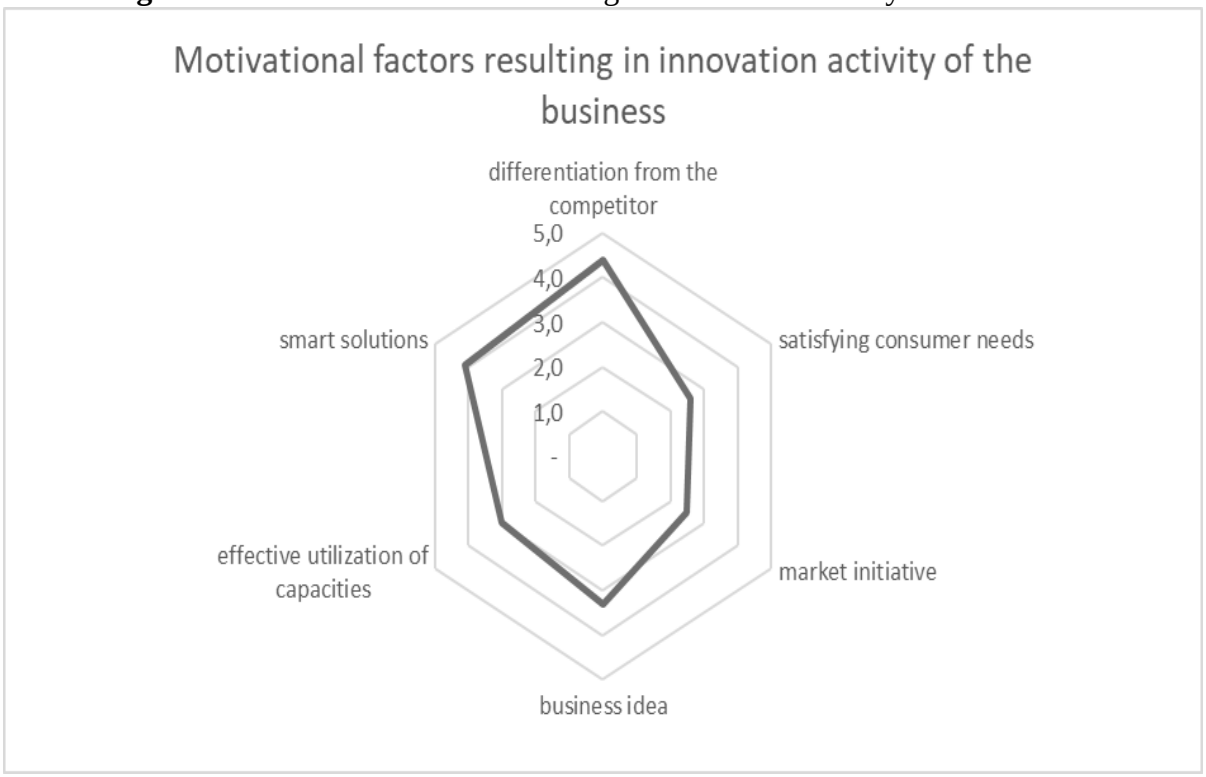
Motivation to innovate is one of the most important determinants that influence the innovative activity of the business. Therefore, we were interested in the factors that motivate the business to realize innovative activities. The obtained results are presented in Figure 1.

In a closer analysis of motivation factors, we can see that for businesses participating in the research the most important motivating factor resulting in innovation activity of the business is the differentiation from a competitor with a score of 4,4, closely followed by smart solutions with a score of 4,1. Our results reflect the trends that those companies with innovative character and start-ups are successful on market due to their smart solutions, which are highly innovative and demanded on the market by end-users. A third most important motivation factor was marked the business idea. This factor is adequately motivating for business entities since it provides companies the possibility of self-realization i.e. implementing their business ideas. Following the first three factors which are closely linked, further factors should be mentioned that stimulate and motivate. These are based on the economic situation of the business. The fourth important motivating factor to innovate is effective utilization of production capacity. It has achieved a score of 3,0. Economic indicators are pushing companies to increase the efficiency of their activities. It was interesting that satisfying the need of the customer is one

of the least motivating factors influencing the innovative activity of businesses. The least motivating factor was the market initiative (2,5). This can be explained by the activity of competitors, further market players and the direct reaction of the company to the situation.

In the further part of the research, we were interested in the resources the company has, which are of particular importance for a business with innovative character or operate as start-ups. We found out which sources represent the most significant pillar of innovation activity. Our findings are presented in Figure 2.

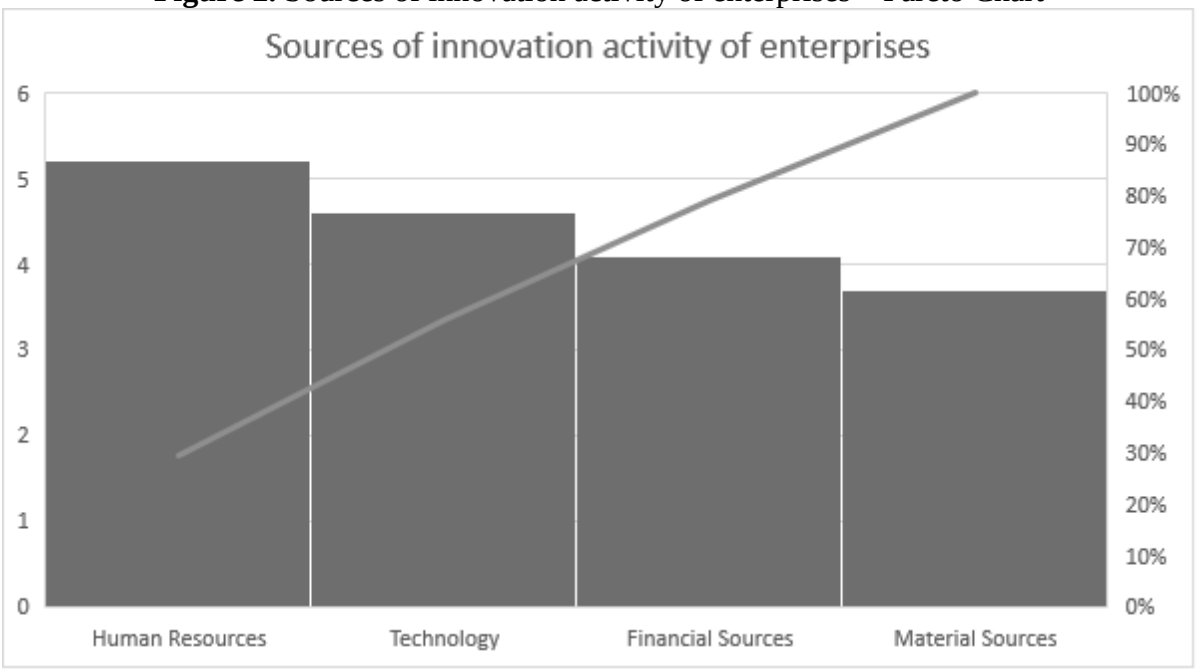
Figure 1. Motivational factors resulting in innovation activity of the business



Source: own research

The most important sources of innovative activity of businesses listed by the respondents participating in this survey were the following: Human Resources, Technology, Financial Sources, Material Sources. These together form the basic pillar of innovation activity of businesses. In Figure 2 (Pareto Chart) we can monitor the results. In the case of innovative and start-up initiatives, human resources have proven to be the most important pillar of the business. Ideas are generated by individuals. In terms of innovative activities, the second most important pillar proved to be technology. It has reached the score of 4,6. Technology is a key element in the process of implementing innovations. These activities have to be backed by financial resources, which was the 3rd most important pillar in the survey. As a last in the survey were mentioned material sources with a score of 3,7. In addition to a good idea and cutting-edge technology, material resources are also essential to create new solutions for products and services.

Figure 2. Sources of innovation activity of enterprises – Pareto Chart



Source: own research

FUTURE RESEARCH DIRECTIONS

Research in the field of innovative small and medium-sized enterprises, micro businesses and start-ups are an extremely discussed issue since only those who are a step ahead of their competitor can remain competitive on the market. At the same time, the customer of the 21st century has increased demands and expects that his needs will be fully met and companies will compete for his loyalty and interest by offering new, currently on the market unavailable products. The innovative ability of businesses is also reflected in offering new or improved solutions. Start-ups immediately introduce their innovative activities and put them into practice that makes our lives easier and simpler. At a time of pandemic crises caused by the SARS CoV2 virus, business conditions have become challenging. However, it is also an opportunity for innovative start-ups that can quickly respond to market circumstances to launch new solutions for everyday life. Economies in the transformation process and economies that operate on social-market principles, start-ups have a challenging opportunity, inspiration can gain from the example of successful enterprises of developed market economies. The future of research in the field of innovative and start-up businesses will focus on their adaptability, flexibility and financial ability or quickly respond to benefit from market opportunities.

CONCLUSION

Start-up businesses as a less developed form of entrepreneurship in Slovakia have huge perspectives. These perspectives are also supported by current trends the businesses face (increased economic competition, demand for innovative products, globalization, etc.). Start-up is a type of business enterprise entering the market. The success of this business is mainly conditioned by the business model based on a clever idea and launching products required by the market. These businesses are small in size, but highly efficient and flexible in terms of new solutions arising interest. These are small enterprises that differ significantly in their structure and business concept. In this paper, we set the goal to present some of the significant partial results of our research and set a partial objective to introduce the activity of innovative start-

ups. On the example of primary research of Slovak enterprises, we presented partial results obtained on a sample of almost two hundred enterprises. Human resources, new ideas and smart solutions are key factors, which determine not only the activity of these enterprises but to a significant extent also their business success. The strongest motivation factor turned out to be the differentiation from competitors on the market. Human resources and technology proved to be the most important pillars of the innovative enterprise. We assume that due to the national and international market trends, the share of innovative start-up companies is expected to increase.

ACKNOWLEDGMENT

This research was supported by the Ministry of Education, Science, Research and Sport of the Slovak Republic. [grant number VEGA 1/0813/19 Managing the development of innovative and start-up forms of businesses in international environment and verification of INMARK concept].

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EMPLOYEES' COMMUNICATION DURING COVID-19

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Abstract: *The context of the COVID-19 pandemic presents communication challenges for companies as they adjust to a new operating, business and public policy environment. This unprecedented public health crisis affects all stakeholders. The COVID-19 pandemic underlined the importance of strategic internal communication, as many companies had to introduce new working practices and hire or fire staff extremely quickly. An explorative qualitative and qualitative research approach was applied to determine the use of digital communication channels and communication channels during the COVID-19 pandemic by Slovenian employees. The opportunities and challenges that arose during COVID-19 the outbreak of the pandemic are presented. Finally, proposals for organizational communication strategies in times of the pandemic are provided.*

Keywords*: Internal communication, COVID-19 pandemic, Digital media.*

INTRODUCTION

Following the outbreak of coronavirus in China at the end of December 2019, the first cases of infection occurred in Europe after 24th January and the first major outbreak happened in northern Italy (Spiteri, Fieldong, Diercke, Campese, Enouf, Gaymars, 2020). As a neighbouring country of Italy with high population mobility, the infection spread relatively quickly to Slovenia. The first case of infection in Slovenia was reported on 4 March. On 13 March, when this study began, the epidemic was declared by the Slovenian government. With a prevalence of 67.8 cases per million population, Slovenia was in 11th place on that day (Coronavirus cases, 2020). On 14 March the first death of coronavirus in the country was reported and the government adopted containment measures that basically shut down public life, as only those workers who provided essential services could go to work.

The COVID-19 pandemic has had a profound impact on the way people around the world live and work. Companies responded to the pandemic with the expected measures - reorganisation, adaptation of work at the company's location and introduction of home-based work or teleworking defined as "a work arrangement in which employees perform their regular work at a site other than the ordinary workplace, supported by technological connections" (Fitzer, 1997, p. 65).

In Slovenia, the number of workers working from home was relatively low during the first pandemic phase. According to Eurofound, in April 2020 29% of Slovenian, 27% of Croatian, 42% of Austrian and almost 60% of workers in Northern European countries and Luxembourg in Belgium were teleworking (Eurofound, 2020). The reason for these differences in Europe was a combination of factors such as a country's affinity with technology, the availability and quality of its technological infrastructure, the management culture and the drive for higher productivity within companies; and the need for workers to be flexible in time and place to

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balance work requirements with family responsibilities and other personal commitments (Eurofound, 2020).

The Slovenian study (Work organization during and after the epidemic, 2020) among employers and employees showed that the experience of working from home was different in Slovenia, but half of the companies estimate that it was better than expected. The main advantages of working from home were the lower risk of transmitting infectious diseases among employees, that there is no loss of time due to transport to work and that meetings are shorter. The main disadvantages were that there was no real separation between work and private life, dependence on the Internet connection, disturbances in the home environment, loneliness, poorer control over the work of employees, poorer knowledge transfer, difficult cooperation and communication. Amcham's study conducted in May 2020 showed that 90% of Slovenian companies reported that no or little work from home presented challenges, suggesting that work from home could be maintained even after the restrictions (COVID-19 flash study, 2020).

In a study on homeworking during the pandemic COVID-19 in The UK, Australia and New Zeeland, Waizenegger, Mckenna, Cai and Bendz (2020) found that the benefits of working from home as found in existing e-working literature may not be applicable to the context COVID-19. Their findings show that workers are often forced to work in a home environment, which can jeopardize the original benefits, such as reduced distractions or increased productivity, and negatively affect team collaboration. On the other hand, a typical challenge that existed before COVID-19, such as occupational isolation, has been reduced as all formal and social communication is now through digital channels, enabling the social and occupational integration of workers from the period before COVID-19.

Lithuanian study on the evaluation of telework during the pandemic COVID-19 defines a portrait of the most satisfied teleworker: She is a millennial woman with a university degree and 4-10 years of work experience, working two days a week from home in management and administration. The person most dissatisfied with teleworking seems to be a man of the baby boomer generation, who has a university degree, 20 years or more of work experience and only started teleworking during quarantine. More satisfied with telework are younger employees and middle-aged employees who can combine telework with office work and who themselves have many years of professional and telework experience (telework before quarantine). Meanwhile, the older generations, who worked practically three or more days a week before quarantine, were less satisfied with teleworking (Raišiene et al., 2020)

Teleworking at a distance during the pandemic COVID-19 presents communication challenges. Working from home during the pandemics COVID -19 has dramatically changed financial opportunities and created a new communication pattern in terms of channel, frequency, length and style (Waizenegger et al., 2020). In addition to the need for functional communication during the lockdown in order to perceive and update various adjustments in technological capabilities, communication styles must adapt due to the limitations of technological capabilities (Strong et al., 2014). Since communication channels and meeting forms are the keys to successful teleworking, it is important to know which communication channels are used by employees and with which they are most satisfied.

Communication satisfaction within the organization is defined as “an individual's satisfaction with various aspects of communication in his organization” (Crino and White, 1981, pp. 831-832). The communication channels available to teleworkers are different from those available

in a traditional office environment. For example, full-time teleworkers have little or no personal communication with other employees who fly instead of e-mail, instant messaging, telephone or video communication (Sias et al., 2012). A study conducted by Smith, Patmos and Pitts (2018) on teleworker satisfaction with the communication channels e-mail, instant messaging, telephone and video found that job satisfaction is strongly correlated with satisfaction with the job. Teleworkers who are satisfied with the use of e-mail, instant messaging / chat, telephone and video communication channels thus experience higher job satisfaction. Due to the increased use of new technologies in the workplace, it is important to investigate not only the advantages and disadvantages of certain channels, but also how satisfaction with the communication channel can mitigate the relationship between personality type and job satisfaction. We, therefore, propose the following: There will be a significant relationship between job satisfaction and communication satisfaction with the following communication channels: (a) e-mail, (b) instant messaging/chat, (c) telephone and (d) video conference.

It is important to study satisfaction with communication in telework and to collect sound evidence to identify specific changes in employees' attitudes to communication in telework that may be important for addressing the challenges in human resource management and organizational communication. This raises the question of how teleworkers were satisfied with communication during the pandemic COVID-19. The aim of this study was therefore to determine the use of communication channels, satisfaction with communication channels and to evaluate the communication disadvantages of telework. The study was conducted in Slovenia, a country with a lower proportion of teleworkers in the EU, which suddenly had to switch to telework to a large extent.

MATERIALS AND METHODS

Participants

In order to investigate how employees use communication channels and how satisfied they are with communication within their telework, Slovenian remote workers were approached to participate in the study. The data collection took place from 13 March to 15 April 2020. The data was collected via a web-based survey, which lasted on average about 10 minutes. A total of 312 full-time teleworkers (at least 3 days per week) took part in the study. The sample comprised 32.7% (N = 102) of men and 67.3% (N = 210) of women (Table 1).

Table 1. Socio-demographic characteristic of sample

Variable		**N**	**%**
Gender	Female	102	32.7
	Male	210	77.3
Age	<25	70	22.4
	26–35	65	20.8
	36–45	105	33.6
	46–55	43	13.7
	56–65	25	8.0
	>66	4	0.2
Education	Secondary	16	5.1
	Bachelor’s degree	208	66.6
	Master’s degree	70	22.4
	Doctor’s degree	18	5.3
Field of activity	Services and intellectual outputs	109	34.9
	Production and trade	23	7.4

	Management and administration	43	13.8
	Health	13	4.1
	Education and social services	118	37.8
	Other	6	2.0
Total		312	100

Source: Own calculation

Instruments

Job satisfaction was measured with an adapted version of Pond and Geyer's (1991) global job satisfaction scale. The five questions were answered using a 5-point scale ranging from "strongly disagree" (1) to "strongly agree" (5). This is a reliable scale ($\alpha = 0.86$).

