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The role of wage subsidies in the Macedonian labour market[*]

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Abstract

The main rationale for wage subsidies is giving job opportunities to workers who would otherwise remain unemployed or take jobs that do not exploit their potential productivity. The aim of this paper is to evaluate the wage subsidy programme in North Macedonia for the period 2018-2019 in order to provide a sound basis for its redesign in the times of Covid-19 crisis. The Propensity score matching is used as a principal estimation method. Moreover, we further explore the impact of the wage subsidies on the outcome variables for particular disadvantaged segments by disaggregation of the average treatment effect on treated individuals. The evaluation reveals improvement of the wage subsidy program in 2019 relative to 2018. However, having in mind the impact of the Covid-19 pandemics, there is a room for redesign of this measure by improving its targeting and conditions for retaining the subsidised jobs in the long run.

Keywords: wage subsidy, labour market, unemployment, COVID-19

Introduction

Active labour market measures (ALMMs) aim at bringing unemployed back to work by improving the functioning of the labour market. The active labour market policies have multiple purposes such as: increasing output and welfare by putting unemployed to work maintain the size of the effective labour force by counteracting high unemployment, help reallocate labour between different segments by improving employability of the labour force, alleviate the moral-hazard problem of unemployment insurance etc. (Martin, 2000). The majority of these measures are general-purpose, i.e. serve relatively broad target population. However, often programs are designed for specific groups in the labour market considered as vulnerable segments. The current Covid-19 crisis offer unique opportunities for innovation and reset of social objectives and to experiment with different ALMMs.

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Persistently high unemployment in many countries, tight government budgets and the existing scepticism regarding the effects of active labour market policies are the reason for growing interest in evaluating these measures (Hujer and Caliendo, 2000). The main challenge in carrying out effective impact evaluation is to identify the causal relationship between the program and the outcomes of interest. With respect to this, there exist contrasting positions on the effectiveness of active labour market programs. On one hand, proponents of these programs argue that they are both necessary and useful for reducing unemployment. On the other hand, the opponents demonstrate that active labour market programs are provided at high opportunity costs to other social programs and labour market efficiency as a whole (Dar and Tzannatos, 1999; Kluve, 2006; Escudero, 2018).

The importance of active labour market policies for North Macedonia can be viewed from two different perspectives. First, the role of the active labour market policies receives greater weight when skill obsolescence is higher *i.e.* when the long-term unemployment prevails over the short-term unemployment. Second, the aspiration of the country in the near future to start negotiations for EU accession imposes ambitious objectives in terms of attaining international labour market competitiveness. With this in mind, we can argue that investment in human capital becomes increasingly valuable and implies a need for reforms of active labour market policies (Nikoloski, 2021).

Even though the implemented ALMMs in North Macedonia are characterized with high level of transparency and accountability, there is a lack of their rigorous assessment. To our knowledge, there are two published impact evaluations performed for selected number of active labour market programs: First, for the period 2008-2012 financed by the ILO, and second for the period 2018-2019 (Mojsoska Blazevski and Petreski, 2015; Nikoloski, 2021). The findings show mixed results in the way that some programs bring comparatively better outcomes for the program participants relative to non-participants. However, the analyses identified programs that were not effective in improving the labour market outcomes of the participants.

One of the widely used ALMMs are the wage subsidies that lower the cost of a company to hire particular worker, which should lead to an increase in employment. The main rationale for wage subsidies is giving job opportunities to workers who would otherwise remain unemployed or take jobs that do not exploit their potential productivity. In the absence of wage subsidies, these workers are likely to face long spells of unemployment or inactivity that reduce their human capital. Most of the evaluations of wage subsidy programs focus on high income countries and have shown large variation in results, which depends on the specificities of the design (Katz, 1996; Jaenichen and Gesine, 2007; Bernhard *et al*., 2008; Almeida *et al*., 2014). For instance, Schünemann *et al*. (2011) do not find significant impact of wage subsidies for long-term unemployed workers in Germany on

the employment outcomes. Similarly, Huttunen *et al*. (2010) find out that the Finish subsidy system has no effects on the employment rate. In addition, Bördős *et al*. (2015) in their comprehensive analysis of wage subsidies for youth workers find out that modest pay roll tax cuts in developed countries leads to negligible employment gains and are cost ineffective. However, in middle-income countries wage subsidies in the form of payments to firms lead to sizeable employment gains in the short run.

During the Covid-19 pandemics as part of a wider range of policy measures to counteract the economic and labour market effects of the crisis, many countries adopted the strategy of implementing temporary wage subsidies (ILO, 2020a). Although the temporary wage subsidies are not a new policy instrument, the scale of their use in the pandemic crisis is unprecedented. In contrast to targeted subsidies that aim to encourage firms to employ specific categories of workers such as youth, long-term unemployed, or workers with disabilities, temporary wage subsidies are used in times of crisis to save jobs and help enterprises to retain as many employees as possible. However, the analyses suggest that as economic conditions improve, temporary wage subsidy schemes will be gradually integrated with the pre-existing systems (Linden *et al*., 2021).

The need to assess the effects of wage subsidy programme in North Macedonia stems from the fact that public funds are limited and spent at a time of an economic crisis as well as increased risk of poverty due to the Covid-19 pandemics. Although ESA successfully copes with the implementation of planned ALMMs including the wage subsidy programme, there still exist a lot of challenges regarding the redesign of the actual and introduction of new measures (Nikoloski *et al*., 2023). The aim of this paper is to evaluate the wage subsidy programme in North Macedonia for the period 2018-2019 in order to provide a sound basis for its redesign in the times of Covid-19 crisis. The paper is structured as follows. In section 1 we present the characteristics of the wage subsidy programme in North Macedonia followed by section about the data and sample used for the analysis. The variables under consideration and estimation technique are elaborated in Section 3 and Section 4 respectively. The estimation results are presented in Section 5, followed by an analyses of the cost effectiveness and the impact of Covid-19 pandemics. In the last section are presented the concluding remarks and the policy recommendations.

1. Characteristics of the wage subsidy programme in North Macedonia

The efforts to increase employment and reduce social exclusion in North Macedonia continue to be high priority due to the need for reducing unemployment, especially among vulnerable groups.

In this context, the process of planning, design and implementation of ALMMs has been continually performed since 2007 (Nikoloski, 2021). Among the implemented measures, the usual types of measures are provided on regular basis, while the others are provided sporadically. As regular, we can consider the following ALMMs: subsidies for employment, trainings for known employers, trainings for advanced IT skills and trainings for jobs on demand. The non-regular ALMMs are quite heterogeneous and sometimes they have been provided for only couple of years such as trainings for specific fields or specific support for firms regarding new job openings (Krstevska and Ilievska, 2018).

The planned active labour market programs and measures in North Macedonia are systematized in the Operational Plan (OP), which is prepared on yearly basis by the ESA. The OP is an official document that contains detailed explanation of each ALMM including the eligibility criteria, the number of beneficiaries (participants), the selection procedures etc. In the realisation of the OP are involved different institutions such as ESA, Ministry of Labour and Social Affairs, educational organisations etc. Furthermore, the OP encompasses the financial framework with indicated costs and financial sources for each ALMM. The guiding principles in the realization of the ALMMs according to the OP is providing gender balance and representation of youth (aged under 29) for at least 30 percent.

In this context, the wage subsidies in North Macedonia are used to promote integration into the labour market of specific groups of workers that usually face employment difficulties. Particularly, the target groups are the following types of workers: long-term unemployed, youth (under 29), older workers (above 50), social assistance beneficiaries, single parents, disabled people, some ethnic minorities (Roma), homeless persons, persons without elementary education, former drug abusers etc.

The eligible companies for wage subsidies are micro, small and medium enterprises, social enterprises, civil and non-profit organisations that carry out economic activities, newly created enterprises within the self-employment programme as well as individual unemployed persons. The eligible companies are informed about the programme by a public announcement, while individual unemployed are directly contacted by using the ESA registry. After selecting the successful submissions, ESA signs with the beneficiary companies contracts that contain the terms and conditions.

The selection criteria generally consider the employers. First, the total number of employees in the company has not be lower then the average number of the full-time employees in the previous year. Second, the company should has settled all obligations regarding payments of salaries and social security contributions. Third, the company should not have financial debts in the previous year.

Fourth, the employer has to have at least one employed person with permanent (open-ended) contract. Fifth, the number of newly hired workers by the wage subsidy program in the company may not exceed 50% of the average number of employed in the previous year and may not by greater than five persons by one employer.

The wage subsidies in North Macedonia are granted for a limited period of 3, 6 or 12 months. A follow-up period of further employment is obligatory after the expiration of the subsidy. For instance, the employer is obliged to keep the beneficiary worker for a total period of: (i) 9 months in the case of receiving wage subsidies for a period of 3 months, (ii) 18 months in the case of receiving wage subsidies for a period of 6 months, and (iii) 30 months in the case of receiving wage subsidies for a period of 12 months. If a beneficiary worker is dismissed within this period for reasons attributable to the employer, the employer has to reimburse part of the subsidy.