To assess satisfaction with the communication channels, respondents evaluated that was adopted from Hecht's (1978) scale of satisfaction with interpersonal communication. Four channels were measured: e-mail, chat or instant messaging, telephone, and video conferences (e.g. zoom, teams, Webex). Five questions were asked for each channel and answered using a 5-point scale ranging from "strongly disagree" (1) to "strongly agree" (5), making a total of 20 questions. The satisfaction scale of the communication channels is reliable ($\alpha = 0.78$).

In order to evaluate the communication disadvantages of telework communication elements from the scale for evaluating factors that have a negative impact on the efficiency of teleworking, the study consisted of 12 items (Raghuram et al., 2019). The scale aimed to measure the disadvantages of teleworking using a Likert type 5-point scale ranging "not important at all" (1) to "absolutely necessary" (5). The satisfaction scale for communication channels is reliable ($\alpha = 0.88$).

The variables of frequency of use of communication channels and forms of the meeting were also included. The frequency had the following dimensions: never, insignificant working time, several times a week, daily up to 10 min, daily 10-30 min, daily 30-60 min, daily 1-2 hours, daily more than 2 hours; forms of meetings: face-to-face meeting, team or small group meeting (3-6 persons), meeting (6-10 persons), conference (more than 10 persons).

Data Analysis

In addition to simple descriptive statistics, a Pearson and Spearmen correlation was performed to access the association between variables. IBM SPSS Statistics for Windows, version 25.0 was used for all analyses. P values 0.05 were considered statistically significant.

RESULTS

Use of communication channels

Most teleworkers (43.4%) use telephone calls most frequently across all communication channels, between 1 and 2 hours a day. No less than 25.4% of respondents use the phone for more than 2 hours. Most (38.2%) of the respondents (38.2%) use e-mail daily for 30 to 60 minutes, but also 28.5% use it for one or two hours. Video conferencing is used several times a week by most respondents (35.5%), but 27.3% also stated that they use video conference for more than 2 hours a day. Chat or instant messaging for work is the majority of respondents (42.5%) insignificant working time, and 28.6% of respondents also use it from 10 to 30 minutes.

Table 2. Frequency of using communication channels (N = 312)

	Never	Insignificant work time	Several times a week	Daily up to 10 min	Daily 10-30 min	Daily 30-60 min	Daily 1-2 hours	Daily more than 2 hours
Phone calls	0.0	0.0	1.5% (5)	2.5% (8)	5.5 (17)	21.7 (68)	**43.4% (135)**	25.4% (79)
Emails	0.0	2.1% (7)	2.1% (7)	3.7% (12)	22.7% (71)	**38.2% (119)**	28.5% (89)	2.1% (7)
Video conferences	0.0	6.8% (21)	**35.5% (111)**	3.3 (10)	3.7% (12)	4.5% (14)	18.8% (59)	27.3% (85)
Chats or instant messaging	15.1% (47)	**42.5% (133)**	3.3 (10)	3.7% (12)	28.6% (89)	3.6 (11)	3.3 (10)	0.0

Source: Own calculation

Although certain channels of communication are only intended for specific meetings, teleworkers use them for different types of meetings. Telephone calls predominate for personal communication (95.2%), but a few (4.8%) also use them for dark or small group discussions. E-mail is mainly used for personal communication (85.7%), some (9.9%) for thematic or small group meetings or regular meetings (3.3%). Videoconferencing is mostly used for team or small group meetings (63.1%) or meetings (28.6%) and some (4.5%) even for personal communication. They all use chats for personal communication.

Table 3. Common forms of meeting with use of communication channels (N = 312)

	Face-to-face meeting	Team or small group meeting	Meeting	Conference
Phone calls	95.2% (297)	4.8% (15)	0	0
Emails	85.7% (271)	9.9% (31)	3.3% (10)	0
Video conferences	4.5% (14)	63.1% 197	28.6% (89)	3.7% (12)
Chats or instant messaging	100 312	0	0	0

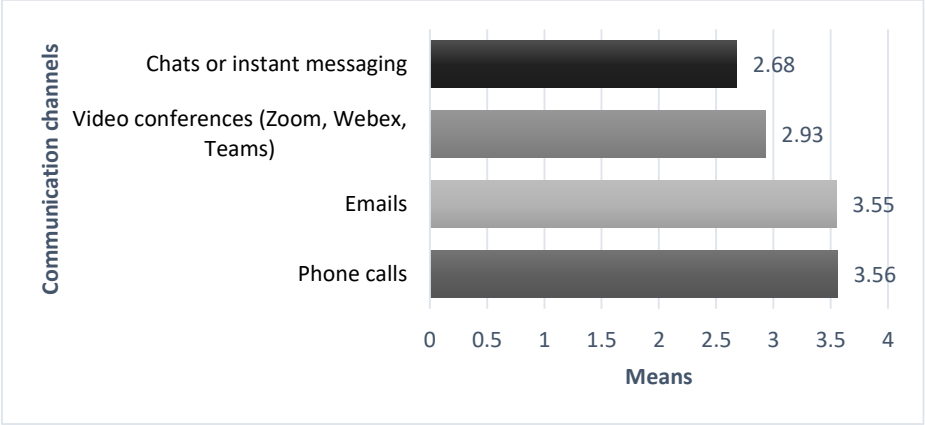
Source: Own calculation

Satisfaction with communication channels and satisfaction with job

Figure 1 shows that respondents are most satisfied when use phone calls (M = 3.56, SD = 0.61), followed by emails (M = 3.55, SD = 0.91), then video conferences (M = 2.93, SD = 0.89) and chats (M = 2.93, SD = 0.89).

A bivariate correlation was conducted to examine if there is a relationship between communication channel satisfaction and job satisfaction. It was predicted that there would be a significant relationship between e-mail, instant message/chat, phone, and video communication channel satisfaction and job satisfaction. Results indicated job satisfaction to be strongly correlated with communication channel satisfaction for e-mail (r = 0.51, p = 0.001), instant messaging (r = 0.48), phone call (r = 0.45, p = 001), and video conference (r = 0.46, p = 0.001). As such, teleworkers satisfied with using e-mail, instant message/chat, phone, and video communication channels experience greater levels of job satisfaction.

Figure 1. Satisfaction with communication channels (N = 312)



Source: Own calculation

Table 4. Correlation between satisfaction with job and satisfaction with communication channels (N = 312)

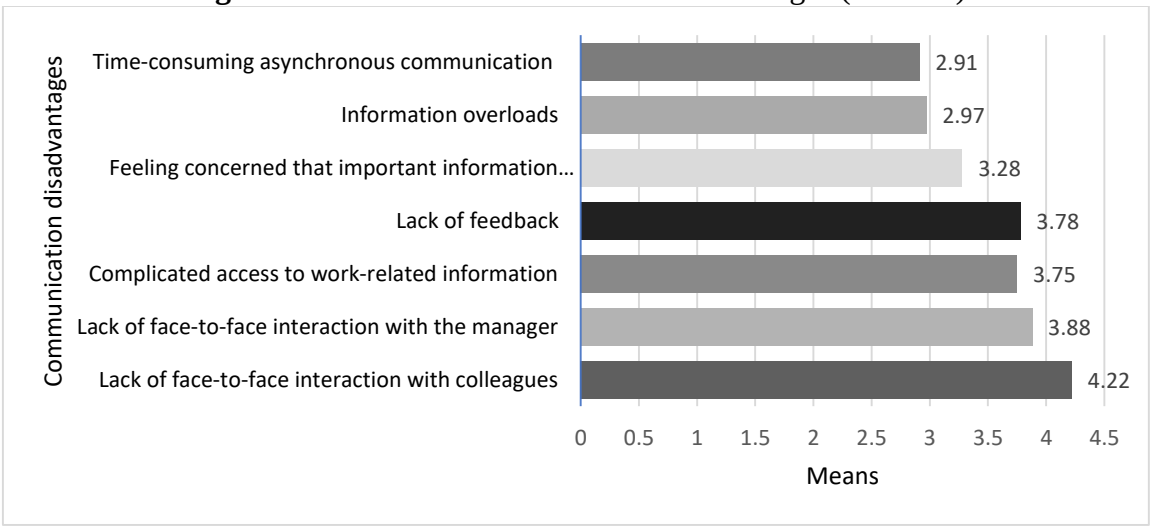
	Pearson's r	p-values
Phone calls	0.45	0.001
Emails	0.55	0.001
Video conferences (Zoom, Webex, Teams)	0.46	0.001
Chats or instant messaging	0.48	0.001

Source: Own calculation

Communication disadvantages

Regarding the factors that negatively affecting communication efficiency of teleworking, Figure 2 shows that respondents expressed a relatively high negative attitude, namely the most negative attitude toward lack of face-to-face interaction with colleagues (M = 4.22, SD = 0.81), followed by the lack of face-to-face interaction with manager (M = 3.88, SD = 0.93), then complicated access to work-related information (M = 3.75, SD = 0.81) and lack of feedback (M = 3.78, SD = 0.87), the feeling concerned that important information evades me, that I miss something (M = 3.28, SD = 0.97), information overloads (M = 2.97, SD = 1.07) and time-consuming asynchronous communication (M = 2.91, SD = 0.91).

Figure 2. Means of communication disadvantages (N = 312)



Source: Own calculation

At least the association between gender, age and education of respondents and communication disadvantages was examined (Table 5). The Spearman correlation showed that the assessment of communication disadvantages in teleworking differed between men and women in only one case. It was found that women expressed a more negative attitude towards lack of face interaction with colleagues (r = -0.22, p = 0.01). The test also showed that older people over 56 years of age felt the lack of face-to-face interaction with colleagues (r = -0.31, p = 0.01) and information overload (r = -0.21, p = 0.01) more strongly than younger people. The Spearman's correlation also shows that a higher level of education is associated with an increased lack of face-to-face interaction with the manager (r = 0.29, p = 0.05) and concern about the lack of important information (r = 0.13, p = 0.01).

Table 5. Evaluation of telework communication disadvantages from remote workers by groups (N = 312)

	Spearman's r		
Disadvantages	**Gender**	**Age**	**Education**
Lack of face-to-face interaction with colleagues	−0.22**	−0.31**	0.11
Lack of face-to-face interaction with the manager	0.13	−0.01	0.29*
Complicated access to work-related information	-0.17	−0.14	0.31
Lack of feedback	0.09	−0.32	0.29
Feeling concerned that important information evades me, that I miss something	0.29	−0.31	0.31**
Information overloads	0.08	−0.21**	0.17
Time-consuming asynchronous communication	0.29	−0.29	0.27

p < 0.05, ** p < 0.01.

Source: Own calculation

FUTURE RESEARCH DIRECTIONS

Since communication disadvantages could be related to the use of communication channels and other variables whose relationship we could not investigate due to lack of space, future research should find out how communication disadvantages are related to the use of communication channels and satisfaction with communication channels and job satisfaction.
Organisational communication during the COVID-19 pandemic provides an opportunity for new analyses of theory and practice from cross-disciplinary and multi-cultural perspectives. Conceptual and evidence-based reviews that are associated with employee engagement and wellbeing will be of particular interest.

CONCLUSION

Respondents were most satisfied when they used telephone calls, followed by e-mail, then video conferencing and chats. The results confirm the hypothesis: significant results were found between satisfaction with the communication channels e-mail, video technologies, instant messaging and telephone communication and job satisfaction. Overall, these results indicate that organizations can provide and promote a variety of communication channels for

communication. This would maximize the likelihood that individuals, based on their personality traits, would have access to the optimal communication channels to meet their needs and thereby increase job satisfaction.

Respondents expressed a relatively high level of negative attitudes, namely the most negative attitude towards the lack of face-to-face interaction with colleagues. Therefore, the organization must also provide for less formal communication between employees, which is very important for the employees.

Men rated working from home more negatively than women regarding the lack of personal interaction with colleagues. Older people over 56 felt the lack of face-to-face interaction with colleagues and the information overload more than younger people, and respondents with higher education levels miss more face-to-face interaction with the manager and are more concerned about the lack of important information than respondents with lower education.

Based on the study, management should review the pace and communication patterns of telework during the pandemic COVID -19, and the well-being of employees and the home situation should be taken into account when assigning team tasks and planning team communication.

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THE IMPORTANCE OF EMOTIONAL INTELLIGENCE OF LEADERS IN CRISIS SITUATIONS

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Abstract: *In the modern world, today, due to rapid changes, development of technology, market demands, we can conclude that more than ever there is a danger of various types of crises. In this regard, more than ever before, it is necessary to understand what resources companies need to be more resilient to crises. This paper provides an overview of the theoretical framework, as well as research conducted in the field of emotional intelligence and crisis management. Many studies show that the importance of emotional intelligence of leaders in a crisis is great. Leaders who have a higher level of emotional intelligence possess certain skills that can be crucial to the organization in crisis situations. This paper aims to present the correlation that exists between emotionally intelligent leaders and crisis situations, taking into account several studies conducted in this area. All studies conducted have shown that there is a positive relationship between the emotional intelligence of leaders and crisis management. The conclusion is that examining the impact of the relationship between the emotional intelligence of leaders and the crisis is an exceptional framework that provides an opportunity for human resources to operate within organizations, as management of organizations themselves, seeking and shaping leaders with emotional intelligence skills.*

Keywords: *Emotional intelligence, Leader, Crisis management.*

INTRODUCTION

The first papers and research on emotional intelligence came from the authors' John Mayer and Peter Salovey, who, as part of their research, developed models and ways to measure and assess emotional intelligence. Emotional intelligence refers to the ability to recognize the importance of emotions and their mutual influence, as well as to judge and solve problems based thereon. Emotional intelligence includes the ability to perceive emotions, adapt to emotionally-related feelings, understand, and manage the information resulted from those emotions (Salovey & Mayer, 1997; Salovey & Mayer, 1990).

Nowadays, the importance of emotional intelligence is particularly reflected in the areas of business. Companies are increasingly interested in hiring managers with characteristics of a person with a higher level of emotional intelligence, or managers who will be able to recognize emotions both in themselves and their team members and to manage these emotions in the right way. In their research, Salovey and Mayer (1997) point to the importance of the relationship between an individual's developed skills and his/her emotional intelligence. People who have developed skills related to emotional intelligence understand and express their own emotions, recognize emotions in others, manage action, and use moods and emotions to motivate adaptive behavior.

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The research that gave special importance to the topic of emotional intelligence in business is a 1998 article by Goleman, in which, having conducted research, Goleman concluded that 67% of all skills required by an individual in order to be successful in business results are actually based on emotional intelligence, that is, emotional abilities. Therein, Goleman divided the employee's skills into personal and social abilities. The first group includes abilities such as: self-awareness, management of oneself and one's own reactions, and motivation. The second group consists of abilities such as: empathy and social skills, that is, the ability to arouse desirable reactions in others.

Two years later, Goleman published a new article linking emotional intelligence to leader success, listing 4 key groups of abilities: self-awareness, self-management, social awareness, and social skills. Through each of these groups, the author states clear skills that contribute to the difference between exceptional and average managers, that is, provides the insight into skills needed by a true leader in order to effectively manage his/her team. (Goleman, 2000). Boyatzis (1999), drawing on Goleman's research, found that emotional skills, in order to have an impact on management performance, must permeate all four groups of emotional skills. He argues that out of all the skill groups, self-management is the most important, due to the impact it has on other groups, it has the most significant effect on business success results (Boyatzis, 1999).

On the other hand, it is clear that crisis is a term that is related to every segment of human life and greatly affects the satisfaction thereof. When we look at a person's working life, we can say that a person spends a third of his/her life at work. In that case, possible crises of companies or markets can certainly have a significant impact on employees. However, as the time we live in requires adaptation to all changes that are fast, dynamic, and often without clear instructions for adapting to a new process or change in an organization, personality structure of an individual, his/her energy, assertive communication and the ability to react to change in the right way in a short time thus become more important. The role of a leader in all times of change and crisis is to help his/her team maintain efficiency and set results, as well as motivation and a healthy, collegial relationship. Successful team management is more of an emotional than a cognitive process, because research shows more significant and better results in motivating team members through emotion, compared to the use of logic and cognitive mechanisms (Ilić, 2008).

This paper aims to determine, through research in the field of emotional intelligence and crisis management, whether there are positive or negative correlations between emotionally intelligent leaders and their crisis management. Identification of this relationship aims to produce certain conclusions, which can help companies in adopting strategies for establishing organizations more resilient to crises.

EMOTIONAL INTELLIGENCE AND CRISIS MANAGEMENT ABILITY

Due to all of the above, it is important to understand the way in which leadership and developing a leader's emotional intelligence can have a beneficial effect in times of crisis. Although the assumption that poor crisis management greatly affects the creation of significant losses in any crisis, it seems that human resources as well as other factors also affect it. Modern understandings within the field of human resources characterize human strength with unlimited resources. In addition, the ability to think and solve problems increases one's importance. Experts in this field perceive human resources to be so valuable that they consider any costs in

this area as an investment. Investing in the development of emotional intelligence of leaders in the organization can make that organization healthier and thus more resilient to crisis situations.

During the crisis, it was noticed that all leaders involved in solving it, used their cognitive resources to solve the situations, dealing with the problems of the crisis daily, often not including any other resources (Bargh & Chartrand, 1999). The way of team leading is important in that sense, so even changes in leadership styles can affect overcoming the crisis. As crisis implies a specific situation, it affects the cognitive overload of a leader, which further creates a blockage in the conscious perception of the leader's actions, as well as his/her personal assessment of his/her own results and management efficiency (Lord & Maher, 1993).

As stated before, Goleman (2000) defines 4 key groups of abilities within emotional intelligence: self-awareness, self-management, social awareness, and social skills. Soltani, I., Shahsavari, M., Moradi, M. (2014) conducted a case study, published in the *International Journal of Academic Research in Business and Social Sciences,* presenting the relationship of each of these four abilities of emotional intelligence with the ability to manage crisis. In a total of 130 surveyed managers in Isfahan Province (Iran), the results showed that there were positive correlations between emotional intelligence and crisis management. Of the total number of respondents, 76% were male and 23% female. Regarding the importance of the position, 9% of respondents represented the position of top management, 21% of middle management and 70% of the first-level management. The analysis proved that, with a coefficient of 0.58, emotional intelligence affected the ability to manage crises, with a coefficient of 0.58, self-awareness affected the ability to manage crises, with a coefficient of 0.71, self-management affected the ability to manage crises, and with a coefficient of 0.51, social awareness affected the ability to manage crises. However, this analysis also showed that there was a link between social skills and crisis management skills, but, with a coefficient of 0.05, the analysis rejected this.

Research conducted by Mader and Smith (2009) confirmed the accuracy of the hypothesis that the effect of leader emotions in crisis situations on leader evaluation is realized through the effect of participants. This study proved that accepting responsibility had a great impact on team members, that is, that a leader who accepted responsibility in a crisis situation was more valued by his employees. It was also proved that a leader giving answers and showing emotions in crisis situations makes the members of the team see him as a leader (Arsovski, 2014).

Nowadays, most organizations are project-oriented, which means that project managers become modern leaders in such organizations, because their responsibilities related to the project are completely related to the project team, that is, the success achieved on the project is related to the success of project team management. On the other hand, project managers are specially prepared for crisis situations, as each project is a separate business venture, and therefore the risk of failure is higher. A study conducted in our area in 2012 by a group of authors investigated the correlations between the emotional intelligence of project managers and their position in the organization hierarchy, as well as the emotional intelligence of project managers and their level of education (Obradović et al., 2012). The study results showed that there was a positive correlation, that is, that project managers with higher emotional intelligence (over 4) are in higher positions and have a higher level of education. The research sample included 75 respondents, project managers from the top 10 companies in Serbia, according to the list of the top 100 most successful companies in Serbia (published by the Ministry of Finance). Of the total number of respondents, 43% were male and 57% female. In terms of position importance, 4% of respondents were from top management, 17% from

executive management, 31% from operational management and 48% from middle management. The largest percentage of respondents had a university degree 55%, followed by 21% of respondents with a master's degree, 17% with a high school diploma and 7% with completed doctoral academic studies. Research findings show that project managers from the field of top management (4.33) and project managers with completed doctoral academic studies (4.64) have the highest level of emotional intelligence. They are followed by project managers from the field of executive management (4.09). An interesting finding in this study is the correlation observed in gender and age structure with business experience and emotional intelligence coefficient (EQ). Comparing the gender structure with the emotional intelligence coefficient, female respondents are found to have a higher coefficient (3.91) than male respondents (3.67). A positive correlation was also observed by comparing the age structure with business experience and the emotional intelligence coefficient, that is, years of work and life experience have an impact on a higher level of emotional intelligence.

Through these studies, it can be clearly seen that there is an unbreakable link between emotional intelligence and crisis management. The correlations in these studies go in a positive direction, which suggests that leaders with a higher level of emotional intelligence will manage crisis situations easier.

DEVELOPMENT OF EMOTIONAL INTELLIGENCE SKILLS IN LEADERS IN CRISIS SITUATIONS

Through numerous conducted studies, we can also see that when it comes to crisis situations, certain abilities within the emotional intelligence, which in normal business conditions would not be so important, are now more valued. The project named *Emotional Intelligence Used in Crisis Manager Training: The Pandora project*, implemented in the UK, basically shows the way of training of the special police units called "Gold commanders", which are believed to manage the crisis on a daily basis in their scope of work. They are in charge of control and strategy in dealing with extremely difficult and crisis situations (Mackinnon et al., 2000). The Pandora project puts emotional intelligence and crisis management in a special relationship, providing a special overview of the ways in which trainings are done and efficiency is improved in these situations. Through the project, theoretical frameworks were discussed, and practical exercises and trainings were implemented, so one of the conclusions was that the variables that particularly affect the individual in crisis situations were personality traits, leadership style, experience, self-efficacy, stress and anxiety.

In addition to the development of the emotional intelligence of the individual, or the leader, it is necessary to present the abilities that should be developed on a team level. In their paper published in 2001, Druskat and Wolff, in addition to individual skills, specifically listed the skills required of an emotionally intelligent group. In most of the literature, the development of emotional intelligence is tied to the individual, however, in crisis situations, emotionally intelligent teams, or emotionally intelligent companies, are of great importance. This case study singles out the following two skills important for a group:

Team self-assessment and feedback
It is extremely important for every leader to set a time to examine the effectiveness of the team by including the team in these activities. Creating measurable tasks, and then processing and measuring them, should be done transparently and with a team understanding of both processes. Transferring and communicating feelings between team members basically starts from the leader's open communication and his/her ability to express feelings about the team and the

situations the team is going through. It is crucial to allow team members to give opinions and suggestions on processes they consider inefficient or insufficiently effective. Bass (1998) believes that effective group management cannot be carried out without the skills of reliability and conscientiousness of the leader.

In addition to these skills, the research also provides insights into ways in which the development of emotionally intelligent groups can be encouraged (Druskat & Wolff, 2001):

1. Creating an affirmative environment. In this case, the optimism of the leader comes to the fore. It is important for the leader to encourage the important and positive mission of the group and to focus on what he/she can control. In crisis situations, the group must be reminded of other difficult situations that it has managed to successfully overcome. True leadership is based on the idea that leaders need to reach out to their followers emotionally and motivate them by identifying common values and higher purpose (Bass et al., 1987).
2. Proactive problem solving. We can say that this is most important for crisis management, for one reason, and that is foreseeing. Emotionally intelligent teams can anticipate problems and solve them before they occur or a crisis arises. It is important for this segment to take the initiative in order for the team to understand the situation and be more efficient. Changes are inevitable, necessary, expected, but they can lead in two directions: growth or crisis. It is clear that good decisions lead to the growth of the company, and that bad decisions lead to the crisis. Perhaps the most important knowledge we have about crises is that most crises are preceded by a series of prior warning signals. To prevent a major crisis, organizations only need to learn to read these early warning signals and respond to them more effectively (Mitroff, 1987).

Changing assumptions that are part of the organization's culture, including the concept of leadership, can create group resistance, as such changes enhance the group's defense mechanisms based on logical thinking (Schein, 2004). Therefore, it can be deemed that re-examining the cultural assumptions of the organization in itself is one of the crisis situations, for it generates a high level of stress. But on the other hand, it is clear that longer crises already produce higher levels of stress, but without the exhausting state (Smart & Vertinski, 1977), which leads to the conclusion that periods of crisis are a good time for these types of changes (Lord & Maher, 1993).

CONCLUSION

The skills required for effective crisis situations management are becoming more important over time. One of the reasons is the feeling that the modern age brings frequent periods of crisis, that is, that today any unfavorable situation can be considered a crisis situation. Markets are rapidly transforming due to people's needs for creativity, change, new technologies. The emotional intelligence of leaders provides a wide range of different social and personal skills, which, one can say, have become necessary in today's business model. All research conducted on the relationship between emotional intelligence and crisis, aimed to show the importance of this relationship, as well as the significance that arises from it. However, it seems that companies today are aware of this relationship and want to go in the direction of creating an emotionally intelligent organization. The disadvantage is that there are not sufficiently precise empirical frameworks for this field of research, or enough studies that would offer companies a way to strengthen their organization to leaders with higher EQ, develop them and thus create a more crisis-resistant organization.

As research has shown, emotional intelligence is affected by age, as well as an individual's work experience. Studies have also shown that people with a higher level of education have a higher EQ. In support of this, and as a conclusion, we can say that companies, in setting their strategies for the development of managers and leaders, must keep in mind that it is necessary to further educate leaders, both in soft skills and expertise, but also, that it is necessary to create an organization that will nurture the values of protecting individuals who have been employed in the company for many years.

The role of the human resources sector in understanding this concept is significant. The skills of an emotionally intelligent leader, which can be pivotal in crisis situations, do not have to be so pronounced in the situations of regular business. It is up to the human resources sector to assess which positions may be crucial in possible crises. On the other hand, emotionally intelligent leaders can be good at estimating projected events, so there is a possibility that some crises may be affected preventively. Due to the understanding of the environment, the team they are in charge of, the need to adapt quickly to change, emotionally intelligent leaders will have a faster and clearer response, and then they will offer their team and organization a more concise and complete solution.

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WORK-LIFE-BALANCE BENEFITS AS BRAIN DRAIN PREVENTION

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Abstract: *The contribution of highly qualified employees, not only for multinational companies, is unquestionable. Their eventual departure often has negative economic consequences, and their replacement is usually difficult and expensive. Therefore, it is important to pay increased attention to their stabilization. This article aims to find out which of the work-life balance area benefits are more important for the stabilization of IT employees in an international automotive company (n=154). With the use of the Friedman test, it was found out that the most important benefit is flexible working hours. Based on the Kruskal-Wallis test, the evaluation of the importance of individual benefits was further verified according to basic socio-economic factors (age, gender, length of employment). The right setting of benefits will give a competitive advantage in the search for new talent and at the same time serve as an effective tool against brain drain.*

Keywords*: Work-life-balance benefits, Retention of employees, IT employees, Brain drain, Brain gain.*

INTRODUCTION

Highly qualified employees form the basis of a company's economic success. They bring high added value and they are a source of innovations that are necessary not only to keep pace with the competition but also for further development. Therefore, the attention of human resources within talent management is focused not only on acquiring new, talented people, but also on their subsequent adaptation, motivation, job satisfaction and overall stabilization. A lack of talent is faced especially by international corporations, which show a growing interest in this group of employees (Przytuła, 2018). The positive effects of talent management have been repeatedly empirically demonstrated (Slavković, Babić, & Stojanović-Aleksić, 2015; Crowley, Benson, & Al Ariss, 2019; Meyer, & Xin, 2018). However, in the area of talent management in companies, weaknesses that can result in the loss of these highly qualified employees are often identified. Vetráková et al. (2020) surveyed HR professionals and, based on the Delphi method, concluded that if talented employees receive an offer from another employer, they leave their current employer much more easily than other employees.

If the brain drain phenomenon occurs in a company and highly qualified employees leave, damage arises that may create a decline in competitive ability and subsequent negative economic impacts. Therefore, some studies aim to understand why people leave their jobs. Wage levels play an important role but it is not the only factor that people consider when making decisions. Other factors, such as secondary work responsibilities, work investment and

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moonlighting (i.e. the combination of two employments), are also important as well as job satisfaction (Zimmerman, Swider, & Arthur, 2020). Highly qualified people, also referred to as *inventors*, are less geographically limited (Drivas, 2020) which in turn means that there is a brain drain not only from the company but also from the country.

In order to prevent brain loss, companies find out the level of satisfaction of their employees and look for such benefits that would increase it and, thus, increase also the probability of their staying with the current employer. At present, issues in the field of work-life-balance come to prominence. It has been found out that work-life balance in conjunction with workplace stress significantly affects the employee's intention to leave (Kerdpitak & Jermsittiparsert, 2020). Long-term W-L-B imbalances have also been proven to negatively affect job satisfaction (Gragnano, Simbula, & Miglioretti, 2020) but they also have negative health consequences (Mensah & Adjei, 2020). The feeling of W-L-B imbalance is mostly influenced by working hours, the amount of free time the employee has for himself, subjective assessment of financial condition and others (Pawlicka et al., 2020 Bjärntoft et al., 2020). Based on detailed research, various models in the W-L-B field, which have increasing job satisfaction and ensuring talent retention as its goal, are emerging (Rodríguez-Sánchez et. Al., 2020).

This article aims to find out which of the benefits in the W-L-B area is considered the most important for employees and whether there are statistically significant differences in the evaluation of these benefits with respect to basic socio-economic characteristics (gender, age, and length of employment).

METHODOLOGY

The research took place in a major multinational manufacturing company operating in the automotive field. In terms of optimal operation of the company, maintaining of competitive ability as well as development and benefits of future innovations, the brains include employees working in the IT department. The survey sample included 154 workers with a university degree. It consisted of 123 men and 31 women.

The W-L-B benefits that were taken into account in this survey include: nursery/kindergarten allowance, paid leave, extra leave, home office, flexible working hours.

To meet the goal, the following hypotheses were defined:
Hypothesis One: The most important of benefits that belong to the W-L-B area for stabilizing employees is flexible working hours.
Hypothesis Two: The relationship between age and the assessment of the importance of stabilization related benefits is statistically significant.
Hypothesis Three: The relationship between gender and the assessment of the importance of stabilization related benefits is statistically significant.
Hypothesis Four: The relationship between the number of years in a company and the assessment of the importance of stabilization related benefits is statistically significant.

The method of anonymous electronic inquiry was selected. Most of the questions were closed, the respondents answered on the Likert 7-point scale (1 = least, 7 = most). The questionnaire included, for example, the following question: *Indicate how important are the following benefits in relation to your decision to stay in the company*.

The data were processed using Microsoft Office Excel and IBM SPS Statistics. The following statistical tests were used: Friedman test, Kruskal-Wallis test.

RESULTS

First, it was determined which benefit from the W-L-B area is most important for the stabilization of IT employees. As clearly shown in Table 1, the most important benefit is the flexible working hours which on the Likert scale 1 – 7 reached an average value of 6.5. In second place was the extra leave benefit and the third was home office. The results show that respondents clearly prefer such benefits that allow them to organize their time, or possibly gain more free time.

Table 1. Importance of selected benefits

Work-life Benefits	Ø importance	Rank	K-related samples (Sig.)	Ø area
Nursery/kindergarten allowance	2.4	5.		
Paid leave	4.2	4.		
Extra leave	6.2	2.	2.7E-85	5.0
Home office	5.7	3.		
Flexible working hours	6.5	1.		

Note: N=154; K-related samples – Friedman Test; Sig. = Significance

Source: Own calculation

The calculated values in the K-related samples column indicate statistical significance among the benefits at the 0.01 level. Hypothesis 1, which assumed that for the stabilization of employees the most important of the benefits that belong to the W-L-B area is flexible working hours, was confirmed.

The Kruskal-Wallis nonparametric test was used to determine differences in the assessment of the importance of benefits and socio-economic data.

First, it was examined whether there are differences in the assessment according to the age of the respondents. As can be seen in Table 2, there were significant differences in the assessment of the importance of nursery/kindergarten allowance and paid leave, which are more important for employees under 30. The evaluation of the importance of home office reached significance only at 0.1 level.

Table 2. Importance of benefits in relation to remaining in company – according to age

Benefits	Age (years)	Mean Rank	Mean	Standard Deviation	Kruskal-Wallis H	Sig.
Nursery/ kindergarten allowance	< 30 31 – 40 41 – 50 > 50	89.78 84.34 57.47 64.30	2.4	1.7	15.2	0.002**
Paid leave	< 30 31 – 40 41 – 50 > 50	86.94 83.13 58.09 72.90	4.2	1.7	9.6	0.022*

Home office	< 30 31 – 40 41 – 50 > 50	83.16 83.05 71.70 58.80	5.7	1.8	6.4	0.092

Note: N=154; Correlation is significant at 0.05-/0.01-** level; Sig. = Significance*

Source: Own calculation

Thus, the second hypothesis, which assumed that the relationship between age and the assessment of the importance of stabilization related benefits is statistically significant, was partially confirmed. This finding is not surprising as young people who have small children are statistically significantly more interested and their interest in preschool allowance is, of course, logical.

There are also differences in the assessment of the importance of benefits in the distribution by gender, where all the benefits are more important for women. The significant differences (Table 3) can be found in paid leave and extra leave, and the benefit of flexible working hours is on the borderline of significance.

Table 3. Importance of benefits in relation to remaining in company – according to gender

Benefits	Gender	Mean Rank	Mean	Standard Deviation	Kruskal-Wallis H	Sig.
Paid leave	Man woman	71.90 99.71	4.2	1.7	9.9	0.002**
Extra leave	Man woman	73.01 95.31	6.2	1.2	7.7	0.005**
Flexible working hours	Man woman	74.74 88.45	6.5	1.0	3.6	0.059

*Note: N=154; Correlation is significant at 0.01-** level; Sig. = Significance*

Source: Own calculation

The third hypothesis assumed that the relationship between gender and the assessment of the importance of stabilization related benefits is statistically significant. This was confirmed for the two above-mentioned items and one on the borderline of significance.

Finally, a calculation was performed to verify whether there are differences in the assessment of the importance of benefits depending on the number of years spent in a company (Table 4). From this point of view, statistical significance was found only at the borderline values with significance at the 0.05 level. This applies to the benefit of the contribution to the nursery/kindergarten allowance and home office, which are more important for employees who have been working for the company for 1-5 years.

Table 4. Importance of benefits in relation to remaining in company – according to number of years in the company

Benefits	Number of years	Mean Rank	Mean	Standard Deviation	Kruskal-Wallis H	Sig.
Nursery/ kindergarten allowance	1 – 5 6 – 10 11 – 15 16 – 20	86.39 81.48 79.18 59.41	2.4	1.7	10.6	0.059

	21 – 25 > 25	61.63 65.57				
Home office	1 – 5 6 – 10 11 – 15 16 – 20 21 – 25 > 25	87.75 71.08 86.55 63.07 62.13 73.93	5.7	1.8	10.1	0.073

Note: N=154; Sig. = Significance

Source: Own calculation

These findings are not surprising. It can be assumed that the people belonging to the category 1 – 5 years within this research are the same people as in the young age group, i.e. under 30 years old.