The monthly amount of the wage subsidy in 2018-2019 was 310 EUR. Hence, the total financial support for a period of 3 months was 930 EUR, for 6 months was 1.860 EUR, while for 12 months was 3.720 EUR. Having in mind that the gross minimum wage for the same period was around 300 EUR, the monthly wage subsidy provided possibility for paying the beneficiaries higher then the minimum wage.

When the Covid-19 pandemics hit the Macedonian economy in March 2020, the Government approached the World Bank in search of co-financing support for the implementation of a wage subsidy scheme. The scheme was designed to provide salary subsidies to adversely affected firms for three months (April, May and June) to enable these firms to meet their immediate liquidity needs, retain employees, encourage operational upgrading, and spur an economic recovery. This support covered 50% of social contributions from employees for viable firms in tourism and transport as the hardest hit sectors during the pandemic. Accordingly, approximately 20,000 companies benefitted from this wage subsidy scheme, helping over 120,000 employees (World Bank, 2020). Having in mind that jobs in the informal sector were not eligible for this measure, it is assumed that it assisted a number of informal jobs to formalize (ILO, 2020b; ETF, 2021; Finance Think, 2021).

2. Data and sample

The data for the analyses are provided from two sources: the registry of the Employment Service Agency as administrative data and a survey carried out on a sample of wage subsidy beneficiaries. There are several advantages of using administrative data for policy research such as: its superior quality, exhaustive coverage, representativeness etc. (Pierre, 1999). However, the ESA registry does

not contain data on all considered attributes. In order to obtain information for additional attributes that are not provided by the ESA registry, an additional telephone survey was carried out during September 2021, covering a sample of participants (treatment group) and non-participants (control group).

The sample for analysis consists of treatment and control groups. The treatment group comprises persons who were wage subsidy beneficiaries. On the other hand, the control group comprise persons who applied but have not been selected. The figures regarding the sample size for the treatment and control groups are reported in Table 1. In addition to response rate, we present the rates of unreached participants and control group applicants and the rates of rejection.

Table 1. Total number and sample size of the treatment and control groups

	Wage subsidy program 2018		Wage subsidy program 2019	
	Treatment	**Control**	**Treatment**	**Control**
Database from ESA	1206	531	1945	281
Sample size	261	121	234	82
Response rate (percent)	21.7	22.8	35.8	40.2
Unreached rate (percent)	55.6	52.5	33.9	33.3
Rejection rate (percent)	22.7	24.7	30.3	26.5

Source: own calculations

The number of planned subsidised jobs in 2018 according to the OP was 570, while there were actually provided 1206 subsidies (which is more than double). Accordingly, the number of planned wage subsidies in 2019 was increased to 1419, while the ESA actually provided 1945 subsidies. The control groups of workers were considerably smaller than treatment groups, consisting of 531 and 281 applicants in 2018 and 2019 respectively.

The attrition is a problem because we might expect the employment outcomes of individuals who refuse to be surveyed or who cannot be found to differ from those who are interviewed. A typical approach has been to compare attrition rates in the treatment and control groups, and then do a bounding exercise if the attrition rates vary (often the control group is slightly less likely to respond). This type of differential response would bias the estimated treatment effect upwards, overstating the impact of training (McKenzie, 2017). A second issue with the use of survey measures of employment is the possibility that those in the treatment groups over-report their employment outcomes to express their appreciation for being given the program, while those in the control group potentially under-report these outcomes.

3. Variables under consideration

The analysis is based on observing a wide range of possible outcomes obtained from the ESA Registry or from the survey. The following possible 8 outcomes may arise: Employed person, other person who search for job, unemployed person, unknown status, founder, manager, founder and manager, death or retirement. In addition, from the survey carried out on a sample of participants and control group applicants we provide information about the following outcome measures:

- Currently employed – defined according to the standard ILO definition and further is disaggregated to the following categories: employer, employed, self-employed and unpaid family worker;

- Currently unemployed which correspond to the ILO definition of a person who does not have a job, is searching for job and is available to take a job within four weeks;

- Inactive – correspond to the ILO definition of inactivity, or more precisely categorizes those who have not searched for a job at least four weeks;

- Type of contract – permanent (open-end), temporary (close-end), seasonal or no contract if the person is employed informally;

- Monthly salary earned on the current job for employed persons or monthly wage earned on the last employment for those who are unemployed. Instead of asking the respondents about the exact amount of monthly salary, we assign them to classes with predefined ranges;

- Changes in financial conditions after the participation in the program or after the cut-off point for the applicants from the control group. The possible outcomes are categorized as: better, same or worse.

- Changes in employment prospects after the participation in the program or after the cut-off point for the applicants from the control group. The possible outcomes are categorized as: better, same or worse;

- Job search effort – assessed on a five point Likert scale with five options from 'do not search at all' to 'search to great extent';

- Emigration intention – assessed on a five point Likert scale with five options from 'do not plan at all' to 'plan to great extent'.

- Similarly, to outcome indicators, the explanatory variables are obtained from the ESA Registry or by the survey. The variables under consideration are the following:

- Demographic (age, gender, urban/rural, marital status, disability) – all of these variables except the marital status are provided from the ESA registry; the marital status of respondents has been provided from the survey;

- Household characteristics – Number of household members, Number of household members under 15, Number of employed household members, Number of unemployed household members, Number of retired household persons; this information is provided from the survey;

- Human capital (education) – the education level is categorized in the broad education groups: primary, secondary, higher (2 years), higher (4 years) and specialization which corresponds to the post-graduate and doctoral levels;

- Previous work experience – provided from the ESA registry and measured number of months;

- Unemployment history – duration of unemployment prior to application or participation in the program; this information is provided from the ESA registry.

In order to evaluate the targeting of the ALMMs with respect to vulnerable and marginalised groups, we pay particular attention to the coverage of specific categories of workers. As marginalised groups are considered the following: unemployed without work experience, youth (aged under 25), female, those living in rural areas and very-long-term unemployed (those who search for job more than 4 years). Additionally, as a disadvantaged groups can be considered disabled people and some ethnic minorities such as Roma, but their underrepresentation in some ALMMs prevents us from undertaking more detailed analyses.

The participants in the ALMMs are assessed with respect to their satisfaction with the provided training or wage subsidy. Particularly they are questioned about the gained knowledge and skills, the appropriateness of the applied training methods, the usefulness of the training materials, the appropriateness of the training environment and whether they would apply for another ALMM. In the case of wage subsidies the satisfaction is assessed with respect to the job, salary, on-the-job training and superiors. For the purpose of evaluation we use a five point Likert scale in the gradation from 'not satisfied at all' to 'satisfied to great extent'. Having in mind the circumstances engendered by the Covid-19 pandemics, the participants and ALMM applicants have been assessed whether the pandemics imposed a need for new skills. As possible outcomes we assume an increased demand for the following skills: foreign languages, basic IT skills, advanced IT skills, e-commerce, e-banking etc.

4. Estimation technique

Part of the differences in labour market outcomes between ALMMs participants and the control group is due to the differences in their socio-demographic characteristics. A similar explanation could be offered for the different outcomes across the various programs (aside from the differences stemming from the characteristics and intensity of programs). Given that the treatment and control

groups are likely to differ in their observable and unobservable characteristics, a comparison of their employment outcomes can be biased. Specifically, better employment outcomes can be expected for individuals with higher levels of education, those who have prior work experience, those with shorter unemployment spells and so on. In other words, program participants may have better employment outcomes not because of the effectiveness of the programs but because of their better characteristics. Thus, if the groups systematically differ in these characteristics, the differences in employment outcomes may be due to these differences, rather than to differences in program effects.

The analysis is be based on quasi-experimental approach where programs are evaluated ex-post. Namely, because the control group does not exist, it must be created and matched as closely as possible to the observed characteristics of those who participated in the program. These methods are called quasi-experimental, because they attempt to recreate a situation similar to a controlled experiment. In this case there is no single method that is preferable in all circumstances, and various alternative techniques can be applied (Caliendo and Hujer, 2005; Gertler *et al*., 2016).

The Propensity score matching is used as a principal estimation method. This method is based on the assumption that differences between participants and non-participants that jointly determine their decision to participate and the outcome of interest are all observable in the data. Matching therefore results in comparing participants with non-participants, giving more weight to the non-participants that are most similar to participants. In this context, a logistic regression is used in order to calculate the propensity scores. The outcomes of participants and non-participants with similar propensity scores are compared to obtain the program effect. The technical aspects of estimation based on propensity score matching procedure is developed within the Roy-Rubin framework[*].

There are several matching algorithms suggested in the literature such as: nearest-neighbour matching, radius calliper matching and Kernel matching (Loi and Rodrigues, 2012). The choice of the matching algorithm is not trivial since it involves trade-off between bias and variance. The quality of the matching procedure is evaluated on the basis of its capability in balancing the control and treatment groups with respect to the covariates used for the propensity score estimation. The basic idea is to compare the distribution of these covariates in the two groups before and after matching on the propensity score.

Let denote with Y^T the outcome when the person gets the treatment, whereas Y^C denotes the outcome when person does not participate in the ALMM (comparison group). Additionally, we

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[1] Developed by A.D. Roy and D.B. Rubin.

introduce a binary assignment indicator D that determines whether the individual gets the treatment (D=1) or not (D=0). The average treatment effect of the treated (ATT) is defined as follows:

$$ATT = E(Y^T - Y^C | D{=}1) = E(Y^T | D{=}1) - E(Y^C | D{=}1)$$

ATT shows the expected effect of the program for those persons who actually participated. However, we cannot observe the counterfactual $E(Y^C | D{=}1)$ i.e. the average outcome of those persons who participated in the program had they not participated. Thus, without further assumption ATT is not identified. But if we can observe all factors that jointly influence outcomes and participation decision, then conditional on these factors (X), the participation decision and the outcomes are independent.

The propensity score matching method creates a comparison group from untreated observations by matching treatment observations to one or more observations from the untreated sample, based on observable characteristics. The propensity scores are used to select the comparison group for each treatment group according to the following three steps:

- First, a logistic regression model is estimated for each ALMM in which the dependent variable is dichotomous, taking the value 1 for those who took part in the intervention, and 0 if they did not. The explanatory variables include all observables that may affect participation, but that are not affected by the intervention;

- Second, the output from these selection models are used to estimate choice probabilities conditional on X (the so-called propensity scores) for each treatment and potential comparison group member. Hence, an individual's propensity score is the fitted value from the participation equation. Having calculated the propensity scores for all observations, the region of common support is identified;

- Third, for each treatment group member is selected potential comparison group member based on their propensity scores.

Once the matching is done, a test is performed for balance by comparing the mean characteristics of treatment and comparison groups. There should be no significant difference in average characteristics between the two groups. Finally, the impact estimate is calculated by first calculating the difference in between the indicator for the treatment individual and the average value for the matched comparison individuals, and second, by averaging over all these differences.

There are several pros and cons using the propensity score matching method. On one hand it is characterised with its simplicity in computing the standardised bias and joint significant test. Furthermore, the matching method does not require any functional form assumption for the outcome equation and therefore, it is not susceptible to misspecification bias along that dimension. However,

in practice it may be the case that some of the participants do not have matched counterparts in the pool of non-participants with similar propensity scores. In technical terms, it is possible a lack of common support, or lack of overlap between the propensity scores of the participants in the program and those of the pool of non-participants. Having in mind these characteristics of the propensity score matching method, for checking the robustness of the estimates alternative methods for estimation are applied as well.

5. Evaluation of the wage subsidy program

For the wage subsidy programme, we determine what outcome would have been for a program beneficiary after participation in the program compared with the counterfactual outcome i.e. if the person had not participated in the program. The difference between the observed outcome and the counterfactual outcome is used as a measure of the impact of the program. One of the main issues in the sample selection is the so-called selection bias, which may affect the accuracy of the estimates. Selection bias means that a better outcome for the participants compared to the non-participants may be observed due to differences in the characteristics of the persons in the two groups and not to participation in the program.

Furthermore, we estimate the individual probabilities to participate to the program, depending on a set of observable characteristics. This is conducted through using standard Probit regression on the treated and the non-treated individuals. The estimated coefficients will provide insights in the factors influencing selection into treatment, but may also capture factors of attrition from the survey, i.e. factors explaining differential non-response rates in the treatment and in the control group. According to the estimated Probit model is than calculated the propensity score for each individual in the treatment and comparison group.

The propensity scores are used to match participants with comparable non-participants. For each treated individual, we look for the one individual among non-participants who is the closest neighbour in terms of the predicted probability of being treated. In other words, for each pair comprising a participant and a non-participant, the absolute difference in terms of the estimated propensity to participate in a certain treatment is minimized. To ensure that the matched pairs have reasonably similar probabilities to be treated, we exclude participants for whom the predicted probability to be in the program is larger than for any individual in the comparison group. In this way we achieve common support. Alternative matching procedures are used as robustness checks.

Moreover, we further explore the impact of the wage subsidies on the outcome variables for particular disadvantaged segments by disaggregation of the average treatment effect on treated individuals. In this context, particular attention is paid to youth, female, unemployed from rural areas, without work experience and being very-long-term unemployed. The disaggregation is performed only for those outcome variables where statistically significant impact has been identified.

Finally, we conduct evaluation of the matching quality. A way to do so is to compare the standardized mean bias before matching to the standardized mean bias after matching. In addition, we also re-estimate the propensity score on the matched sample to compute the pseudo-R^2 before and after matching. The number of observations that are off common support in absolute and relative term is also presented as an additional indicator of matching quality. In what follows, we separately evaluate the wage subsidy programmes in 2018 and 2019.

5.1. Wage subsidy program in 2018

From Table A1 (Annex A), in 2018 statistically significant positive difference is observed with respect to the number of the unemployed household members, primary education and short-term unemployment, while negative difference is observed with respect to age, marital status, number of persons under 15 and number of employed in household.

According to Table A2 in Annex A, age, education level and previous unemployment history have statistically significant impact on the probability to enjoy benefit from wage subsidies. Namely, younger unemployed, those with primary education and short-term unemployment are more likely to be wage subsidies beneficiary.

Table 2. Wage subsidies 2018, treatment effects on outcome variables

Outcome variables	Difference		Standard error		t-statistics	
	Unmatch.	ATT	Unmatch.	ATT	Unmatch.	ATT
Employed	-0.163	-0.085	0.048	0.064	-3.42	-1.34
Unemployed	0.092	0.093	0.026	0.018	3.50	5.14**
Salary	-19.038	211.267	306.046	431.011	-0.06	0.49
Permanent contract	-0.325	-0.298	0.056	0.080	-5.77	-3.72**
Better financ. cond.	0.009	0.016	0.039	0.058	0.24	0.27
Better empl. prosp.	0.051	0.039	0.037	0.049	1.41	0.80
Search for job	0.023	-0.008	0.043	0.067	0.52	-0.12
Intend to emigrate	0.027	0.020	0.015	0.008	1.82	2.25**

Note: */**/*** indicate significance at 10/5/1 percent level respectively.

As displayed by Table 2, wage subsidies have statistically significant positive impact on unemployment and on intention to emigrate, while they have negative impact on the probability of having permanent contract. In addition, the matching quality is good since the percent of mean bias reduction is 42.8%, the pseudo-R^2 in the case of matched samples is more than double compared to unmatched samples, while only 1% of the observations are off common support.

We further evaluate the impact of the wage subsidy programme in 2018 with respect to the impact of wage subsidies on disadvantaged groups (Annex A, Table A3). Youth are better off than mature unemployed vis-à-vis probability of being unemployed and having permanent employment contract, but express higher intention to emigrate. Female are better off than male unemployed vis-à-vis probability of being unemployed, worse off with respect of probability of having permanent employment contract, and express lower intention to emigrate. Unemployed from rural areas are worse off than those from urban areas vis-à-vis probability of being unemployed and having permanent employment and express slightly higher intention to emigrate. Unemployed without work experience are better off than those with work experience vis-à-vis probability of being unemployed and having permanent employment contract, and express lower intention to emigrate. The very-long-term unemployed are worse off compared to those with shorter spells of unemployment regarding the probability of having permanent contract. In addition, we present the propensity score density functions and the quality of the matching (Annex A, Figure A1 and Figure A2 respectively).

5.2. Wage subsidy program in 2019

From Table B1 presented in Annex B, we can observe that statistically significant difference between the treatment and control group is found for the following observables: age, gender and previous work experience.

According to Table B2 (in Annex B), only age appears to have statistically significant impact on the probability to enjoy benefit from wage subsidies. Namely, an additional year increases the probability to be wage subsidies beneficiary.

According to Table 3, wage subsidies have statistically significant positive impact on salary and perception for better financial conditions, while negative impact on the probability of being unemployed and the intention to emigrate. In addition, the matching quality is good since the percent of mean bias reduction is 56.6%, the pseudo-R^2 in the case of matched samples is more than four times higher compared to unmatched samples, while 18.7% of the observations are off common support.

Table 3. Wage subsidies 2019, treatment effects on outcome variables

Outcome variables	Difference		Standard error		t-statistics	
	Unmatch.	ATT	Unmatch.	ATT	Unmatch.	ATT
Employed	-0.006	0.029	0.039	0.056	-0.15	0.52
Unemployed	-0.089	-0.121	0.022	0.051	-4.03	-2.37**
Salary	1314	1382	505.113	648.636	2.60	2.13**
Permanent contract	-0.065	-0.094	0.061	0.085	-1.07	-1.11
Better finan. cond.	0.078	0.064	0.032	0.029	2.40	2.19**
Better empl. prosp.	0.058	0.040	0.035	0.040	1.67	1.00
Search for job	-0.052	-0.052	0.057	0.082	-0.91	-0.64
Intend to emigrate	-0.282	-0.260	0.059	0.086	-4.74	-3.03**

Note: */**/*** indicate significance at 10/5/1 percent level respectively.