FUTURE RESEARCH DIRECTIONS

The research was focused on talented employees who work in the dynamically developing field of IT. In future research, it would be appropriate to focus on other professional groups, such as doctors, scientists, technicians, and others, as their benefit preferences may differ. It is probable that other professional groups will also be interested in the possibility of flexible working hours and other benefits that enable independent organization of working hours. This consideration is also confirmed by studies that already have been done and concentrated on similar issues. For example, flexible working hours for researchers at universities have been examined in more detail by Lytovchenko (2018). Other scientists also report on the positive effects of flexible working hours. Aries et al. (2019) found that if the employer allows flexible working hours, it significantly strengthens employee engagement. Flexible working hours are considered a competitive advantage by talented employees, which in turn has an impact on work performance (Galea, Houkes, & De Rijk, 2014; Bukhari, Gupta, & Taggar, 2018; and others).

This research found that benefits in W-L-B area are more important for women. In future research it would be appropriate to verify whether this finding is related to other roles that women take on (motherhood, home care, family care). Some studies have already addressed this issue not only in the context of W-L-B benefits, but also in the context of part-time work possibility (Beham, Baierl, & Eckner, 2020). This opens up another interesting area of possible future research in the field of new forms of employment, such as shared jobs, etc.

CONCLUSION

Given that obtaining talented people is a very difficult and costly process for companies, it is essential that these employees receive increased attention. It is important to regularly determine their job satisfaction and respond quickly to the changing situation, needs and requirements of individual groups of employees. The results of this research show that within the W-L-B benefits group, IT specialists consider flexible working hours to be the most important benefit. In the area of W-L-B, the benefits that create more time for their personal lives are preferred by the employees. If employers want to recruit and further stabilize talented IT employees, they should create working conditions that allow them to saturate these needs.

The results also showed that other socio-economic factors are important when selecting benefits, such as the age of employees (for younger age groups, the benefits associated with

caring for preschool children are important) and gender (women place more emphasis on W-L-B benefits than men). If employers underestimate the care of talented groups of employees, the risk of brains leaving their company will increase significantly.

ACKNOWLEDGMENT

This research was supported by the Jan Evangelista Purkyně University in Ústí nad Labem [grant number UJEP-SGS-2020-45-005-3].

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ONLINE LEARNING PERFORMANCE: THE STUDENTS' PERSPECTIVE

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Abstract*: The paper's contribution is to present the opinion of students of the University of Novo mesto about the implementation of online studies. The quantitative research method and a structured questionnaire were used for collecting research data. The research sample comprised 387 students. The results showed that only 36% of students were trained to use various forms of online study before conducting online studies. Among the advantages of online learning, they recognized the fact that they did not waste time driving to faculty/university (4.2), which resulted in lower costs (4.1), making it easier to coordinate study and family obligations (4.0), had the possibility of time flexibility (4.0) and "learned" self-discipline (4.0). Among the shortcomings was the lack of personal contact with teachers (3.8), the lack of personal contact with study colleagues (3.7), being left with one's ingenuity (3.3) and one's own self-initiative and self-discipline (3.1).*

Keywords*: Full and part-time students, University of Novo mesto, Online learning.*

1. INTRODUCTION

Slovenia is not the most advanced in the process of digital transformation. From the point of view of providing educational opportunities in accordance with the needs of the digital society, it is particularly worrying that we are lagging behind in the development of human capital and the use of Internet services (Bregar, Zagmajster, Radovan, 2020, pp. 1-2).

The educational programs offered by educational organizations and other education providers in our country today have not yet been designed in such a way as to enable learners to acquire the skills needed in an open, rapidly changing and digitalized society (Bregar et al., 2020, p. 2). Because of the COVID-19 epidemic, the use of information and communication technology (ICT) is a daily practice, and the question is how many opportunities the ICT offers we actually take advantage of. In learning, students largely use multimedia online learning resources, through which they have the opportunity to completely personalize learning and adjust it according to their previous knowledge, experience and interest (Kiswarday, 2018, p. 71). The introduction of ICT encourages teachers to improve the way they learn through interactive and dynamic resources that enable them to use ICT and provide more motivation and a richer learning experience for students (Brečko and Vehovar, 2008).

Online education is not homogeneous and we find different approaches in it. Some are consistent with advances in technology, while others are based on different didactic paradigms (Krašna, 2015, p. 25). Awareness that technology alone is not more effective and that the amount of multimedia does not necessarily contribute to better knowledge has raised the importance of pedagogy and didactics. They were given the additional task of selecting or

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developing the pedagogical work that will derive the most benefit from the technological given. This has influenced pedagogical shifts and shifts in didactics to look for methods of effective education at all levels of formal education in new, technologically more developed circumstances. Pedagogy and didactics can guide the development of learning technology (Rebolj, 2008, p. 28). This is very important, as Daymont and Blau (2008) argue that online study does not have much success compared to classical lectures, and also requires a lot of self-discipline and organization of time and study from students. Therefore, Bitenc, Werber and Urh (2020, p. 12) also confirm this finding based on their own research and suggest that teachers constantly encourage students to work independently, regularly and continuously. At the same time, we must not forget the didactic principles that must be followed for the good implementation of online studies (Jevnikar, 2015, p. 249; Volk, 2018, pp. 41-42): students' learning activity, unity of visual and conceptual, structure and systematic teaching, rationality and economy of teaching, problematic teaching and learning differentiation and individualization. Among the advantages of online study, Bregar et al. (2020) include the possibility of an education that would not be feasible in traditional circumstances (e.g. the COVID-19 epidemic), cheaper organization and cheaper and faster delivery of education, better use of available ICT, improved information literacy of lecturers and students, the possibility of fast and usually simple adapting educational content to students 'needs, greater flexibility in time, place, pace and content of education, greater interactivity and faster access to knowledge from various sources, the possibility of adapting learning approaches to students' needs, transparency and documentation of the pedagogical process and its consistent implementation, the introduction of modern pedagogical models and innovation of the pedagogical process, etc.

Since the Government of the Republic of Slovenia adopted a decree which temporarily banns the gathering of people in educational institutions, universities and independent higher education institutions in the annual semester 2019/2020 to contain and control the COVID-19 epidemic, we at the University of Novo mesto, have carried out the entire pedagogical process online to the extent enabled by the appropriate communication technology since March 2020.

2. METHODOLOGY

2.1. Purpose and goals of the research

The purpose of the research is to examine the opinions of students of the University of Novo mesto about the implementation of online studies.

The goals of the research are:

- to analyze the satisfaction of students with the implementation of various forms of studying during the epidemic and the execution of the pedagogical process online,
- to analyze the level of satisfaction of students, with cooperation with teachers during the epidemic and the course of the online pedagogical process,
- identify the benefits of online studies perceived by students,
- identify shortcomings of online study perceived by students.

2.2. Research questions

Depending on the purpose and goals of the research, we asked the following research questions:

1. How satisfied were the students with the implementation of various forms during the epidemic and the course of the pedagogical process at a distance?

2. How satisfied were the students with the cooperation with teachers during the epidemic and the course of the online pedagogical process?
3. What benefits of online learning did students perceive?
4. What shortcomings of the online study did students perceive?

2.3. Research methods and technique

The quantitative research method and a structured questionnaire with different sets of questions were used for collecting research data.

We have used the quantitative method. A structured questionnaire with different sets of questions was used to collect the data. We compiled a questionnaire by relying on the theoretical starting points of various authors (Bregar et al., 2020; Istenič Starčič and Lebeničnik, 2020; Tratnik, 2016; Puhek and Amič, 2016). The online survey was used as the method of data collection. Absolute and relative frequencies were calculated, and average ratings for the scales. Students assessed satisfaction with the implementation of various forms of study, satisfaction with the cooperation with teachers during the epidemic and the distance pedagogical process, and the advantages and disadvantages of online study according to the scale model.

2.4. Sample

The basic population of the sample is represented by 677 full-time and part-time students studying at the University of Novo mesto. The study involved 387 students of the summer semester in the academic year 2019/2020. 43% were full-time students and 57% were part-time students. At the time of the survey, 86% of them were studying at the 1st cycle, 10% at the 2nd cycle and 4% at the 3rd cycle of the study program. 12% of students studying at the Faculty of Economics and Informatics and the Faculty of Business and Management Sciences, 72% at the Faculty of Health Sciences and 16% at the Faculty of Mechanical Engineering. Among them, 79% were female students and 21% male students. At the start of the online study, 36% were trained to use various forms of online study, 34% were partially trained and 30% were not trained. 61% of the surveyed students thought they were sufficiently self-disciplined for online studies, 25% thought they were partially self-disciplined and 14% thought they were not self-disciplined enough for online studies.

3. RESULTS AND DISCUSSION

This part of the analysis of the study is the basic descriptive statistical analysis, for which the results are presented below. The next question focused on the respondents' opinions on the satisfaction with the implementation of various forms of online learning during the epidemic and the course of the pedagogical process online. The respondents assessed a set of statements on a scale of 1 to 5, with 1 meaning “I am very satisfied” and 5 “I am very dissatisfied”. The results are shown in Table 1.

Table 1 shows that the respondents were most satisfied with video conferencing (3.9) and electronic communication (3.8). The lowest level of satisfaction was expressed for online materials (3.4) and the online classroom Moodle (3.2).

Table 1. Satisfaction with the implementation of various forms of study during the epidemic and the execution of the pedagogical process online

Form of study	M	SD	n
E - mail	3,8	1,0	387
online classroom Moodle	3,2	1,2	387
video conferencing (MS Teams, Zoom, Skype, Webex, GoToMeeting)	3,9	1,0	387
online materials	3,4	1,1	387

Note: M – mean, SD – standard deviation, n – number of answers

Source: Own calculation

The next set of statements refers to the activities of teachers during the online study and to what extent they encouraged and motivated students during their online studies. The respondents assessed the statements on a scale of 1 to 5, with 1 meaning "I completely disagree" and 5 "I completely agree".

Table 2. Activities of teachers during online study

Statement	M	SD	n
The lecturers encouraged me to use an online learning environment for learning.	3,6	1,0	387
The lecturers provide appropriate support.	3,5	1,0	387
The lecturers gave me clear written instructions for individual work.	3,6	1,0	387
The lecturers gave me clear oral instructions for individual work.	3,6	0,9	387
The lecturers motivate me to continue individual work.	3,5	1,0	387
The lecturers motivated me to keep learning.	3,5	1,0	387
The lecturers gave feedback on my individual work regularly.	3,4	1,1	387
The lecturers checked my attendance at lectures and tutorials.	4,1	0,9	387
The lecturers contacted me by email if I was absent from lectures and tutorials.	2,8	1,3	387
The lecturers required the same level of knowledge from me as if the lectures/ tutorials were conducted by direct communication (in the lecture room).	3,8	1,1	387

Note: M – mean, SD – standard deviation, n – number of answers

Source: Own calculation

Lecturers mostly checked the attendance of students in lectures and tutorials (4.1), required the same level of knowledge as if the pedagogical process was carried out through direct communication (3.8), encouraged students to use different online learning environments (3.6), gave clear written and oral instructions for individual work (3.6), sent feedback less regularly (3.4), provided appropriate support (3.5) a little less intensively, motivated students to continuous learning (3.5) and motivated them to continuous individual work (3.5). However, they do not agree with the statement that higher education teachers contacted students if they were absent from lectures and tutorials (2.8).

The next set of factors refers to the advantages of online learning. The respondents assessed the factors of online learning on a scale of 1 to 5, with 1 meaning "not important at all" and 5 "very important".

Table 3 shows that the respondents thought the following factors were the most important in terms of advantages of online learning: not wasting time driving to faculty/university (4.2),

time flexibility (4.0), lower costs (4.1), requires a lot of self-discipline (4.0), easier fulfillment of studies and family obligations (3.9), more free time (3.8) and easier fulfillment of official obligations and studies/work through student service and studies. However, the respondents prefer classical forms of knowledge transfer (3.8). The following factors were rated of medium importance as an advantage of online learning: study at home (3.7), greater independence when learning (3.6), online learning is equivalent to classical education (3.3), and more creative learning (3.2). The lowest level of agreement was achieved by the statement that online learning is more interesting than classical learning (2.9).

Table 3. Advantages of online learning

Factor	**M**	**SD**	**n**
time flexibility	4,0	1,0	387
study at home	3,7	1,2	387
there is no waste of time driving to faculty/university	4,2	1,2	387
lower costs	4,1	1,2	387
more free time	3,8	1,2	387
easier fulfillment of official obligations and studies/work through student service and studies	3,7	1,3	387
easier fulfillment of studies and family obligations	3,9	1,2	387
greater independence in study	3,6	1,2	387
customized learning	3,7	1,2	387
more creative study	3,2	1,3	387
more interesting than classical study	2,9	1,4	387
requires a lot of self-discipline	4,0	1,1	387
online learning is equivalent to classical education	3,3	1,4	387
I prefer classical forms of knowledge transfer	3,8	1,2	387

Note: M – mean, SD – standard deviation, n – number of answers

Source: Own calculation

The next set of factors refers to the shortcomings of online learning. The respondents assessed the factors of shortcomings of online learning on a scale of 1 to 5, with 1 meaning “not a shortcoming” and 5 “a major shortcoming”.

Table 4. Shortcomings of online learning

Factor	**M**	**SD**	**n**
lack of personal contact with other students	3,7	1,2	387
lack of personal contact with teachers	3,8	1,1	387
being left with one's own ingenuity	3,3	1,2	387
being left with one's own self-initiative	3,1	1,2	387
being left with one's own self-discipline	3,1	1,2	387
poor ICT knowledge of teachers	3,0	1,1	387
poor ICT knowledge of other students	2,8	1,1	387
My own poor ICT knowledge	2,6	1,2	387
poorly prepared e-materials	3,0	1,2	387
low teacher responsiveness	2,9	1,2	387

Source: Own calculation

Table 4 shows that major shortcomings of online learning are: lack of personal contact with teachers (3.8), lack of personal contact with other students (3.7) and being left with one's own

ingenuity (3.3). The respondents saw as less important shortcomings in the following factors: being left with one's own self-initiative (3.1), being left with one's own self-discipline (3.1), poor ICT knowledge of teachers (3.0), poorly prepared e-materials (3.0), low teacher responsiveness (2.9), poor ICT knowledge of other students (2.8) and my own poor ICT knowledge (2.6).

4. CONCLUSION

The results of the survey, which consisted of a sample of 387 full-time and part-time students studying at the faculties of the University of Novo mesto, showed that lecturers performed their lecturers and tutorials online relatively well. The faculties had switched from the classic form of pedagogical process to online learning practically "overnight". Since there was no time to prepare relevant materials for online implementation, and there was no prior preparation and training on the use of ICT for neither teachers nor students, we believe that teachers and students did a good job.

Certainly, the results of the research show that everyone, teachers and students, must prepare properly for the online form of learning in advance and be aware, that this form has its advantages and disadvantages. We could observe the lack of knowledge on ICT practices for both lecturers and students. This should be the motivating factor for them to study different forms of online learning. This will give the lecturers to be more satisfied with the organization and implementation of online learning that will, according to the current epidemiological situation, last quite some time. The students, on the other hand, will be able to use all available tools to gain new knowledge, information and study materials provided by the lecturers.

It would be interesting to repeat the survey after the end of the winter semester in the academic year 2020/2021 and, by comparing the results, determine whether there are differences of opinion about online learning, especially in the context of advantages and disadvantages of this form of study. The key to achieving student satisfaction and success is the continuous overall support of the faculty at the pedagogical, organizational, technical and administrative level of operation.

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ONLINE CLASSES' EFFECTS DURING COVID 19 LOCKDOWN - TEACHERS' VS. STUDENTS' PERSPECTIVE, CASE OF THE SCHOOL OF ENGINEERING MANAGEMENT

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Abstract: *In the second decade of the 21st century, there is an ongoing discussion on the value of online classes in higher education as the implementation of new technologies in the higher education processes is on the rise. The main questions that are emerging are the level of interactions, quality of knowledge transfer, and development of critical thinking. Several previously conducted research concluded that online models of higher education teaching add more value than traditional methods, and some of the research has shown the shortcomings of online higher education programs. The pandemic of Covid-19 disease caused by a Corona Virus (SARS-CoV-2) has forced most of the higher education institutions in Europe to transfer almost the entire educational process to online platforms.*
In this paper, the satisfaction of the teachers and the students with the online classes' effectiveness regarding the teacher-student communication, knowledge transfer, and development of critical thinking in the case of the School of Engineering Management in Belgrade, Serbia, is researched through a short survey and interviews. Statistical analysis has shown that there is a statistically significant difference between students' and teachers' satisfaction. Furthermore, in short interviews, it is shown that the students are more receptive to knowledge transfer, teacher-student communication, and the development of critical thinking through online classes than the professors. As the sample is small, further empirical research on the wider sample is needed in order to get more compelling conclusions.

Keywords: *Online classes, Covid-19 pandemic, Teachers, Students, Knowledge transfer, Higher education.*

INTRODUCTION

In the second decade of the 21st century, as the number of online courses is constantly growing, there are ongoing discussions on the value of online classes in all levels of formal and informal education (Hollis, 2018; Baker, et al., 2019; Hermond & Tanner, 2020). It is particularly noticeable in higher education as the implementation of new technologies in higher education teaching processes is on the rise. Among other relevant questions, the main issues that are emerging are the levels of teacher-student interactions, the quality of knowledge transfer, and the development of students' critical thinking. A variety of research brings different conclusions. Several of the previously conducted research have concluded that online models of higher education teaching add value more than traditional methods, and some of the research has shown the shortcomings of online higher education programs.

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Many of the higher education institutions have searched during the last decade for suitable solutions for online learning to be included in their programs, with mixed success and satisfaction with the outcome. However, the incidence of the pandemic of Covid-19 disease caused by a Corona Virus (Severe Acute Respiratory Syndrome Coronavirus 2 - SARS-CoV-2) in 2020 suddenly forced most of the higher education institutions in Europe to transfer, at least for a [so far] short period (currently less than a year), their almost entire educational process to online forms. Higher education institutions in the Republic of Serbia have also started to transfer almost all of their teaching process to online forms (whether they are accredited for that or not) after the announcement of the State of emergency on March 15, 2020 (Službeni glasnik, 2020). It has been the main form of teaching until the end of May after the abolishment of the State of emergency. Most of the institutions have continued with the hybrid model in the Fall semester, although the teaching process during the state of emergency circumstances (most of the Summer semester) is the main focus of this research. Actually, in the Republic of Serbia, this has been a hybrid model that has included online lectures and exercises, but not the exams and the tests which by *Serbian Law on Higher Education* can be conducted solely at a higher education institution premises (Republika Srbija, 2017).

In this paper satisfaction of the teachers and the students with the online classes' effectiveness regarding the teacher-student communication, knowledge transfer, and development of students' critical thinking in the case of the School of Engineering Management in Belgrade, Serbia, is researched through a short survey and interviews.

ONLINE CLASSES' EFFECTS - LITERATURE REVIEW

From the beginning of the 21st century, the number of higher education institutions including either online programs or some online classes is growing and the implementation of new technologies in higher education teaching processes is rapidly increasing (Hollis, 2018; Baker, et al., 2019; Hermond & Tanner, 2020). The number of students who take at least one online course is on the constant rise since the early 2000s (Yang & Cornelius, 2004). At the same time, hybrid models of teaching are also emerging, joining web-based teaching with the traditional, campus, teaching (Alexander, *et al.,* 2014; Estacio & Raga, 2017; Bettinger, Fox, Loeb & Taylor, 2017).

The main issues that are emerging are the levels of interaction between the students and their teachers (Chen & Chen, 2007; Parks-Stamm, Zafonte and Palenque, 2017) and the ability to communicate in new ways (more discussion groups, etc.); the knowledge transfer (Chen & Chen, 2007); and the quality of knowledge transferred from the teachers to the students. Students' development of critical thinking skills is also one of the crucial focal points of researching the online classes' effects (Parks-Stamm, Zafonte, and Palenque, 2017), as it is one of the key activities of higher education teaching processes. Critical thinking has many definitions, one of the most appropriate is the one by Heard, Scoular, Duckworth, Ramalingam and Teo (2020):

> 'To think critically is to analyse and evaluate information, reasoning and situations, according to appropriate standards, to construct sound and insightful new knowledge, understandings, hypotheses and beliefs. Critical thinking encompasses the subject's ability to process and synthesise information in such a way that it enables them to apply it judiciously to tasks for informed decision-making and effective problem-solving'.

Other issues are gaining importance. One of the issues arising is cheating during the online courses (Hollis, 2018), especially during the tests, quizzes, etc., especially in the cases when

cheating is going to the extent of hiring so-called *ghost student* who takes exams or writes papers instead of a student, as they are not visible while taking an online test or writing a paper, which is the costly but very easy solution for the students who do not or cannot commit to their obligations. It also raises another issue for other research, it is noted that part-time teaching staff overburdened with obligations in various institutions are less likely to focus on this issue than the ones employed full time, which opens a completely new topic for the research (Hollis, 2018). Some of the research is focused on time management issues for the students who take online classes that can cause problems in achieving academic success because a more relaxing schedule often brings more delaying in completing the tasks (Baker, et al., 2019), especially for the students who require more supervising, guidance, and mentoring.

The incidence of the pandemic of Covid-19 disease caused by a Corona Virus (SARS-CoV-2) last spring forced most of the higher education institutions in Europe and all over the world (Aristovnik, Keržič, Ravšelj, Tomaževič, Umek, 2020; Desai, et al., 2020; Engle, 2020; Pažun & Langović 2020; Trout, 2020) to transfer completely to the online forms of teaching, using platforms that include Zoom, Microsoft Teams and other platforms (Roy, et al., 2020). Zhu and Liu (2020) have stated that one of the major advantages of this mode of classes are the possibility to access the class from anywhere, and a capacity for new modes of teaching that include extra students' involvement and additional interaction between the students and teachers (discussions, etc.). The teaching process is changing from teacher-oriented to students oriented process (Alawamleh, Al-Twait, Al-Saht, 2020; Zhu & Liu, 2020). There is also one of the technical problems arising, namely poor Internet quality in some areas, which opens up more substantial, the topic of accessibility of knowledge for the students that live in underdeveloped areas with a poor internet connection (Aristovnik, Keržič, Ravšelj, Tomaževič, Umek, 2020).

Also, there is an important problem emerging for other research, namely the classes that cannot be organized in the online form, such is the practical courses in medicine (Engle, 2020), and other courses that require lab work.

MATERIALS AND METHODS

Objectives and survey design

School of Engineering Management is a private higher education institution in Belgrade, Republic of Serbia, a part of the "University Union – Nikola Tesla", with accredited undergraduate programs *Engineering Management* and *Management*; master programs *Project Management and Industry 4.0*, Engineering *and Management of Security Information Systems*, *Economics and Management of Energy*, and newly accredited Ph.D. program *Waste Management*. The School of Engineering Management has been forced to transfer completely to online forms of teaching due to the pandemic of Covid-19 disease. Online classes at the School began on March 23, a week after the state of emergency has been announced and the teaching has been organized through Zoom platform with the Google classroom used for disseminating teaching materials and announcements.

The satisfaction of the teachers and the students with the online classes' effectiveness regarding the teacher-student communication, knowledge transfer and development of critical thinking in the case of the School of Engineering Management in Belgrade, Serbia, is researched through short surveys and interviews. The survey has been organized from June 8th to 12th, and the series of short interviews have been organized from June 22nd to 26th through short, in-

person, semi-structured interviews. They have been asked to identify the main advantages and disadvantages of online classes regarding teacher-student communication, knowledge transfer, and development of critical thinking at the Institution during the pandemic online classes.

For the main research questions, a five-point Likert scale has been used to measure the statements (coded as follows: 1 – I disagree completely; 2 – I disagree; 3 – I am neutral; 4 – I agree; 5 – I agree completely). The constructed scale has been subjected to the test of reliability and it have had good (0.979) Cronbach's Alpha value, which indicates an acceptable level of internal consistency for the scale with the specific sample used for the study.

Table 1. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.721	.723	3

Source: authors

It is assumed (H_1) that there is a statistically significant difference in the satisfaction of students and teachers with online classes' effectiveness in the teacher-student interaction, knowledge transfer, and development of critical thinking. Several sub hypotheses have been developed further, stating that there is a statistically significant difference in the opinion of the students and teachers on the online classes' effectiveness in:

- H_{1a}: Teacher-student interaction;
- H_{1b}: Knowledge transfer;
- H_{1c}: Development of critical thinking;

H_0 states that there is no statistically significant difference in the satisfaction of students and teachers regarding online classes' effectiveness in the teacher-student communication, knowledge transfer, and development of critical thinking.

Collected data have been tabularized and subjected to statistical analyses by using statistical package SPSS v. 18.

Description of the sample

For the purpose of this research, the students of undergraduate and master programs have been targeted, same with the teaching staff in various ranks. The total sample size has been 81 (N=81), among them 43 (53.1%) have been the students and 38 (46.9%) professors (Table 2). Participants have been randomly chosen to represent each year of undergraduate studies and master studies among the students, and to represent each teaching rank among teaching staff: teaching associates, teaching assistants, languages professors, assistant professors, associate professors, and full professors.

Table 2. Survey Demographics

		Frequency	Percent	Valid Percent	Cumulative Percent
Students	I year	11	13.6	13.6	13.6
	II year	10	12.3	12.3	25.9
	III year	6	7.4	7.4	33.3
	IV year	7	8.6	8.6	42.0
	Master	9	11.1	11.1	53.1

Teachers	Teaching associate	7	8.6	8.6	61.7
	Teaching assistant	6	7.4	7.4	69.1
	Languages professor	5	6.2	6.2	75.3
	Assistant professor	6	7.4	7.4	82.7
	Associate professor	6	7.4	7.4	90.1
	Full professor	8	9.9	9.9	100.0
	Total	81	100.0	100.0	

Source: authors

After the survey, one participant for each group has been randomly chosen for the interviewing. Demographical profile of the participants is given in Table 3.

Table 3. Demographic of interviewees

Code Name	Profile	Gender (F/M)
P1	Student, I year, undergraduate studies	F
P2	Student, II year, undergraduate studies	M
P3	Student, III year, undergraduate studies	F
P4	Student, IV year, undergraduate studies	M
P5	Master student	F
P6	Teaching associate	f
P7	Teaching assistant	M
P8	Languages teacher	F
P9	Assistant professor	F
P10	Associate professor	M
P11	Full professor	M

Source: authors

RESULTS AND DISCUSSION

One-way ANOVA has been applied to formally test the hypotheses. The significance level (α) has been set as .05. Descriptive statistical results are shown in Table 4.

Table 4. Descriptive statistics

		N	Mean	Std. Deviation	Std. Error
Teacher-student interaction	Students	43	3.63	.536	.082
	Professors	38	2.39	.755	.122
	Total	81	3.05	.893	.099
Knowledge transfer	Students	43	3.58	.663	.101
	Professors	38	2.47	.647	.105
	Total	81	3.06	.857	.095
Development of critical thinking	Student	43	3.60	.495	.075
	Professors	38	2.71	.768	.125
	Total	81	3.19	.776	.086

Source: authors

Before beginning with *One way ANOVA analysis*, several assumptions have to be met, and one of the main assumptions for *One way ANOVA* is that there has to be the equality of variance

among the various categories under consideration. *Levene's test for Equality of Variances* has been carried out as a measure for the homogeneity of variance among the various categories.

Table 5. Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Teacher-student interaction	5.434	1	79	.022
Knowledge transfer	.008	1	79	.929
Development of critical thinking	7.728	1	79	.007

Source: authors

As *Sig* (*p*) values less than 0.05 indicate that the variance among the various categories is not the same for the first and the third research question, *Welch's ANOVA* has been used instead. In this analysis Welch's *Sig values* have been considered.

Table 6. Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Teacher-student interaction	Welch	70.200	1	65.777	.000
Knowledge transfer	Welch	57.797	1	78.213	.000
Development of critical thinking	Welch	37.696	1	61.798	.000
a. Asymptotically F distributed.					

Source: authors

As the Sig (p) values are in this case less than 0.05, the main research hypothesis (H_1) that there is a statistically significant difference in the satisfaction of students and teachers with online classes' effectiveness in the teacher-student interaction, knowledge transfer, and development of critical thinking is accepted. Each sub hypotheses are accepted.

In further interviews with the students and teaching staff, the students expressed their satisfaction with the online teaching process (P1, P3, P4, P5), namely, P4 expressed satisfaction with the ability to participate in online discussions, to ask questions and to get answers in real-time, P2 and P5 have expressed satisfaction with the ability to follow up recorded classes, with the opportunity of additional effort in searching online databases of academic articles to further develop the knowledge. Overall, none of them felt that communication with the professors has been damaged by transferring from "real" to "virtual" world. Also, the students have seemed more at ease in using mobile phones, tablets, lap tops, net books and PC's as learning tools.

On the other side, the professors felt (P7, P10, P11) that the process of teaching itself has been much better than anticipated, and that the lectures have been delivered in a proper way. Nevertheless, they have expressed frustration with the efforts to include all students in the discussions and concern that the students have been lacking "live" interaction, stating that they believe that the students acquire knowledge better in traditional forms of classes and discussions.

Some of the concerns that have been voiced by the students and teachers are presented at Table 7, which can be further analysed in developing online learning processes.

Table 7. Major online classes concerns

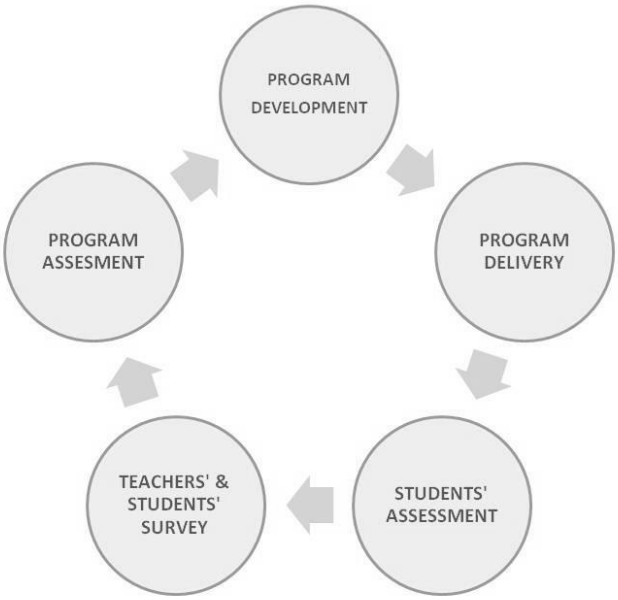
Students' perspective	**Teachers' perspective**
Inability to interact in real-time (not ready to answer questions)	Difficulties to include all participants in discussions in groups larger than ten students.
Inability to see the teacher if the presentation open.	Students are not asking for clarification until after the lecture.
Difficulties to participate in online discussions	Concern of the value of knowledge transfer.

Source: Authors based on interviews

Based on the results of the interviews, the authors propose a model for the development of new curricula that will include online models of teaching not only for the possibility of other extraordinary circumstances incidence but in order to blend traditional and online teaching that can be further improved and developed for future generations.

The basic activity would consist of developing programs that would include elements of facilitating real-time teacher – students' interaction, means of establishing knowledge transfer and modes of discussions that would improve the critical thinking of the students. The second step would be the implementation of the programs which would include discussion groups, group and individual presentations. This would lead to the third step, specifically, the students' assessment through tests and quizzes that would provide an objective assessment of the students' knowledge through grading. After completion of a program and grading, the students and the teachers would be surveyed and interviewed regarding their experiences and attitudes, which would complete the evaluation of the programs. Final evaluation would help to revise and improve the programs.

Figure 1. Proposed model of online classes development and assessment



Source: Authors

FUTURE RESEARCH DIRECTIONS

As a study of one higher education institution, this research has major limitations regarding methodology and scope of data. For further research, it is needed to initiate analysing data collected from various higher educational institutions on national (Republic of Serbia), regional (former Yugoslavia or Western Balkans), and international level (EU and non-EU countries, the United States and other developed counties, etc.), which would give an insight to the point of view of different national cultures in the countries with diverse economic and social development.

CONCLUSION

In the second decade of the 21st century, as the number of online courses is constantly growing, there are ongoing discussions on the value of online classes in all levels of formal and informal education, especially in higher education. The pandemic of Covid-19 disease caused by a Corona Virus (SARS-CoV-2) forced most of the higher education institutions in Europe to transfer, at least for a short period, almost the entire educational process to online platforms.

This paper examined the literature on the approaches to effective teacher-student communication, knowledge transfer, and development of students' critical thinking during online classes and courses.

The findings of the research show that there is a statistically significant difference in the satisfaction of the teachers and students with the online classes' effectiveness in regard to the teacher-student communication, knowledge transfer, and development of students' critical thinking. Furthermore, during short interviews with students and teachers, it can be concluded that the students are more satisfied with knowledge transfer, teacher-student communication, and the development of students' critical thinking skills during online classes than the professors. As the sample is small, further empirical research on the wider sample is needed in order to get more compelling conclusions.

This paper presented a model for the approach to further curricula development of online courses that would develop effective teacher – students' interaction, means of establishing knowledge transfer and modes of discussions that would improve the critical thinking of the students.

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EVALUATION OF EFFICIENCY IN SECONDARY EDUCATION

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Abstract: *The state of Slovak education is influenced by several negative factors. In terms of human capital, we have seen the decline of pupils for demographic reasons and lack of interest in the work of teachers. This paper aims to evaluate the efficiency of secondary education on the example of selected secondary schools. The main method of the paper is multicriteria analysis. The subject of research is the efficiency of selected secondary schools. The 10 Business Academies attended by pupils aged 15-19 years and established in the Banská Bystrica and Žilina self-governing regions will be the subject of research. For the analysis we use panel data collected for the school years 2013/2014 - 2017/2018. The contribution of the paper is to create an evaluation of the efficiency of the surveyed schools and to propose solutions for schools that achieved below-average results. The findings may serve as a basis for assessing the efficiency of the Business Academies for comparison with competitors, as well as for the founders of these secondary schools.*

Keywords*: Efficiency, Education, Business academy, Self-governing region.*

INTRODUCTION

Education is seen as a significant determinant of human capital development. Human capital can be identified with acquired schooling and viewed as a determinant of economic growth, along with basic production factors (Gould, Ruffin, 1995; Gillies, 2015). According to research, we find out that in Slovakia, the share of secondary school educated people is 60% (Lauko, Gruňák, Križan, Tolmáči, 2012). The emphasis on education should therefore be on secondary education. Several authors (Afonso, St. Aubyn, 2004; Korónyi, Hronec, 2012) have studied the efficiency of secondary schools and education systems. Based on efficiency, some rankings help schools and their founders improve their performance. Also, these results can affect students' choices when choosing a school institution for further study.