Similar to the previous analysis, we make inference with respect to the impact of wage subsidies on disadvantaged groups (Table B3, Annex B). Youth are better off than mature unemployed vis-à-vis probability of being unemployed and expecting better financial condition but they have lower monthly salary and lower intention to emigrate. Female are better off than male unemployed vis-à-vis probability of being unemployed, they have similar expectations for the financial conditions and intention to emigrate, but they are worse of regarding the level of monthly salary. Unemployed from rural areas are worse off than those from urban areas vis-à-vis perception of the financial conditions, they manifest lower intention to emigrate and they have lower level of monthly salary. Unemployed without work experience are worse off than those with work experience vis-à-vis probability of being unemployed, they have lower level of monthly salary and intention to emigrate, but they expect better financial conditions. The relative position of the very-long-term unemployed is not possible to be assessed because of their low representation among participants in the wage subsidy program. The propensity score density functions and the quality of the matching are presented on Figure B1 and Figure B2 respectively (Annex B).

6. Cost effectiveness

The cost effectiveness analysis serves as a tool of economy by calculating the cost of producing of one unite of outcome. In order to carry out a cost effectiveness analysis the outcomes from the wage subsidy must be quantifiable and completely attributable to the intervention. In addition, cost effectiveness analysis obviously require accurate measure of the cost of the intervention. Two issues are fundamental to the measurement of the cost effectiveness analysis of ALMMs: first, what is the outcome? and second, when should one measure the outcome: immediately after the training or over some time period? Outcomes of interest in labour market programs typically relate to some form of

employment and might include increases in earnings, increases in hours worked, or change in job status from part-time to full-time. The cost per participant in the wage subsidy programme in 2018 was 136.970 MKD, while in 2019 it was 158.017 MKD.

Although the calculation of the net cost of activities and outputs is a very useful role for cost effectiveness analysis in program management, its most common application in the training literature calculates the cost of producing a unit of net outcome. The term 'net' indicates that the evaluator has controlled the external influences on outcomes and estimated the exact relationship between the ALMMs and the change in employment of participants. In this context, the cost per employed participant in the wage subsidy programme in 2018 was 198.507 MKD, while in 2019 it was 181.005 MKD. This measure is also known as average cost effectiveness ratio (ACER).

In order to assess whether the wage subsidy programme change its effectiveness in the course of time, we can calculate the so-called incremental cost effectiveness ratio (ICER). An incremental cost-effectiveness ratio is a summary measure representing the economic value of an intervention, compared with an alternative (comparator). It is usually the main output or result of an economic evaluation. An ICER is calculated by dividing the difference in total costs (incremental cost) by the difference in the chosen measure of treatment outcome (incremental outcome) to provide a ratio of 'extra cost per extra unit of outcome'. Hence, the ICER is calculated as a change in total cost divided by the change in the number of employed participants according to the following formula:

$$\text{ICER} = \frac{(\text{Cost}_{2019} - \text{Cost}_{2018})}{(\text{No. employed participants}_{2019} - \text{No. employed participants}_{2018})}$$

The calculated ICER for the wage subsidy programme (2019/2018) is 165.336 MKD which is lower compared to the average cost per employed participant in 2018 (198.507 MKD). Therefore, we can conclude that the cost effectiveness of wage subsidies in 2019 improved compared to 2018.

7. The impact of Covid-19

The last Covid-19 crisis exerted devastating effects on the world economy as well as the functioning of the labour markets. When the pandemic spread out around the world, the governments reacted swiftly with wide-ranging containment measures. The negative impact of this crisis is manifested as structural distortions among a number of industries and professions that will have long lasting economic consequences.

The Covid-19 crisis has stimulated many activities in the digital gig economy[2]. The demand for gigs in many sectors and the expected ascension of several new forms of job calls for the employment of a comprehensive gig economy framework. Following the Covid-19 outbreak, many sectors in the economy are under pressure including home rental, design and crafting, simple tasks and renting. Others, such as software-based services, banking and investment services are expected to remain at the same level or even increase, while vital sectors such as service delivery are expected to rise considerably (Dhaini *et al*., 2020, Nikoloski *et al*., 2023).

Notwithstanding, it is expected that the recovery from the Covid-19 will last longer and will need more substantial restructuring of the economy. In this context, the most affected are the vulnerable population segments such as: women, older people, immigrants and the workers with lower levels of education and they are less likely to be reached by the mitigation and job retention measures that have been adopted in response to the Covid-19 pandemic. According to the World Bank estimates, recent poverty reduction gains in a number of countries will likely be lost because of the pandemics as firms resort to labour shedding in the most affected sectors. In addition, the mobility limitations engendered from the pandemics has considerably restricted the possibilities for circular migration and had significant adverse effects on the emigrants welfare.

Digital technologies nowadays represent a significant generator of changes in the domain of employment. In this context, the internet has opened up a wide range of opportunities for employment through providing easier access to the global labour market and developing new forms of employment. The recent studies in this domain indicate that online platforms provide job opportunities for those otherwise excluded through geographic borders, gender, or ability. Although ICTs have implied many positive effects on employment, certain studies indicate negative impacts that mainly arise from process optimization and capital-labour substitution in traditional industries. According to these insights the internet induces specific changes on the job market, such as: the end of job stability, and the rise of freelancing, self-employment and odd-jobs. However, it should be noted that arguments about net positive effects prevail indicating that new technologies generate new types of employment.

Besides the outcome variables, the success of a given ALMM depends on the satisfaction of the participants. The satisfaction of the wage subsidy beneficiaries is assessed with respect to the job, salary, on-the-job training and superiors. The results of the respondents are presented in Table 4.

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[2] A gig worker is someone who is employed on a freelance basis, carrying out short-term jobs or contracts to one or more employers.

Table 4. Self-assessed satisfaction (percent)

	Job		Salary		On-the-job training		Superiors	
	WS 2018	WS 2019	WS 2018	WS 2019	WS 2018	WS 2019	WS 2018	WS 2019
Not satisfied at all	-	5.3	5.4	19.8	-	15.5	-	3.4
Not satisfied	0.5	1.0	19.9	11.1	0.5	3.9	1.4	2.9
Do not have opinion	1.4	0.5	3.2	4.4	1.8	3.9	1.4	2.9
Satisfied to less extent	32.7	2.4	40.7	9.7	16.8	8.7	21.4	5.3
Satisfied to great extent	65.5	90.8	30.8	55.1	80.9	68.1	75.9	85.5

Source: own calculations

From Table 4 we can conclude that majority of the wage subsidy beneficiaries where generally satisfied from the job, the on-the-job training and the superiors. However, lower satisfaction can be observed regarding the level of monthly salary.

The estimated extent to which Covid-19 pandemics imposed a need for new skills among wage subsidy beneficiaries and control groups is presented in Table 5.

Table 5. The extent to which Covid-19 pandemic imposed a need for new skills (percent)

	Wage subsidy programme 2018		Wage subsidy programme 2019	
	Treatment	Control	Treatment	Control
Did not impose at all	1.9	0.8	25.6	19.5
Did not impose	31.2	27.3	3.0	-
Do not have opinion	1.2	0.8	15.8	25.6
Imposed to less extent	30.0	31.4	-	-
Imposed to great extent	35.8	39.7	55.6	54.9

Source: own calculations

According to Table 5, in 2018 dominate respondents who stated that the pandemic of Covid-19 imposed a need for new skills (to less or great extent). Among the respondents in 2019 dominate those whose skills are affected to great extend, however accompanied with considerable shares of those who responded that Covid-19 pandemic did not impose at all a need for new skills.

Furthermore, we attempt to identify the increased demand of specific skills due to the Covid-19 pandemics. The results for both the wage subsidy beneficiaries and control groups are presented in Table 6.

Table 6. Increased demand for skills due to Covid-19 pandemic (percent)

	Wage subsidy programme 2018		Wage subsidy programme 2019	
	Treatment	Control	Treatment	Control
Foreign languages	2.7	-	39.8	31.1
Basic IT skills	36.2	41.3	1.6	-
Advanced IT skills	5.4	5.0	39.1	42.2
E-commerce	2.3	-	7.0	15.6
E-banking	0.4	1.7	12.5	11.1
Other	53.1	52.1	-	-

Source: own calculations

From Table 6 we can notice that the majority of the respondents in 2019 emphasised the increased demand for advanced IT skills due to the pandemic of Covid-19. The high shares of the category 'Other' in 2018 suggest a need for more detailed inspections. In particular, some other skills engendered from the social and physical distancing may have not been anticipated. The EU experience shows that the burden of the Covid-19 social distancing falls disproportionately on vulnerable workforce groups, such as: women, older employees, the lower-educated and those employed in small enterprises. As a consequence there is an urgent need for immediate and targeted policy responses to prevent ongoing job losses and widening of labour market and social inequalities due to the pandemic.[3]

Conclusion

In order to answer the research question, we applied a post-program quasi-experimental evaluation method with an aim of achieving unbiased results. By using the propensity score matching technique the 'net' effects of the wage subsidy programme on the outcome variables were estimated. In addition to estimating the general effect, we disaggregated the average treatment effect on treated participants by various attributes in order to identify the particular impact of the wage subsidies on the vulnerable labour market segments. Moreover, we conducted cost effectiveness analysis with an aim to explore whether the devoted funds for the wage subsidy programme are worth with respect to the expected benefits from their implementation. Finally, the assessment of the impact of Covid-19 pandemics aims to identify needs for redesign of this programme.