1. THEORETICAL BACKGROUND OF EFFICIENCY IN EDUCATION

The Slovak Republic has the right to education given in the basic legal document - the Constitution. The task of education is to build a system of knowledge, habits, skills and values, physical and mental abilities. Educating and teaching the population supports their skills, disrupts passivity and generates higher incomes (Dembélé, Lefoka, 2007). In terms of human capital, the content of education at secondary schools is the development of individual, integration, regulatory and knowledge potential. Secondary education prepares for the practical exercise of the profession. Education should constitute the intersection of theoretical and practical learning, as well as career preparation and contextual learning (Lynch, 2000). One of

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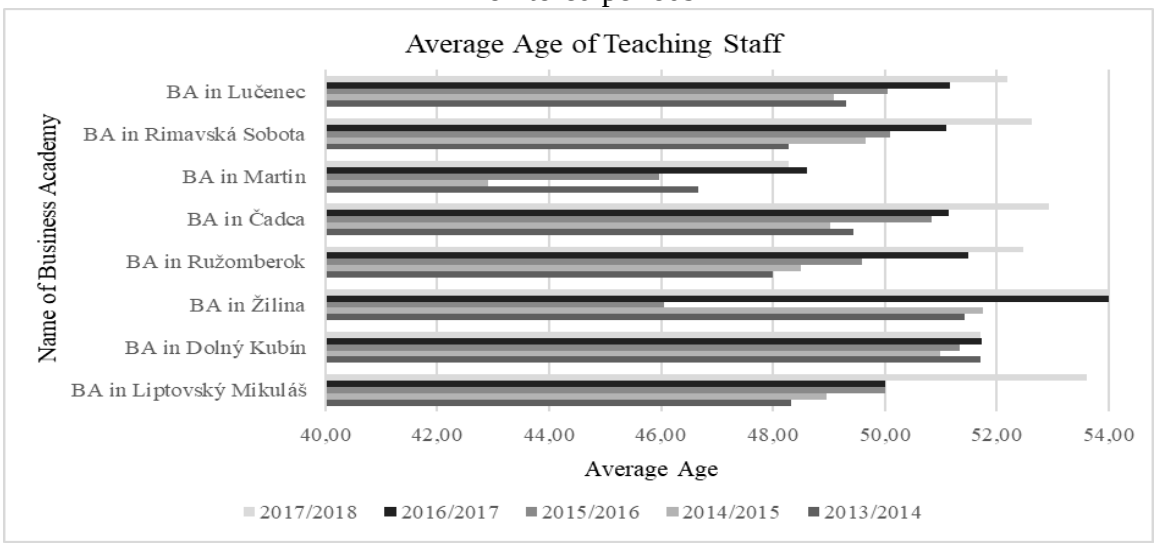
the goals of the current education reform – Learning Slovakia (Burjan, Ftáčnik, Juráš, et al., 2017) is the cross-curricular interconnection of knowledge, which we rate positively. Providers of secondary education in Slovakia are self-governing regions, which perform this task within the scope of the transferred competence of the state.

However, there is an opinion that education should not be provided by the state because of its inadequacy. From the literature review we know, that few researchers (Mauro, Sedano, 2005) state that education should be provided by other structures, with freedom, hope and all-round development prevailing. We are critical of this view because there would be exclusion and rivalry in the private provision of education alone. Consequently, low-income social groups would not be able to participate. Compulsory schooling, which lasts 10 years, also applies in Slovakia. The last year is the content of secondary education.

The research assumption is to find out what level of efficiency the researched Business Academies achieve. These secondary schools are attended by pupils aged 15-19. The Business Academy curriculum complies with ISCED-3A, implemented during four years of study and focusing on vocational training for economic, business, marketing, monetary activities and tourism work of Business Academies (Šlosarová, 2002). We use quantitative and qualitative indicators to investigate research assumptions. The efficiency study aims to compare inputs with outputs. In the absence of data, we replace missing indicator values with the lowest measured value of the corresponding indicator each year. From an economic point of view (Palmer, Torgerson, 1999), achieving greater output efficiency at specified resources should be the main criterion for prioritizing schools.

Figure 1. Development of the Average Age of Teaching Staff in 8 Business Academies in monitored periods



Source: own processing based on Internal Reports (2020)

We reflect on the current situation when the number of teachers is falling due to a lack of interest in this profession. The reason is the unfavorable situation caused by the employment of retired teachers, which results in a low number of vacancies in this sector in the labor market, and thus a lack of interest in the profession (Beňp, Šimčáková, 2007). The qualified teaching staff is the main condition for the functioning and development of the educational system. It is precisely the influence of this factor that we monitor in the age average indicator of the teaching staff.

We excluded BA in Brezno and BA in Banská Bystrica from observation (Figure 1) because they did not disclose their data. We find that the average age of the teaching staff in the last reference year is 52 years. The biggest change was recorded in BA in Žilina, when the average age increased by 17.3% (SE 2.59%). This BA employed 7 teachers under 60 years old; 2 teachers over 60 years old and 7 retired teachers, as an example of the above situation. The opposite effect is observed in BA in Martin. The average age in the school year 2017/2018 is 48.2 years and 63.6% (SE 9.57%) of teachers are under 50 years old, which we consider being younger productive age.

The formation of human capital concerns pupils. From the overall development, we find that during the monitored periods the attendance of selected secondary schools decreased by 31.72% (SE 4.76%), which can be calculated as a total decrease of 100 pupils per year. The decline is also associated with a decline in open classes, but especially a decrease in income from normative funding. Funds resulting from normative funding per pupil increase by approximately 2% per year and amounted to 42.84 EUR for the 2017/2018 school year. Thus, as the number of pupils decreases, so does the public finance. Schools are therefore forced to use other resources to improve their financial situation. The most common are projects and grants provided by the European Union, or business activities (rental of premises, etc.).

2. METHODOLOGY AND METHODS OF RESEARCH

This paper aims to evaluate the efficiency of secondary education on the example of selected secondary schools. From the methodological point of view, the work is divided into 4 stages. In the first stage, primary research was carried out to identify suitable indicators to measure efficiency. The research was carried out by a method of semi-structured interview with the professional public, consisting of directors, representatives, economic workers and former graduates of selected secondary schools. The semi-structured interview method (Miovský, 2006; Kallio, Pietilä, Johnson, 2016) focuses on qualitative research. It is important to discuss the questions of the conversation and should be based on data or facts. Efficiency indicators have been compiled according to the research of qualitative indicators of education (Štefanišinová, Štrangfeldová, 2020). The discussions were conducted following ethical principles. Based on the outcome of the interviews, we select the 4 most rated indicators.

In the second phase of the research, panel data for the school years 2013/2014 - 2017/2018 were compiled. Financial Statements, Internal Reports and Annual Evaluation of secondary schools served as data collection materials. Please note that BA in Banská Bystrica has no data available for the school years 2013/2014 and 2015/2016, BA in Brezno has not made available data for the school years 2013/2014 - 2015/2016 and BA in Žilina has not made data available for the school year 2017/2018. This may be due to slightly biased results or disproportionately high statistical error. However, it was not possible to abstract from these academies, as they are established by a self-governing region for a comprehensive expression of efficiency measuring the self-governing regions and their comparison.

In the third stage, we determine the efficiency of the monitored secondary schools using the standardized variable and integral indicator method. Multicriteria analysis (Skubičan, 2010) is a tool that greatly facilitates the decision-making process. The advantage of the method is that we can use an unlimited number of input and output indicators. In the standard variable method, the original values of the individual variables are converted to a dimensionless number. In the first step we calculate simple arithmetic means (x_j), standard deviations (s_{xj}) for each indicator. Subsequently, we subtract the arithmetic mean from the original values and divide their

difference by the standard deviation. In the case of indicators with the aim of minimizing, on the contrary, the value is deducted from the arithmetic mean and subsequently the difference divided by the standard deviation (Jenčová, 2011). Mathematical expression:

(1)

$$u_{ij} = \frac{(x_{ij} - x_{priemj})}{s_{xj}} \qquad u_{ij} = \frac{(x_{priemj} - x_{ij})}{s_{xj}}$$

Where:
x_{ij} - the value of the j-th indicator in the i-th subject;
x_{priemj} - arithmetic mean calculated from the values of the j-th indicator;
s_{xj} - standard deviation, calculated from the values of the j-th indicator.

The mathematical expression of integral indicator (Sabol, Tkáč, 2012) is given according to the formula:

(2)

$$d_i = \frac{\sum_{i=1}^{m} u_{ij} * p_j}{\sum_{i=1}^{m} p_j}$$

Where:
u_{ij} - the value of the j-th indicator in the i-th subject,
p_j – the weight of j-th indicator.

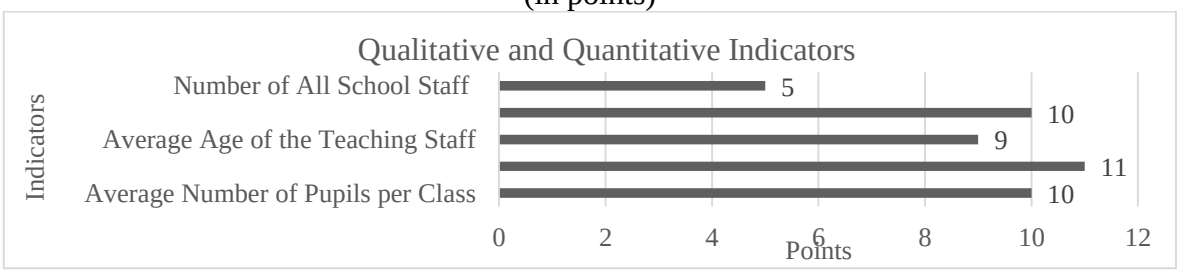
The best subject is one whose integral indicator is maximum. The advantage of the method is the variability of the indicator. The method evaluates the degree of fulfillment of the set criteria in periods, taking into account their importance through weights (Štrangfeldová, 2013). For efficiency, we set weights as 10:9:11:10. Weights are used to score individual indicators found in the first phase of the research.

In the fourth stage, we interpret the results, using the statistical method of data sorting. At the end of the research, we propose suitable solutions for improving the efficiency of the monitored academies.

3. RESULTS AND DISCUSSION

The result of the first stage of the research (Figure 2) is the compilation of appropriate qualitative and quantitative indicators based on the semi-structured interview method. Based on the points obtained, the weight of the indicator for the efficiency measurement was determined.

Figure 2. Appropriate indicators for measuring efficiency according to professional public (in points)



Source: own processing (2020)

In the next phase of the research, we will work with the quantitative indicators of the average number of pupils per class and the average number of pupils per teacher. Qualitative indicators are the average age of the teaching staff and academic achievement. The interviews confirmed that the average age of the teaching staff indicator is important. This is because a high proportion of older teachers is associated with a higher absence for health reasons. And, according to the addressed director, older teachers do not respond flexibly to current changes, they are not interested in engaging in projects that are in cooperation with abroad because of a lack of language skills. The motivation of university-educated people is precisely the expectation of higher wages in the future (Čarnogurská, 2019). This is also confirmed by the results of the interviews; the low wage in the field does not sufficiently motivate young people to work in the field of education, even if they have graduated from the pedagogical direction of higher education.

Table 1 below shows the overall value of the integral performance indicator of efficiency. The best use of inputs at the output shows the academy, whose integral indicator reaches the maximum level. Interpretation of results is complemented by recommendations for improving efficiency. Recommendations for improvement of quantitative indicators are formulated based on the best result in the given part of the file. We use the law (Act No. 464/2013 Coll.) to formulate recommendations for qualitative indicators. The efficiency of the monitored secondary schools in the Žilina self-governing region is expressed by a decreasing curve. The best average result was achieved in the school year 2013/2014.

We are seeing a big slack between the maximum and minimum efficiency levels even today. In this self-governing region, the best efficiency was achieved in BA in Čadca. Nevertheless, we observe that its efficiency decreased on average by 31.6% (SE 4.74%) over the period. This academy should therefore respond to a change in the number of pupils by reducing classes by 2, achieving an 18% (SE 1.26%) better efficiency. Most teachers (i.e. 20) are under the working age of up to 50. On average, BA in Dolný Kubín ranked second. In the last reporting period, there has been a significant increase in efficiency. This is due to the low age average of the teaching staff (i.e. 51.72 y.o.), the excellent academic achievement (i.e. 1.75) as well as the high average number of pupils in the class (i.e. 25.08).

Table 1. Efficiency of 10 Business Academies in the monitored periods

Žilina self-governing region						
Name of Academy / School Year	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	Average
BA in Liptovský Mikuláš	-0.216	-0.774	-1.176	-1.122	-0.892	-0.836
BA in Dolný Kubín	0.022	0.473	0.268	-0.063	0.919	0.323
BA in Žilina	0.055	0.176	0.600	0.255	-1.282	-0.039
BA in Ružomberok	-0.257	-0.259	0.156	0.058	-0.404	-0.141
BA in Čadca	0.764	0.428	0.049	0.400	0.167	0.362
BA in Martin	-0.368	-0.043	0.103	0.472	0.523	0.137
Banská Bystrica self-governing region						
Name of Academy / School Year	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	Average
BA in Banská Bystrica	-0.707	-0.058	-0.707	0.236	-0.010	-0.249
BA in Brezno	-0.707	-0.667	-0.707	-0.566	-0.429	-0.615
BA in Rimavská Sobota	-0.389	-0.586	-0.354	-0.294	-0.646	-0.454
BA in Lučenec	0.389	0.484	0.354	0.306	0.470	0.401

Source: own processing (2020)

The results oscillating around the average recorded 3 academies. The reason for the significant slippage of BA in Žilina is the use of the lowest measured data for individual indicators. Based on the data in 2016/2017, we propose to increase the number of pupils by 9 (i.e. 413), when the academy reaches the required average value of 25 pupils per class and at the same time the value of 11.47 average pupils per teacher. As a result, efficiency will increase to 27.7% (SE 4.16%). We recommend adjusting the academic achievement to 1.93 (the best value in the file). An average result was also achieved by BA in Martin. This academy has the lowest age average of the teaching staff (i.e. 48.28 y.o.). In order to improve the efficiency result, we propose to increase the number of pupils by 23 (i.e. 325) pupils in the following school year, the overall efficiency is 50% better.

Under average results were achieved by the smallest Business Academies by capacity. BA in Ružomberok the best efficiency result was recorded by the academy in the school year 2015/2016. To achieve this result, we recommend reviewing the need for 2 retired teachers or optimizing the average number of pupils in the class by reducing the number of classes to 8. Under these circumstances, overall efficiency would increase to 17.3%. In another way, the lowest overall result was achieved by BA in Liptovský Mikuláš. We observe a decrease in the value of efficiency during school years by an average of 32.40% per year (SE 4.86%). In the school year 2017/2018, this is a slight increase due to an improvement in academic achievement (i.e. 2,02) and an increase in the average number of pupils in the class (i.e. 21,14) and a decrease in the number of teachers in retirement age.

What more, BA in Liptovský Mikuláš shows an overall disparity of indicators. It employs an equal number of teachers like BA in Ružomberok, with only 148 students attending it. Therefore, we propose to reduce the number of classes to 6, increasing the average number of pupils in the class to 24.6 and reducing the number of teachers by up to 9 people, increasing the average number of pupils per teacher to the recommended value of 12 pupils. These measures achieve an overall efficiency of 0.483 (SE 0.097), which significantly improves the efficiency result. If the academy wanted to increase the number of pupils, it would have to apply the same measures as the previous BA in Ružomberok.

In the second part of the sample we follow the development of efficiency in the Banská Bystrica self-governing region. The curve reflecting this trend is slightly increasing in nature but is still relatively low. The average annual change is 18.78% (SE 2.81%). BA in Lučenec shows the best long-term efficiency. The highest achieved academic value was in the school year 2014/2015 (i.e. 48.4%). Thanks to the highest average number of pupils in the class (i.e. 27.13) and the low average age of the teaching staff (i.e. 52.20 y.o.) achieved an efficiency of 47% (SE 7.05%) in the school year 2017/2018. Other academies in the group show significantly lower efficiency results.

In comparison with similar research (Štrangfeldová, Štefanišinová, Hronec, et al., 2018) focused on the evaluation of the quality of Grammar schools in the Banská Bystrica self-governing region, we find that the Business Academies we studied have achieved significantly worse results than another type of schools (Grammar schools). An exception is just BA in Lučenec, which like Grammar school B.S.T. Lučenec achieved positive values of efficiency. Thus, this academy can serve as a benchmark for comparison with other academies in the self-governing region.

BA in Banská Bystrica achieved an average efficiency result of the Banská Bystrica self-governing region. Nevertheless, this is a relatively low value in relation to BA in Lučenec. In

the last two years, we have been using real data for the academy. The number of pupils decreased by 100 during the period under review. To improve the outcome, we recommend increasing the number of pupils by 19 to achieve the recommended average number of pupils per teacher, with a total efficiency of 11.9% (SE 1.43%).

BA in Rimavská Sobota achieved the lowest efficiency result in the school year 2017/2018. This is due to the low value of the academic achievement indicator (i.e. 2.20), the low number of pupils per teacher (i.e. 23.88) and the high age average of the teaching staff. Only 5 teachers are of younger productive age, the remaining 14 are over 50 years and 2 are of retirement age. To increase efficiency by 59% (SE 11.80%), we propose to increase the number of pupils by 9 (i.e. 200). This is a relatively achievable alternative, given the capacity of the academy in previous years.

Despite the low-efficiency result, BA in Brezno shows the ideal average number of pupils in a class. The average number of pupils per teacher is only 3.85 pupils. Therefore, we propose to reduce the number of teachers by 18, thus achieving an average number of pupils per teacher at the required level. This is a significant rationalization measure, but since the academy works together with another secondary school-related in subjects, we recommend the possibility of interconnecting these institutions and creating a part-time job. With this measure, the academy would show 40.6% (SE 6.09%) efficiency. When increasing the number of pupils, the academy would have to achieve fullness as BA in Banská Bystrica (i.e. 325 pupils). However, such a measure is not realistic.

CONCLUSION

The development of human capital is strongly influenced by acquired education. Therefore, we focus our research on the field of secondary education, which is completed by the majority of Slovak citizens. This paper aims to evaluate the efficiency of secondary education on the example of selected secondary schools. We monitor efficiency during 5 school years at 10 Business Academies established in Banská Bystrica and Žilina self-governing regions. The main method of the paper is multicriteria analysis.

In Žilina the self-governing region achieves above the average result of efficiency BA in Čadca. This academy shows 36.2% efficiency. Most teachers are at a younger productive age. The average age of the teaching staff has proven to be a significant determinant of the efficiency outcome. BA in Dolný Kubín achieved second-best rank - just by 10.78% (SE 1.58%) lower efficiency result than BA in Čadca. BA in Lučenec achieved the best result in the Banská Bystrica self-governing region. The efficiency of this academy is 40.1%. Qualitative and quantitative indicators reached very good values. This academy can serve as a benchmark for the other academies studied. Average results were achieved in BA in Žilina, BA in Martin, BA in Ružomberok and BA in Banská Bystrica. For these academies, we formulate recommendations for improving efficiency by changing the monitored indicators. BA in Liptovský Mikuláš, BA in Rimavská Sobota and BA in Brezno show low values of efficiency. In order to improve the efficiency value, it is necessary to make more significant corrections.

In conclusion, we state that we managed to verify the research assumption. We found out what level of efficiency the researched Business Academies achieve. Please also note that the measurement of the efficiency of secondary schools was carried out based on indicators that the professional public described as appropriate, valuable and meaningful. The use of a

different combination of indicators may result in differences in the overall performance results of secondary schools.

ACKNOWLEDGEMENTS

This paper is part of the project VEGA 1/0334/19 Evaluating the performance of regional education by the value-for-money method, using the example of grammar schools.

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POTENTIAL OF ECOTOURISM: COMPARATIVE ANALYSIS OF SLOVAKIA AND SERBIA

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Abstract: *The demand for nature and ecotourism has been constantly rising last forty years and it will continue to grow. Due to the coronavirus, domestic tourism will increase exponentially, which would enhance ecotourism development. Foreigners and local tourists have become more aware to leave a positive impact on the environment where they travel and where they live. Serbia and Slovakia have a great potential to become attractive ecotourism destinations. Both countries are countries with a similar population number, no access to the sea, but with preserved nature, great gastronomic offer, and the main potential next to the capitals of Bratislava and Belgrade lies in ecotourism. At the same time, domestic ecotourism is a perfect economic activity that promotes sustainability and development. In the less developed regions, ecotourism can bring new employment opportunities and increase demand for local products. Agrotourism and rural tourism are inevitable part of sustainable development in Slovakia and Serbia. Despite of small territories of Slovakia and Serbia, both countries can offer a wide range of sceneries and natural beauties to be explored.*
This article aims to analyze the potential of ecotourism in the Slovak Republic and Serbia. To achieve the objective results, we've surveyed the foreign and local respondents. Our study also analyzes whether marketing strategies and promotion of domestic ecotourism is effective to attract tourists. The obtained results will be evaluated and compared. In the last part, the paper focuses on eco labels that currently exist in Serbia and Slovakia.

Keywords: *Ecotourism, Agrotourism, Natural resources, Local products, Protected areas, Marketing, Eco label.*

INTRODUCTION

The number of tourists in the world has grown over the past seventy years from 50 million people in 1950 to a staggering 1.4 billion in 2019 (UNWTO World Tourism Barometer). This figure would not be disturbing in itself if it were not accompanied by a number of negative factors that endanger the environment. For example, in luxury hotels, 1,800 liters of water are consumed per guest per day (for bathing, washing bed linen and towels, etc.), while a village of 700 inhabitants in one of the developing countries consumes 500 liters of water per month (www.travelmagazine).

Awareness of ecotourism does not date back to the distant past. Ecotourism is often referred to as sustainable tourism because of its tendency towards minimal impact on the environment and local culture (Janković et al., 2020). Ecotourism is important because of the reduction of

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negative impacts and contributions to environmental protection, but also as a generator of income, especially in rural areas.

It is important to point out that ecotourism is a form of tourism that focuses on areas of preserved environment, and possible ecotourism destinations can include national parks, protected natural areas, rural areas, areas of rich biodiversity with low levels of construction and urbanization (Milićević et al, 2019).

Recreation and ecotourism services have brought great opportunities to the people living in rural areas: new jobs, improved quality, of education, protection of unique culture and local customs. Recreational activities maximized the potential of historical and cultural sites that attract tourists from all around the globe. (Škvareninová, Kupec, 2019).

Ecotourists are motivated by the awareness of the endangerment of the environment. Awareness of climate change is changing the perception of average tourists and moving it towards ecotourism. According to Booking.com 2019 Sustainable Travel Report, 70% of the world's tourists would book environmentally friendly accommodation when choosing a tourist destination. According to the same report, almost three quarters (72%) of travelers are not aware of the existence of eco-labels for accommodation, although 62% of them would feel better about staying in accommodation with an eco-label. Also, eco-tourists travel more often than other tourists, and according to one of the surveys, 38% of them are interested in archeological sites / caves, 22% - in wild animals and birds (living in their natural habitat), 18% - in national parks visits, and 16% - in the culture of local communities (Travel Guard Update, April 2013).

POTENTIAL OF ECOTOURISM IN SLOVAKIA

The Slovak Republic is a landlocked country located in Central Europe with rich biodiversity. Despite its small territory, it offers many recreational activities such as hiking, swimming, skiing, discovering cultural monuments and local nature, unique for its flora and animal species. The oldest protected area, the National Park of Tatras (TANAP), is home to a number of endemic wildlife: kamzík vrchovský tatranský (Rupicapra rupicapra tatrica), svišť vrchovský tatranský (Marmota marmota latirostris), hraboš snežný tatranský (Microtus nivalis mirhanreini) (Štátne lesy TANAPu). Environmental awareness among local tourists leads to greater demand for more sustainable practices; therefore, traditional tourism is becoming challenged. More protective environmental measures in tourism industry are expected not only by public, but these goals are also incorporated in the document Zelenšie Slovensko -Greener Slovakia.

Integration of the territory of Slovakia into European and international programs for nature protection, is supportive precondition to belong to the system of protected European areas – NATURA 2000, The European Diploma for Protected Areas and the UNESCO World Cultural and Natural Heritage. (Wiezik, M. et al., 2019). In Slovakia, there are 9 national parks, 14 protected landscape areas and a network of so called “small- scaled protected areas” (protected sites, nature reserves and nature monuments). An overlap of proposed NATURA 2000 network with currently existing protected areas is 68 % (Baláž, D. et al, 2005).

Since many years ago, dating in the time of Austro-Hungarian Empire, the foreign tourists have been attracted to visit this land for its famous natural mineral and thermal springs. Many of them are recommended by doctors and medical specialists for its physical healing effects. In

order to treat digestive problems, heart diseases, skin and other individual body parts problems, courses of balneotherapy and hydrotherapy are prescribed in the SPA Trenčianske Teplice, Kováčová, Piešťany, Bojnice, etc. as a part of a treatment program. More than 1300 mineral sources and over 7100 of caves are found within the territory of Slovakia. Moreover, Slovakia has the highest number of caves per person in Europe.

Opportunities for ecotourism are limitless. Many ecotourism spots in Slovakia are still unknown for foreigners, but also among local tourists. Few of them are introduced here: Šranecké piesky known as "Slovak Sahara" with its unique flora and fauna. This area is protected by the EU. The other unusual ecological area is in Čadca city, where special stone balls called "Megoňky" can be found. It is the largest natural stone balls location in Europe. The turquoise water surrounded by beautiful nature known as "Slovak Plitvice lakes" is situated in Malá Fatra.

The Slovak Republic possesses great resources of geothermal energy, which is important and very perspective source of renewable energy. Both countries, Slovakia and Serbia, don't fully use geothermal energy capacity and its potential as an alternative source of energy.

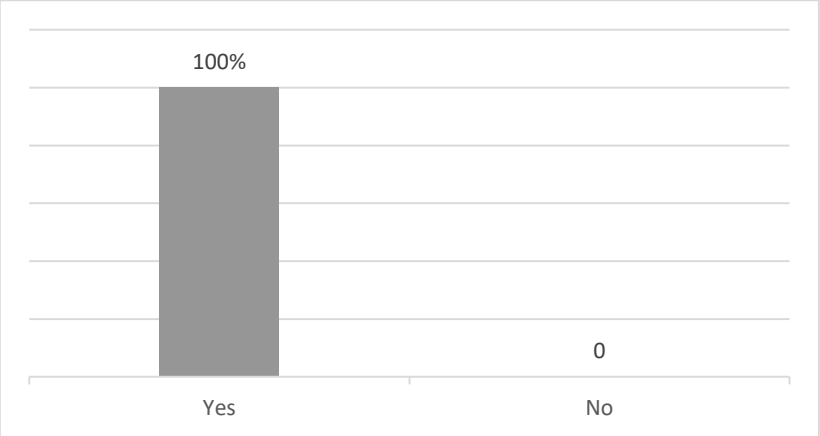
RESEARCH METHODS

In order to obtain scientific results, we've conducted quantitative research method comprised of questionnaire with the intention of efficient gathering of data from two groups of respondents: Group 1- foreign respondents and Group 2- local inhabitants of the Slovak Republic. Our survey consists of closed ended questions. The data were collected from 20 foreign respondents and 50 Slovak respondents. The aim of this survey is to analyze the current development and the potential of ecotourism in Slovakia from the point of view of local people and foreigners. We would like to find out whether marketing strategies to promote ecotourism are efficient, and also to define the preferences of local buyers and quality of local agricultural products. Conclusion will be drawn from obtained results.

RESULTS

Group 1

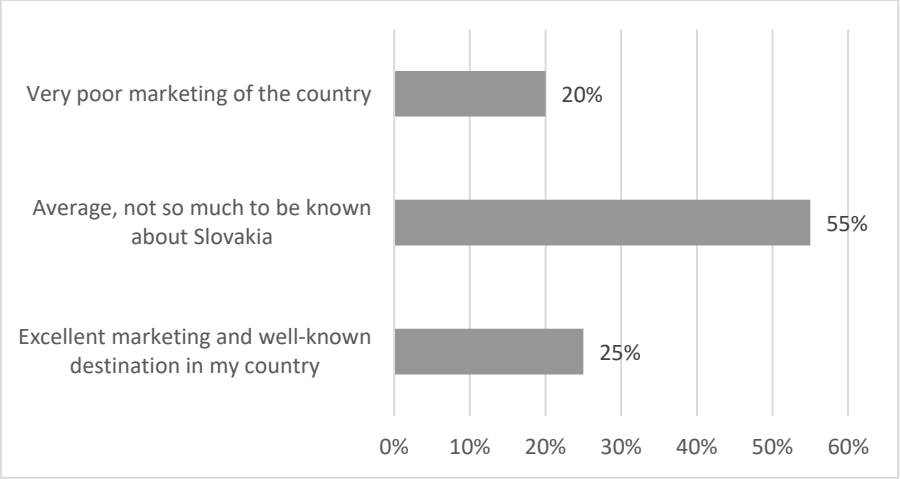
Question 1. Do you consider Slovakia as an environmentally friendly country?



Source: *own elaboration, Škvareninová, 2021*

All respondents agreed, that Slovak Republic can be considered as an environmentally friendly country. All foreigners have already got in contact with the Slovak Republic before conducting a survey; 12 out of 20 foreign respondents have already visited Slovakia, 8 people have depended on secondary information and own knowledge.

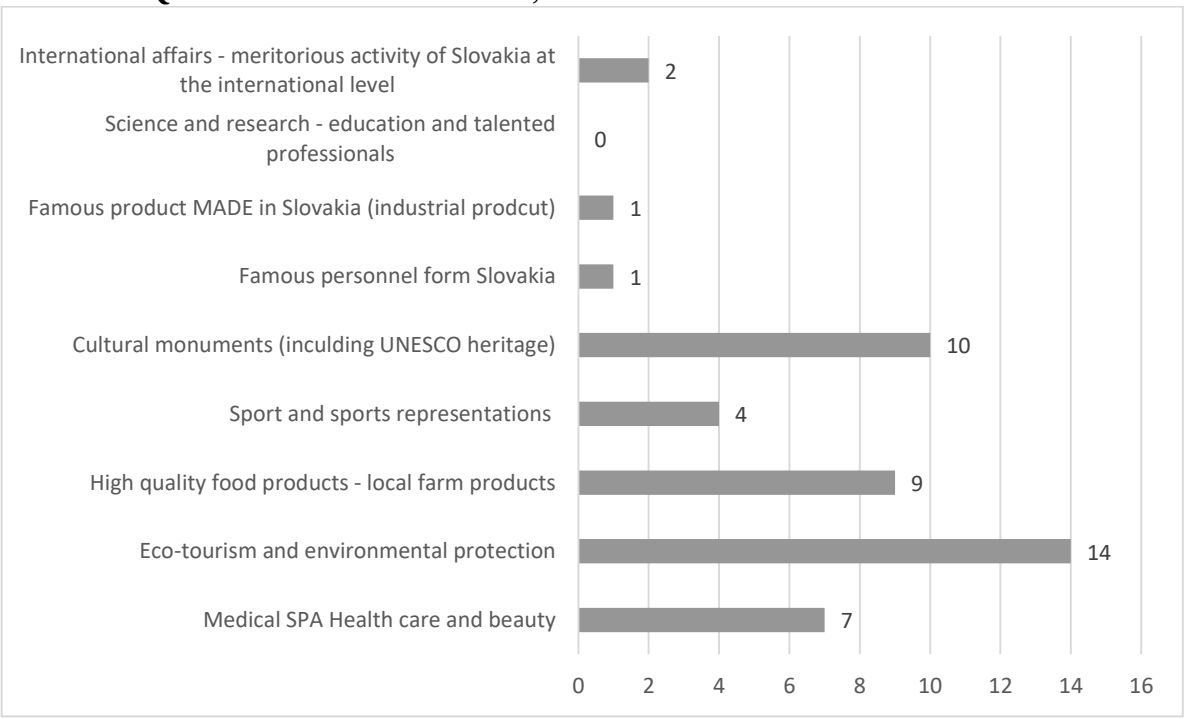
Question 2. How is the marketing of the Slovak republic?



Source: *own elaboration, Škvareninová, 2021*

55% of foreign respondents believe that marketing of the Slovak Republic is average and it is not much to be known about this country. 25% of respondents proclaimed that Slovakia has an excellent marketing and it is well-known destination in their home country. The answer "very poor marketing of the country" has been chosen by 20%.

Question 3. Please select area, which can be associated with Slovakia

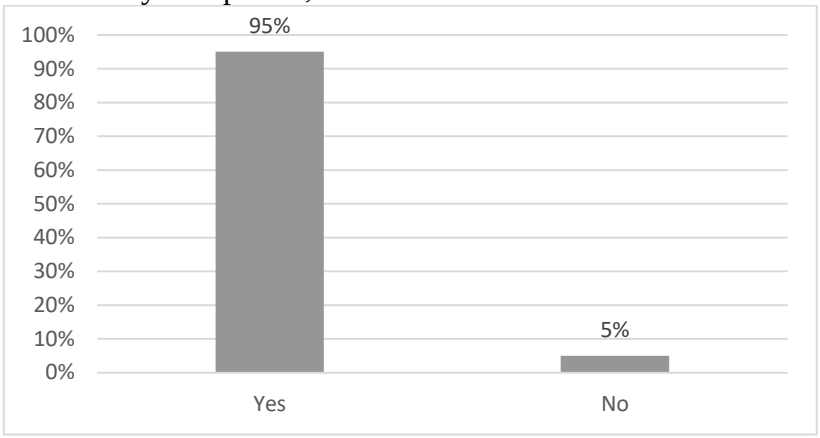


Note: In question 3, the respondents can choose min. 1 and max. 3 answers.

Source: *own elaboration, Škvareninová, 2021*

The answer "Ecotourism and environmental protection" obtained the highest number, which was selected by 14 respondents. The second most frequent answer "Cultural monuments (including UNESCO heritage)" was chosen by 10 people. The third most preferred area, which can be associated with Slovakia, according to the foreigners is "High quality food products-local farm products". The other 6 areas which can be associated with this country are comparably less relevant from the foreigners' point of view.

Question 4. In your opinion, is Slovakia an attractive tourist destination?



Source: *own elaboration, Škvareninová, 2021*

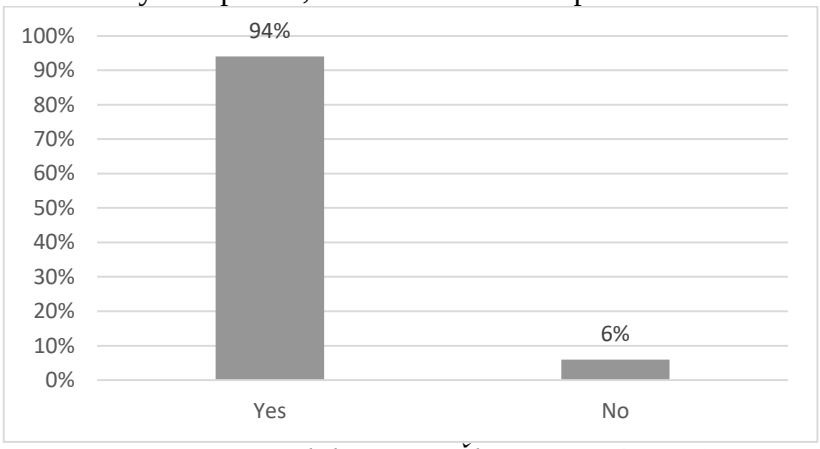
The vast majority, 95% of all respondents are convinced that Slovakia is an attractive touristic destination. Only 5% (1 respondent) thinks that Slovakia is not an attractive touristic destination.