The evaluation of the outcomes from the wage subsidy program reveals its improvement in 2019 relative to 2018. Namely, wage subsidies in 2018 exerted increasing unemployment associated

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[3] Based on the Covid-19 social distancing risk index (COV19R), CEDEFOP.

with increasing intention to emigrate. This can be attributed to the possible job closures after the expiration of the obligatory period for retaining the subsidised workers. However, in 2019 we find out that wage subsidies exert diminishing impact on unemployment associated with positive impact on salary and negative impact on the intention to emigrate. Although, the incremental cost effectiveness ratio demonstrates improving effectiveness in 2019 vis-à-vis 2018, this ALMM is still considered as one of the most expensive measures. The cost-effectiveness analysis of the wage subsidy program needs to be accompanied by cost-benefit analysis in order to assess its beneficial effects relative to the costs. In this context, we recommend redesign of this measure by improving its targeting and conditions for retaining the subsidised jobs on the long run.

Generally, the reforms of the active labour market measures should be delivered by applying integrated and partnership-based approach and should be combined with sufficient management and implementation capacity. In addition, the reforms of active labour market policies should account for the possible complementarities with the unemployment compensation system and the existing social assistance programs. The assessment results for each particular intervention have to be used to inform policy makers whether the program has achieved the objectives and to provide information regarding the potential continuation, re-design or termination of the program.

This study demonstrated that wage subsidies do not work equally well for different individuals and further improvements of their targeting is required. Particularly, a better coverage is needed regarding disabled workers, long-term unemployed as well as representative of some ethnic minorities such as Roma. In addition, a redesign of the program is needed with respect to the eligibility requirements in order serve as a stepping-stone to more stable employment. Having in mind the positive experience from the self-employment support programme, viable business plans prepared by the applicants might ensure the long-term perspectives of the companies and might increase the probability of workers retention after the expiration of the subsidised period.

The reforms of wage subsidy programme in North Macedonia have to take into account the specific socio-economic context due to the Covid-19 pandemics, as well as the ESA capacities. The possibility of combining different programs such as wage subsidies and trainings may bring good synergies and can strengthen their individual impact (Jaenichen and Gesine, 2007). One of the main objectives of wage subsidies is to stimulate the labour demand and to provide effective matching with the supply of skills. Since de demand of skills changes as a consequence of the Covid-19 crisis, one should not be surprised if these measures show to be relatively ineffective in the new circumstances. In this context, the wage subsidy program should be accompanied by a short-term training for acquiring the necessary skills for online working.

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Annex A. Wage subsidy programme in 2018

Table A1. Wage subsidies 2018, mean comparison

	Observables	Mean treated	Mean control	Difference	p-value
Socio-dem.	**Age**	31.4	33.8	-2.4	0.089*
	Gender (1=male)	0.529	0.537	-0.008	0.878
	Rural	0.257	0.256	0.001	0.992
	Married	0.831	0.909	-0.078	0.043**
Household	**Household size**	3.70	3.91	-0.12	0.123
	Number of members under 15	0.80	1.17	-0.37	0.000***
	Number of employed members	1.83	2.03	-0.20	0.046**
	Number of unemployed members	0.742	0.488	0.254	0.010**
	Number of retired members	0.350	0.223	0.127	0.061*
Human capital	**Primary education**	0.337	0.215	0.122	0.015**
	Secondary education	0.486	0.488	-0.001	0.985
	Higher education	0.153	0.198	-0.045	0.273
	Previous work experience	0.602	0.645	-0.043	0.422
	Short-term unemployed	0.851	0.727	0.123	0.004***
Disadvantaged	**Very-long-term unemployed**	0.019	0.083	-0.063	0.003***
	Youth	0.483	0.322	0.160	0.003***
	Older	0.084	0.099	-0.015	0.636
	Disabled	0.011	0.016	-0.005	0.688
	Roma	0.038	0.058	0.020	0.390
	Outcome variables	Mean treated	Mean control	Difference	p-value
Registry	**Currently employed**	0.670	0.603	0.067	0.202
	Currently unemployed	0.115	0.157	-0.042	0.254
	Currently unknown	0.188	0.198	-0.011	0.807
	Employed	0.690	0.851	-0.162	0.001***
	Unemployed	0.091	0.000	0.091	0.001***
Survey data	**Salary**	19528	19556	-28	0.926
	Permanent contract	0.383	0.710	-0.327	0.000***
	Better financial conditions	0.150	0.140	0.100	0.808
	Better employment prospects	0.142	0.091	0.051	0.160
	Search for job	0.195	0.174	0.022	0.613
	Intend to emigrate	0.027	0.000	0.027	0.069*

Note: */**/*** indicate significance at 10/5/1 percent level respectively.

Table A2. Wage subsidies 2018, propensity score coefficients (Probit model)

	Observables	Coefficient	Std. error	p-value
Socio-dem.	**Age**	-0.0133226	0.0066667	0.046[**]
	Gender (1=male)	-0.0364803	0.1462993	0.803
	Rural	-0.0730476	0.1650318	0.658
	Married	-0.2010786	0.2289442	0.380
Household	**Household size**	-0.2391221	0.7231031	0.741
	Number of members under 15	0.0007312	0.717749	0.999
	Number of employed members	0.0618584	0.7214297	0.932
	Number of unempl. members	0.334072	0.7218742	0.644
	Number of retired members	0.3714028	0.6981682	0.595
Human capital	**Primary education**	1.144861	0.3562483	0.001[***]
	Secondary education	0.7831719	0.3392132	0.021[**]
	Higher education	0.7213618	0.3631489	0.047[**]
	Previous work experience	-0.0748539	0.1603538	0.641
	Short-term un. (up to 1 year)	0.3157968	0.1857825	0.089[*]

Note: [*]/[**]/[***] indicate significance at 10/5/1 percent level respectively.

Table A3. Wage subsidies 2018, disaggregated ATT for disadvantaged categories

Variables		Unemployed	Permanent contract	Intention to emigrate
Age	**Youth**	0.071	-0.346	0.031
	Mature	0.112	-0.337	0.022
Gender	**Female**	0.082	-0.338	0.008
	Male	0.101	-0.239	0.043
Place of living	**Rural**	0.104	-0.439	0.030
	Urban	0.088	-0.233	0.026
Work experience	**Without**	0.086	-0.271	0.019
	With	0.096	-0.348	0.032
Unemployment	**Very long-term**	-	-0.400	-
	Short-term	0.094	-0.308	0.027

Note: Estimation based on nearest-neighbour matching only for statistically significant outcome variables.

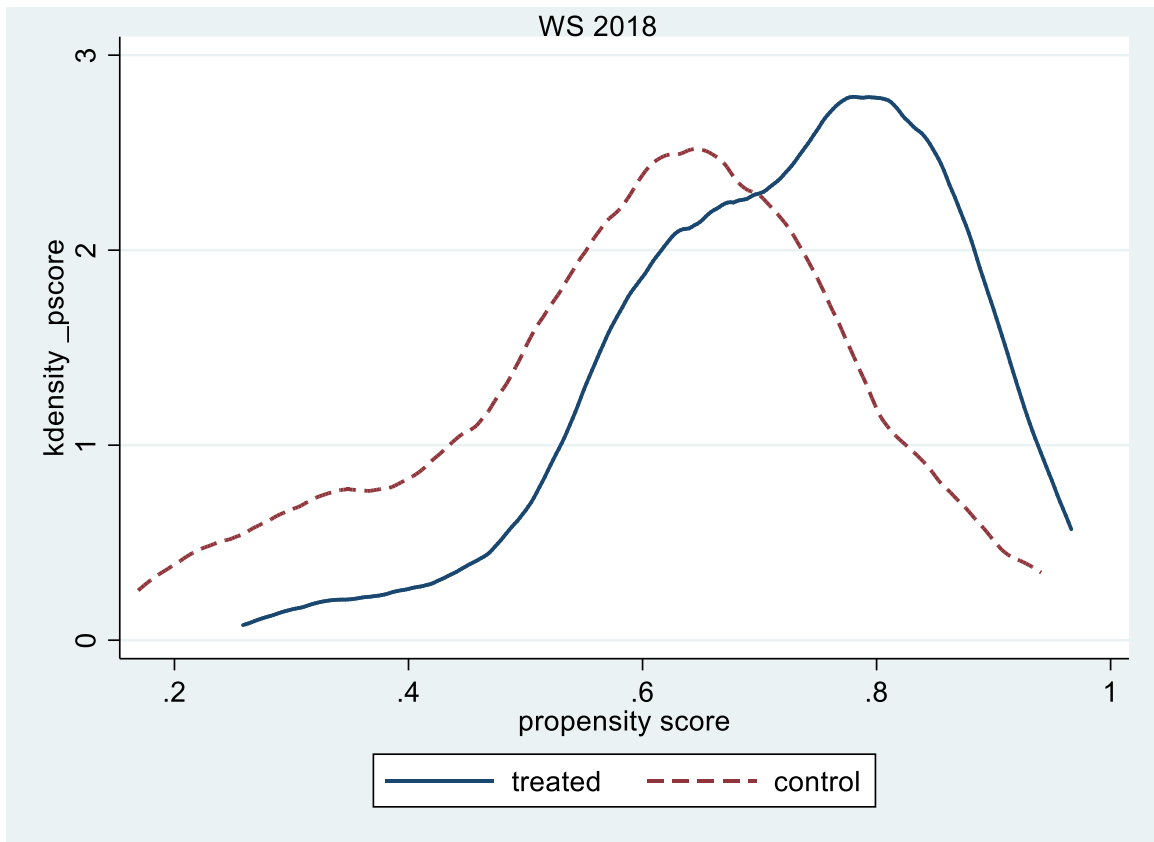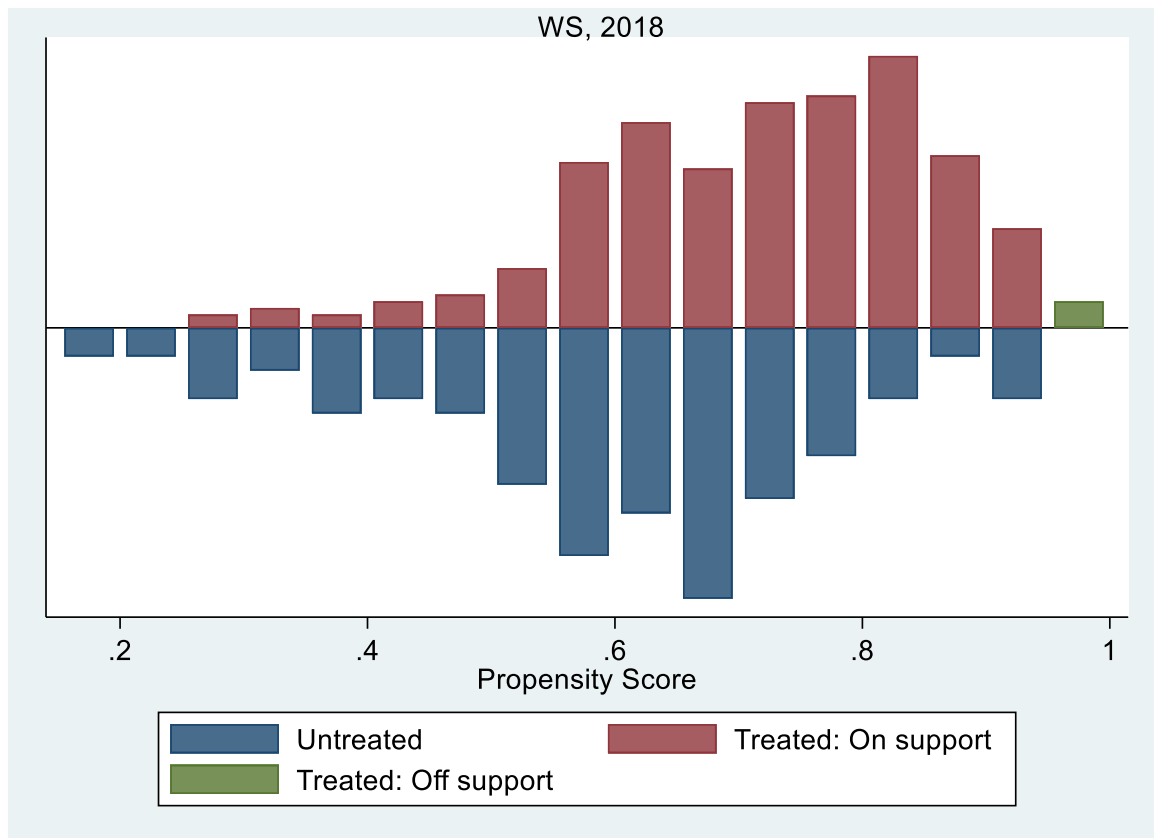**Figure A1. Wage subsidies 2018, Propensity score density functions**

Figure A2. Wage subsidies 2018, Matching quality

Annex B. Wage subsidy programme in 2019

Table B1. Wage subsidies 2019, mean comparison

	Observables	Mean treated	Mean control	Difference	p-value
Socio-dem.	Age	32.2	27.0	5.233	0.000***
	Gender (1=male)	0.423	0.549	-0.126	0.049**
	Rural	0.308	0.354	-0.046	0.444
	Married	0.820	0.793	0.027	0.590
Household	Household size	3.512	3.720	-0.207	0.133
	Number of members under 15	0.940	1.110	-0.170	0.128
	Number of employed members	1.885	1.866	0.019	0.870
	Number of unemployed members	0.607	0.598	0.009	0.928
	Number of retired members	0.171	0.146	0.025	0.675
Human capital	Primary education	0.295	0.268	0.027	0.649
	Secondary education	0.521	0.524	-0.003	0.963
	Higher education	0.141	0.195	-0.054	0.246
	Previous work experience	0.615	0.451	0.164	0.009***
	Short-term unemployed	0.829	0.805	0.024	0.623
Disadvantaged	Very-long-term unemployed	0.038	0.024	0.014	0.551
	Youth	0.393	0.500	-0.107	0.092*
	Older	0.094	0.000	0.094	0.004***
	Disabled	0.021	0.024	0.003	0.873
	Roma	0.026	0.049	-0.023	0.305
	Outcome variables	**Mean treated**	**Mean control**	**Difference**	**p-value**
Registry	Currently employed	0.756	0.561	0.195	0.001***
	Currently unemployed	0.094	0.213	-0.125	0.003
	Currently unknown	0.124	0.195	-0.071	0.113
Survey data	Employed	0.897	0.902	-0.005	0.889
	Unemployed	0.009	0.097	-0.089	0.000***
	Salary	21050	19792	1258	0.015**
	Permanent contract	0.258	0.324	-0.066	0.277
	Better financial conditions	0.090	0.012	0.077	0.018**
	Better employment prospects	0.094	0.037	0.057	0.098*
	Search for job	0.252	0.305	-0.053	0.354
	Intend to emigrate	0.278	0.561	-0.283	0.000***

Note: */**/*** indicate significance at 10/5/1 percent level respectively.

Table B2. Wage subsidies 2019, propensity score coefficients (Probit model)

Observables		Coefficient	Std. error	p-value
Socio-dem.	Age	.0269899	.0100349	0.007***
	Gender (1=male)	-.1998777	.1659805	0.229
	Rural	.0201982	.1764942	0.909
	Married	.2412135	.256391	0.347
Household	Household size	-.7162501	.5964381	0.230
	Number of members under 15	.5663615	.6061233	0.350
	Number of employed members	.796475	.6167568	0.197
	Number of unemployed members	.7551278	.6161485	0.220
	Number of retired members	.731589	.6225828	0.240
Human capital	Primary education	-.5897944	.5882469	0.316
	Secondary education	-.4735914	.5795643	0.414
	Higher education	-.6628186	.5957272	0.266
	Previous work experience	.2348546	.173214	0.175
	Short-term unemployed	.2097703	.219059	0.338

Note: */**/*** indicate significance at 10/5/1 percent level respectively.

Table B3. Wage subsidies 2019, disaggregated ATT for disadvantaged categories

Variables		Unemployed	Salary	Better fin. conditions	Intent. to emigrate
Age	Youth	-0.055	886	0.109	-0.413
	Mature	-0.206	1715	0.071	-0.339
Gender	Female	-0.104	803	0.076	-0.400
	Male	-0.010	1989	0.082	-0.495
Place of living	Rural	-	885	0.127	-0.352
	Urban	-0.093	1412	0.060	-0.430
Work experience	Without	-0.045	219	0.101	-0.309
	With	-0.083	1534	0.076	-0.514
Unemployment	Very long	-	-	-	-
	Short-term	-0.072	1130	0.085	-0.400

Note: Estimation based on nearest neighbour matching only for statistically significant outcome variables.