Foreign respondents judge Slovakia either according to their own first-hand experience or the secondary source of information and knowledge they've gained about the Slovak Republic. Slovakia isn't an unknown destination to them. Surprisingly, all foreigners agreed that Slovakia can be considered as environmentally friendly country. Such positive perception about Slovakia brings many opportunities and new challenges in the field of environmental protection. On the other hand, marketing of the Slovak Republic is not viewed by foreigners in the most positive light. There are obviously many ways, how to improve the marketing of the country abroad. It means, that not only general Slovak population, but especially the representatives of the state bear the responsibility to introduce their homeland as an attractive touristic destination. Inevitable role of the government and the state representatives is to create a positive image of the country who they represent, in order to attract the foreigners and to widen the general knowledge about Slovakia among other foreigners abroad. The results of the survey show, that more attention should be paid to the marketing and the country promotion; foreigners are interested to know more about Slovakia, but very limited information is accessible. In order to achieve more positive results in the future, the Slovak Republic should work effectively on the marketing strategies promoting the country. Based on proposed results, it can be concluded that Slovakia doesn't fully use its own touristic potential and attractive ecotourism spots are lacking promotion abroad.

In Question 3, the respondents have chosen three areas, which can be associated with Slovakia the most. Surprisingly, the answer Ecotourism and environmental protection was chosen by majority of respondents. Cultural monuments and high-quality food products (local farm products) belong to the three top categories.

Group 2

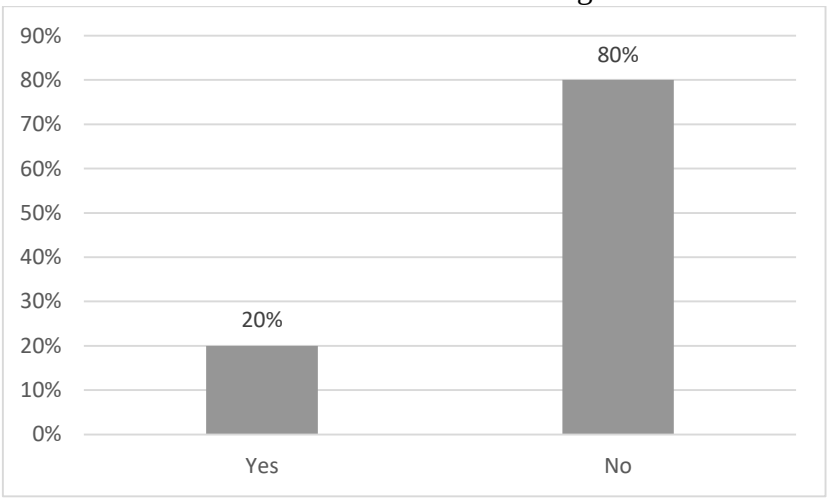
Question 1. In your opinion, does Slovakia have potential in ecotourism?



Source: *own elaboration, Škvareninová, 2021*

The vast majority of respondents, 94% believe that Slovakia has potential in ecotourism. Only 6% of respondents do not agree with this argument.

Question 2. In your opinion, are the marketing strategies effective enough to promote local ecotourism in various Slovak regions?

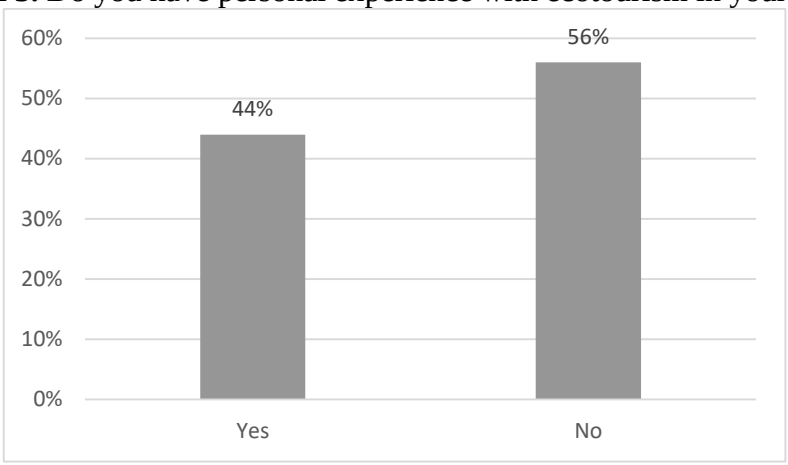


Source: *own elaboration, Škvareninová, 2021*

According to 80% of local respondents, marketing strategies are not effective enough to promote local ecotourism in various Slovak regions. Only 20% of people believe that existing marketing strategies are effective to promote ecotourism in different regions.

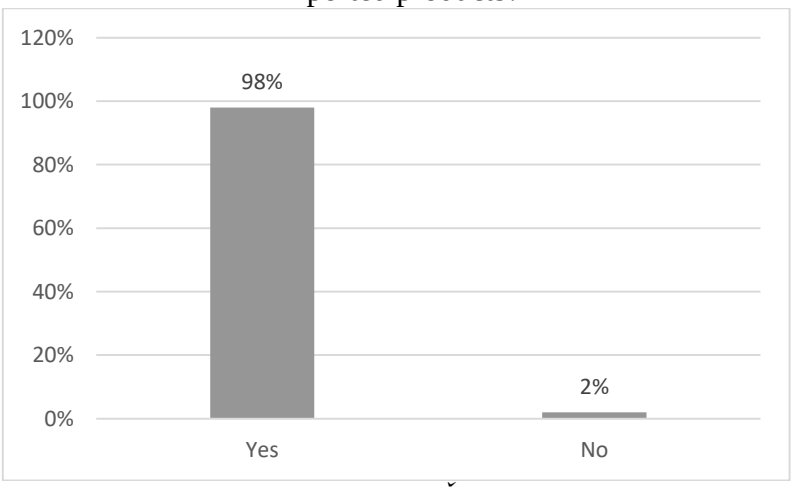
More than half, 56% of respondents claimed that they have personal experience with ecotourism in Slovakia. 44% of Slovak respondents haven't any experience with ecotourism in their own country.

Question 3. Do you have personal experience with ecotourism in your country?



Source: *own elaboration, Škvareninová, 2021*

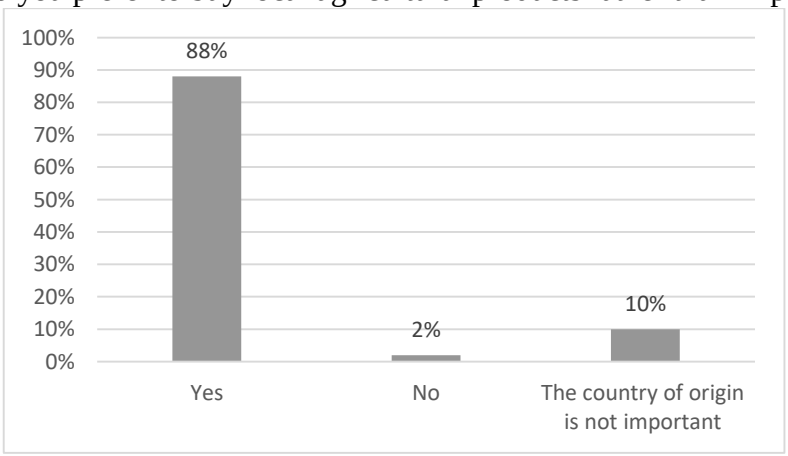
Question 4. In terms of quality, are the local products competitive enough compared to imported products?



Source: *own elaboration, Škvareninová, 2021*

Almost all respondents are convinced about high quality of local Slovak products and claimed that local products are competitive enough compared to imported products. Only 2% don't believe so.

Question 5. Do you prefer to buy local agricultural products rather than imported products?



Source: *own elaboration, Škvareninová, 2021*

88% of respondents prefer to buy local agricultural products rather than imported. 10% don't consider the country of origin as an important factor. Only 2% of local respondents don't prefer to buy local agricultural products, but they rather prefer to buy imported products.

The results of survey among local respondents in Slovakia has shown that the Slovak Republic has a great potential in ecotourism; however, the marketing strategies to promote ecotourism in various regions in Slovakia is definitely not effective. Possibly, due to the lack of ecotourism promotion, many Slovak people haven't experienced ecotourism in their own country yet. With regards to the quality of local products, almost all local respondents believe that Slovak products are competitive compared to imported products. Majority of local people prefer to buy local agricultural products rather than imported products.

POTENTIAL OF ECOTOURISM IN SERBIA

The tourist potential of Serbia is conditioned by many different factors. The Republic of Serbia is a country in Southeast Europe. It has significant archeological sites, some of which were created in the period of 40,000 years before the new era, the most important of which are Lepenski vir and Vinca Belo brdo. However, undoubtedly the largest number of historical sites originate from the time of Ancient Rome - as many as 17 Roman imperators ones were born on the territory of today's Serbia, including Marcus Aurelius Probus, the first Roman emperor who allowed the planting of vines outside Italy.

Serbia has exceptional preconditions for the development of eco-tourism in terms of natural resources, cultural heritage, traditional indigenous food and accommodation in ethno villages, farmhouses and small hotels on the edge of protected areas. Tourists who choose to go on a vacation in the countryside, mountain or near protected areas want to at least briefly leave life in the urban environment, while learning about the traditions and peculiarities of these areas (Jovanović et al, 2019).

In the Republic of Serbia, the number of protected areas is constantly growing. Based on the applied measures of institutional nature protection for more than six decades, the area of protected areas in Serbia covers about 8% of the territory of Serbia and currently amounts to 662,435 ha. There are 461 protected areas under protection, which are protected under the Environmental Protection Act (EPA, 2004) and the Cultural Property Act (CPA, 1994):

- 5 national parks,
- 18 nature parks,
- 20 landscapes of exceptional quality,
- 68 nature reserves,
- 3 protected habitats,
- 310 nature monuments,
- 38 cultural and historical sites.

All these areas can be used as eco-destinations with significant potential for the development of eco-tourism and various forms of entrepreneurship. Wetlands are protected internationally by the Ramsar Convention (RC, 1971). Ramsar wetlands represent resources of great importance for biodiversity conservation. They provide habitats for migratory bird species, which, because of their seasonal movements and cross-country movements, are considered international resources (Štetić, Trišić, 2020). The local population of Ramsar areas and surrounding villages has direct and indirect profits from the growth of this type of ecotourism (Zasavica, Obedska swamp, Imperial swamp, Ludash Lake).

In recent years, the restoration of medieval fortresses throughout Serbia (Golubac, Ram, Bač) has begun, which has attracted a lot of attention, especially from domestic tourists. However, as Serbia does not have the sea and a significant number of ski centers, the largest number of domestic and foreign tourists are focused on spa and rural tourism (Mladenović, Bojičić, 2020). Although spa tourism in Serbia is regenerating, it is noticeable that it is insufficiently used, primarily in the segment of thermo-mineral, mineral and thermal waters (Milićević et al, 2019).

Eco tourism in previous years was not a branch of tourism that could generate a significant number of tourist visits, but with all the changes brought by globalization and modern trends in modern life, an increasing number of tourists are interested in vacationing in nature, far from urban centers.

Preserved natural resources are one of the competitive advantages of tourism development. Serbia has an unusually large diversity of natural animal habitats: from wetlands to arid steppes and mountain gorges. Many plant and animal species can be observed in Serbia, which is their only remaining habitat. The aquatic insect Tisza mayfly (*Palingenia longicauda)*, can be found today only in the bed of the river Tisza and some of its tributaries. *Aldrovanda vesiculosa* - a rootless plant that lives freely floating on the water of ponds, which is critically endangered in Europe, can be observed in the Special Nature Reserve Zasavica (Sačuvajmo čudesne vrste, IUCN Red List). This plant captures small aquatic invertebrates using traps similar to those of the Venus flytrap.

Serbia is one of the six centers of biodiversity in Europe. Although it covers about 2% of Europe's total territory, it is home to 44,200 taxons (species and subspecies) and one of the largest hotspots of biodiversity in which 67% of Europe's mammal fauna is represented. Its territory is home to 51% of Europe's fish fauna, 49% of Europe's reptile and amphibian fauna and 39% of Europe's vascular flora (Biodiverzitet Srbije, IUCN, Red List). The fact that 67% of butterfly species live on the territory of Serbia is especially important because day and night butterflies are the most important bioindicators among terrestrial insect's habitats and an indicator of the degree of environmental protection, due to their exceptional sensitivity to negative changes in habitats.

Bird watching has developed in recent years into one of the most popular and fastest growing nature-based tourism activities (Carver, 2013). This group of tourists is also ready for higher travel expenses (Krejić et al, 2019). More than 70% of the bird fauna of Europe lives in Serbia, hereof it is one of the most desirable locations for bird watching, to which migratory species additionally contribute.

By analyzing the natural resources of Serbia, it is concluded that their diversity, exceptional quality and attractiveness represent distinguished potential for the development of Serbian ecotourism.

ECOLOGICAL LABELS - AN OPPORTUNITY TO INCREASE THE CURRENT TOURIST POTENTIAL OF SERBIA AND SLOVAKIA

Given that it is not possible to label services and products in Serbia with EU eco-labels, until the moment when Serbia becomes an EU member or enters the European Economic Zone, and aware of an increasingly wider circle of environmentally conscious consumers, the Government of the Republic of Serbia in 2009. adopted the Rulebook on detailed conditions, criteria and procedure for obtaining the right to use the eco-label, elements, appearance and

manner of using the eco-label for products, processes and services (Official Gazette of the Republic of Serbia, No. 3/2009). The Rulebook was amended in 2016 (Official Gazette of RS, No. 49/2016), when the criteria for 26 different groups of products and services were prescribed in accordance with the relevant criteria in the European Union.

The Ecological label of the Republic of Serbia is a mark that can be used to mark products and services that are produced on the territory of Serbia and which are determined to meet the criteria set by the Ordinance, and relate to less negative environmental impact than existing ones on the market. The Ecolabel criteria for tourist accommodation services aim in particular to: limit energy consumption, limit water consumption, limit waste generation, promote the use of renewable sources and substances that are less dangerous to the environment and promote communication and education related to environmental protection middle. At least 50% of the electricity used for all purposes in tourist accommodation must come from renewable sources, except in cases where tourist accommodation does not have access to a market that offers electricity from renewable energy sources (Čavlin et al., 2018). Strict conditions are also prescribed regarding the efficiency and production of heat, the way of air conditioning of the facility, energy efficiency of accommodation and service facilities, insulation of windows, ways in which heating, air conditioning and light are turned off and on. The part related to water consumption (flow of water from taps and showers, flushing of toilets, change of towels and bed linen, discharge of wastewater) and regulation and waste management (waste separation, disposable products, breakfast packaging) are especially regulated in detail.

The Slovak Republic did not establish own, nationally recognized Ecological label, because it is part of the European Union and doesn't have national unified standard due to the fact that the certification of ecological tourist accommodation is carried out in accordance with EU label. The EU Ecolabel were for the first time established in 1992, by Regulation no. 880/92 / EEC of 1992. Since then, it has been recognized across Europe and worldwide, and applied to all products at EU level, which a manufacturer from any country wants to place on the market of other Member States under high environmental standards and under eco-label (Janjić, Stojanović-Trivić, 2020).

Traditional hotels and restaurants have become some of the largest consumers of resources (electricity, water) and significant pollutants (waste water, emissions of greenhouse gases). An alternative to these hotels and restaurants are eco-restaurants, the number of which is growing worldwide (Živadinović, 2020). In order to solve the accumulated problems in ecotourism and hotel industry, it is necessary to improve the economic policy and financing of green projects. (Živković, 2020), (Vujović, 2020). Green bonds as sources of green projects financing are relatively new form. However, green bond market has seen an enormous growth in the last years (Stojanović, 2020).

Despite such detailed and strict regulation, most tourists are either not aware of the existence of this sign or do not have enough confidence in it due to insufficient inspections in this area. Therefore, the comparative application of international standards is absolutely desirable. Among the international standards, the ISO organization that created a special group of standards ISO 14000, which specifies the environmental requirements of environmental management, stands out. This series of standards includes 34 standards, among which the most widespread is the ISO 14001: 2015 standard, which is the only standard from this series according to which certification can be performed (Prokić, 2019). The ISO 14001 standard is used to assess the management of the environmental protection system, and can be implemented in any environmental management system (Milošević et al, 2015).

Although, like the national Eco-label of the Republic of Serbia, ISO standards are voluntary, the positive impact they have on attracting environmentally conscious tourists for now has insufficient influence on the owners of catering facilities for their application. Therefore, it is necessary to work on the popularization of these certificates in Serbia and Slovakia in order to be more competitive on the market and attract a growing segment of ecotourists, but also on their strict control.

CONCLUSION

According to the results from Group 1 and Group 2, we have proven the great potential of ecotourism in Slovakia. It is a great result for Slovakia to be viewed as an eco-friendly country from the perspective of foreigners, on the other hand, foreigners claimed the lack of marketing and promotion of Slovakia as a touristic destination. Even the local Slovak people have agreed, that marketing strategies to promote domestic ecotourism in different Slovak regions are not effective. It is suggested to engage deeper in the process of marketing to promote the tourism of Slovakia domestically and on the international level. The Slovak government and regional representatives should take more responsibilities to develop Slovak ecotourism potential.

Demand for ecotourism and agrotourism is rising among local people in Slovakia. Regional tourism can boost the local economy, increase job opportunities. Instead of spending money in a foreign destination for a traditional holiday in the resort, it is essential to support the local tourism and local food producers. The aim of ecotourism is to manage recreational activities in an eco-friendly and sustainable manner, with the least possible pollution of the environment. Traditional mass tourism should be transformed into sustainable form of ecotourism, which is the right way of how to protect the nature that can be saved for our next generations.

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