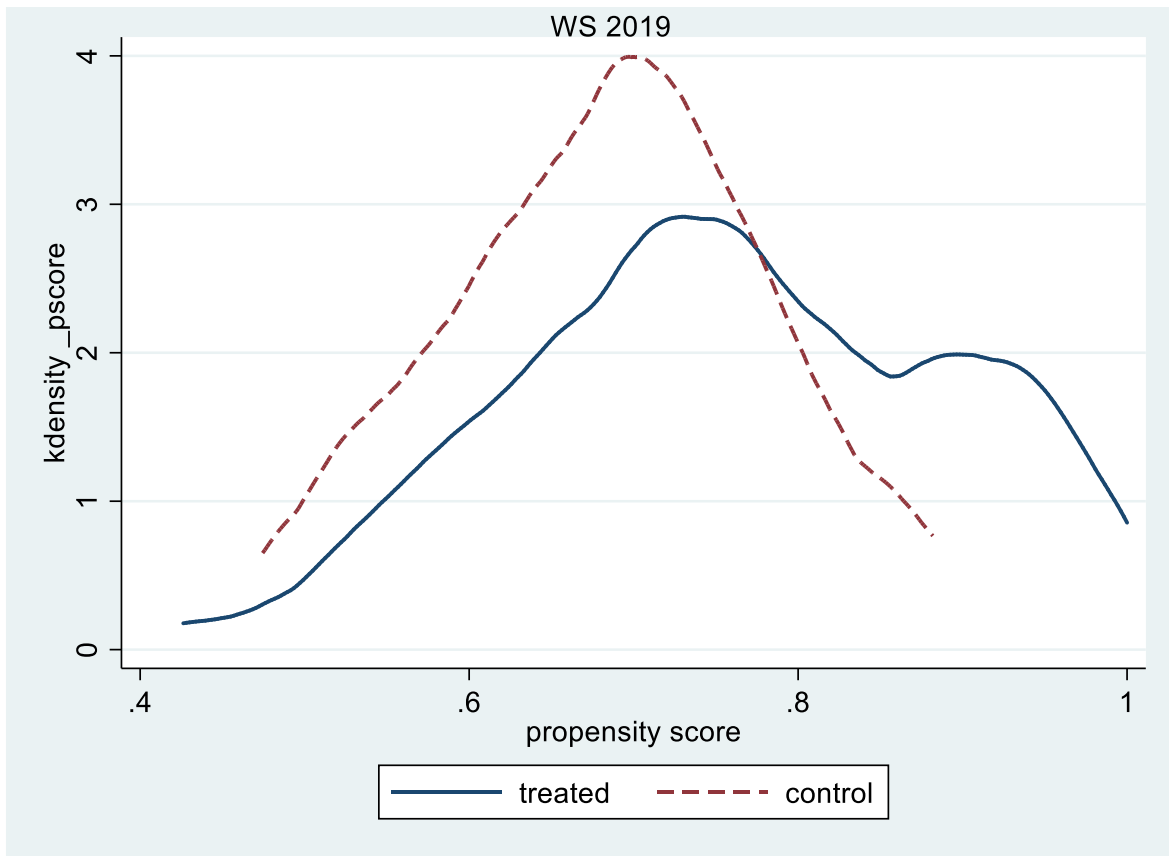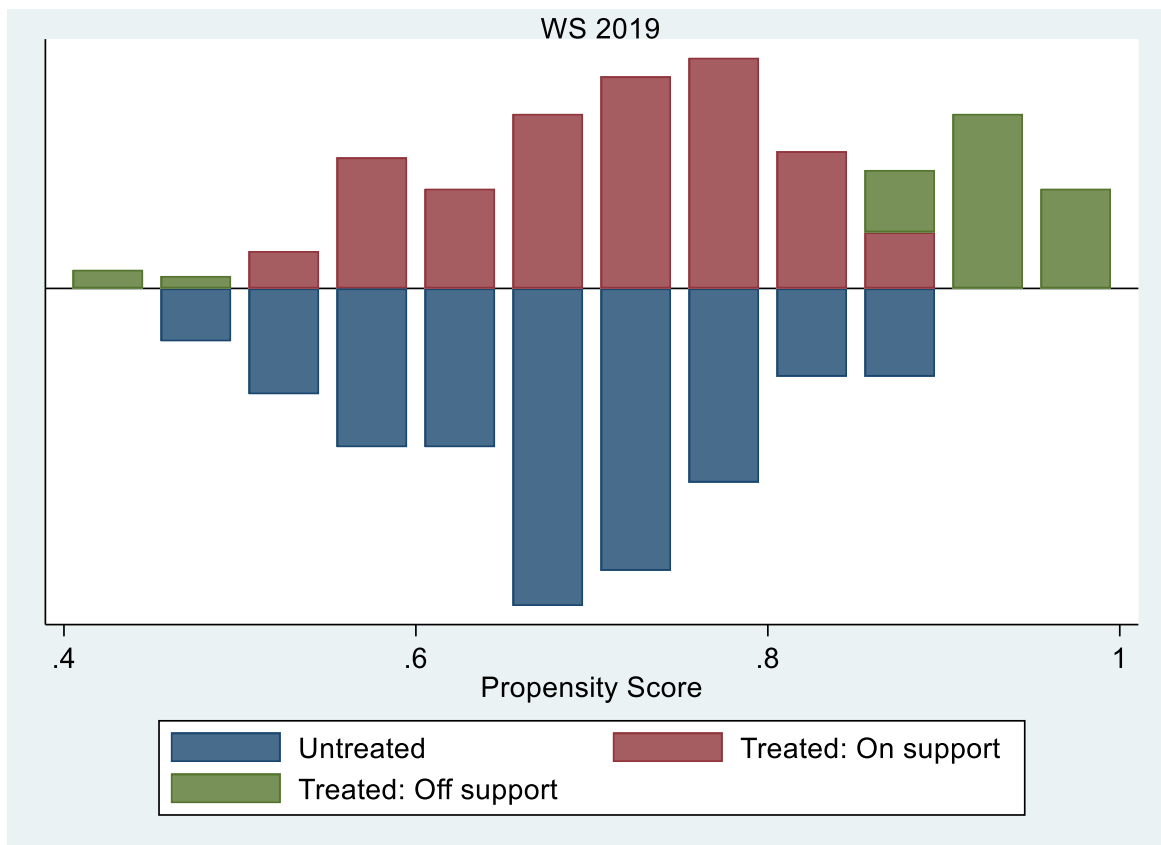**Figure B1. Wage subsidies 2019, Propensity score density functions**

Figure B2. Wage subsidies (WS) 2019, Matching quality

Technologies implemented in the business environment – smart pillar for enhancing organisational performance

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Abstract

This paper takes us on a methodological journey, analysing the efficiency of implementing information technologies in the business environment. In the context of digital transformation of the SMEs in the EU, Romania, and the Republic of Moldova emerges the necessity to focus on implementing information technologies in the business area, as the primary factor of boosting organisational performance. The aim of this research is to shed light on the possibilities of implementing information technologies in the business environment of Romania and the Republic of Moldova. The methodology of this scientific endeavour has been geared towards using multiple methods of research, among which stands out the quantitative research, the inquiry used as a research tool, namely a questionnaire. The results of the research show a direct interconnection between implementing information technologies and customer satisfaction, particularly organisational performance. Thus, organisations aspiring to grow their performance should remodel their management system in terms of implementing new information technologies which will increase customer trust, improve client satisfaction, and gain customer loyalty to the products/ services provided by the company concerned.

Keywords: information technologies, relationship management, organisational performance, SMART pillar

Introduction

According to the Pew Research Center (2015), the use of smartphones in the USA has gained momentum in the past years. Thus, in 2011 only a third of the American adults had their own smartphones, while in 2015, more than 64% of the same category had some type of smartphone (Pew Research Center, 2016). Further, according to the statistics, by 2022 the number of smartphone users

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is expected to reach 3,08 billion. The use on a large scale of the mobile technology has led to the inception of an 'application culture".

As the mobile phone has changed from a device based on voice to a multi-channel device with Internet access, an explosion of mobile apps was registered (Purcell *et al.*, 2010). As stated in mobiThinking (2013), over 800.000 apps have been developed and activated, and the apps were downloaded 81,4 billion times from mobile app stores around the world. Mobile apps have infiltrated the business environment since their emergence, facilitating the ease of communication between clients and organizations. The use of mobile apps assists companies in terms of building a solid healthy foundation with their clients, following the feedback provided by the companies' offers.

This paper embraces a diverse range of theoretical and methodological analyses to determine the contribution of information technologies to the tourism industry. The object of research is the Hilton Honors mobile application developed by the Hilton chain. The aim of this scientific endeavour is to investigate the efficiency of this mobile application developed and used *by* Hilton Hotels. Accordingly, we have aimed for the following:

> *O1: evaluation of the customer perception regarding the usefulness of the mobile app developed by Hilton Hotel*
>
> *O2: evaluation of customer trust (perceived security and risks) regarding the usefulness of the mobile application concerned*
>
> *O3: identification of tourist expectations regarding the Hilton Honors mobile app.*

The theoretical approach of this paper navigates through the most important concepts of the information technologies used in the tourism domain and the main methods, techniques, and particular features employed for assessing customer satisfaction in the hotel business. Further, the methodological approach was set based on the quantitative research approach.

The questionnaire comprises 28 questions, ranging from simple to complex ones, which helped us collect the necessary data and evaluate the targeted indicators. The data were statistically processed and interpreted, pointing out the correlations between the obtained results. In terms of data processing software, it was used the statistical tool SPSS, and, based on it, the hypotheses of the research were tested. Finally, general conclusions were drawn.

1. Literature Review

Mobile phones are communication devices that provide a wide range of functions. They have become increasingly influential and omnipresent due to their portability and multitude of benefits,

not to mention the active part played by social media. A completely new environment has been created by the mobile applications that emerged in the 21st century, facilitating the ease of communication and access to different services. With the emergence of mobile apps, people interact and communicate, exchange and share novel ideas and materials, generated through the use of the Internet (Purcell *et al*., 2010). Particularly, for a large number of mobile phone users, smartphones are nowadays essential devices connecting them to the online world and allowing them nearly unlimited access to online data. The apps for smartphones are designed to deliver a specific task for the user and can improve numerous mobile services.

Additionally, since corporations are able to make a constant contribution to the improvement of app services, this tendency provides consumers with more opportunities for using the full potential of smartphones, which has a positive impact on the fast development of commercial and non-commercial applications (Dickinson, 2014).

The apps are highly efficient instruments for storing large amounts of data, from video clips to catalogues. Users can get useful information whenever they wish with the push of a button by simply being connected to the Internet and through mobile apps. Furthermore, once users install apps on their smartphones, they can deliver various functions such as reading relevant content for businesses and managing bank accounts or payrolls (Campbell, 2011).

It is necessary to highlight that research in this area, particularly on online business, has approaches pointing out the ex-post stage which can be transmitted live. Indeed, social media, online shopping sites, and hotel websites allow customers to post comments about the experience of the service/ product, both in a post-consumption stage and in real-time (Brown and Broderik, 2007). Satisfaction, as an attitude measure and not a time-related one, does not have a precise moment when it can be expressed by customers. Nevertheless, these new instruments deliver quite fast the evaluation process of customer satisfaction, which makes them extremely influential to company management.

The evolution of smartphones has also influenced the tourism and hospitality industry since people are using their smartphones to plan trips and look up information (No and Kim, 2014; Wang, Xiang and Fesenmaier, 2016). Traditionally, many tourism and hospitality corporations used printed brochures to provide information about their properties and promote a wide range of trip-related products (Holloway and Plant, 1992; Yamamoto and Gill,1999).

However, the supply and usefulness of printed brochures are limited. Consequently, numerous hospitality corporations have switched to digital services such as websites since customers can easily access hotel websites, and look up information about hotels through their portable devices such as laptops, tablets, and smartphones.

As the use of smartphones grew, the development and utilization of applications addressing hotel clients have expanded as well. These applications offer updated info about hotels, detailed maps, and online reservation services. Particularly, a good many hotel companies, based in the U.S.A., have incorporated the use of travellers' smartphones in their routine commercial operations through mobile apps („Hilton HONORS app", n.d., „Hyatt Mobile Experience", n.d., Marriott - The Perfect Travel CompanionTM", n.d.). Additionally, over their stay at the hotel, some apps provide unique experiences such as controlling the room temperature and turning clients' smartphones into a remote TV set.

The guests' experiences of using hotel apps are also valuable data sources since their use can function as a good criterion to assess whether the guests' expectations have been met and analyse the factors leading to customer loyalty in terms of delivered hotel services.

From the perspective of a hotel guest, the possibility of seeing the hotel lobby, guest rooms, and the facade of the accommodation building along with the opportunity of using a long list of convenient services chosen from the hotel applications are experiences meant to set up guests' expectations to their own satisfaction and deliver real experiences in terms of hotel products and services.

According to Carlino (2015), in terms of experience customisation of hotel app users, hotel applications play a key part, namely delivering the best way of integrating and customizing the products/ services offered in a digital context. By experiencing the services of the hotel app, the hotel guests can come up with valuable experiences in their own digital environment which may positively impact customer satisfaction and also influence the intent of reusing the hotel application.

Mathwick *et al*. defined the experiential value as "a perceived preference that is relative to the attributes of the products or performances of the service derived from the interaction occurring within a consumption frame which facilitates or blocks the reach of goals or the purpose of clients" (Mathwick *et al*., 2001). As stated by Mathwick *et al*., the experiential value can be broken down into 2 main dimensions, namely the intrinsic value and the extrinsic value. The intrinsic values include the aesthetics and playfulness features which focus on the internal factors of the hotel app users (Mathwick *et al*., 2001).

The hotel guests perceive the content describing the hotel rooms and recognise the atmosphere of the facilities provided through their senses. Thus, they can experience immediate satisfaction due to their intrinsic values. The extrinsic values comprise features such as service excellence and rentability of clients' investment, as well as external stress factors or other visible factors encountered by the hotel guests.

The users of the hotel application examine the quality or efficiency of the hotel apps and create extrinsic value based on proven expertise and task-related performance (Mathwick *et al*., 2001). Furthermore, the users of the hotel app perceive what they get in the exchange process by using the hotel application, which translates as active or inactive investments in services.

In the pre-travel stage, the hotel guests are usually concerned with the app usability for smartphone regarding information collection, notifications about the availability of hotel rooms, meals and reservations, upgrade for hotel rooms, and customer loyalty programs. Meanwhile, during guests' stay, they have access to different tech facilities provided by the hotel app, such as room temperature control, requests for various room facilities, room service included, and the possibility of turning their smartphones into TV remotes. The hotel guests can also create a personal travel profile used as the basis for their information and preferences in terms of travelling.

These experiences can thus lead to customer satisfaction related to the hotel wireless service and improvement of the post-stay relation. In what concerns the hotel business, the platform dedicated to smartphone applications can be designed to provide a more effective and innovative online service before, during, and after the guests' stay (Adukaite *et al*., 2013; Anuar *et al*., 2014). In the hotel applications with images and text, it is possible to add subcategory lists with hotel facilities such as pools, fitness centres, restaurants, bars, saunas and spas, and conference rooms.

Thus, hotel guests can get a large amount of information about the hotel through numerous categories of services provided by the application.

In terms of using mobile technologies, the hotel units have the possibility to make use of various factors which have a direct influence on customer satisfaction such as:

- *Application Atmosphere* – each hotel unit can create the application atmosphere and thus provide easy and fast access to hotel services.
- *Ease-of-Use* – this factor influences directly tourist satisfaction regarding the hotel application for smartphones since each hotel needs to develop its own application and thus provide the possibility of using it easily and swiftly by every type of user.
- *Perceived Usefulness* – for developing the mobile application, the hotel unit needs to identify the elements which bring unity to the hotel unit. For instance, the reservation made by the mobile app comes with certain benefits, such as discounts, extra benefits, etc.
- *Perceived Risks* – the hotel unit which develops the app must also identify certain risks and assess them as well, and try to eliminate them as much as possible to maximize their customer satisfaction.

- *Perceived Security* – the use of the mobile app by tourists should be a safe experience, and provide security in terms of client data and other information as well.
- *Performance of Expectances* – the use of the mobile application by tourists should both meet and inspiretheir client's expectations at the highest possible level. Tourists should experience the performance feeling at the highest level.
- *Usage Habit*– the hotel unit should encourage tourists to use the mobile app to get used to it which will eventually produce better customer satisfaction in terms of using the mobile app.
- *Friability and Receptivity* – this factor should be prioritised by the hotel unit if it wishes to increase customer satisfaction in terms of the mobile application. The hotel unit through its mobile app should meet the tourists' necessities, and even further, anticipate them and their expectations as well. Each hotel unit can develop its own mobile app and thus gain tourist loyalty for the delivered services. Accordingly, this platform can be used in an efficient and interactive way as it is a powerful tool that delivers valuable experiences, provides customer satisfaction, and encourages recurring reservations. The use of the hotel mobile app will improve the customer experience and satisfaction which are the best predictors of future behaviour (Lee *et al.*, 2018; Jeong and Shin, 2019).

2. Research Methodology

In an unstable and competitive environment, the information amount should be constant as information reduces the risk of adopting decisions. The study of the market is the most complex and important marketing research. Any decision related to the activity of a company should be based on a thorough analysis of the market.

Similarly, the adjustment of the company to the environment of its activity involves the use of a significant amount of information. Hilton Hotel was selected as the *object of research*, the place where the research was performed and the data were collected. The Hilton Hotel is an accommodation unit that stands out through its notoriety, and its customer trust due to the quality of provided services, and which, over time, has also distinguished itself from the rest by features such as competence and an attractive quality-price ratio.

Figure 1. Model of quantitative research
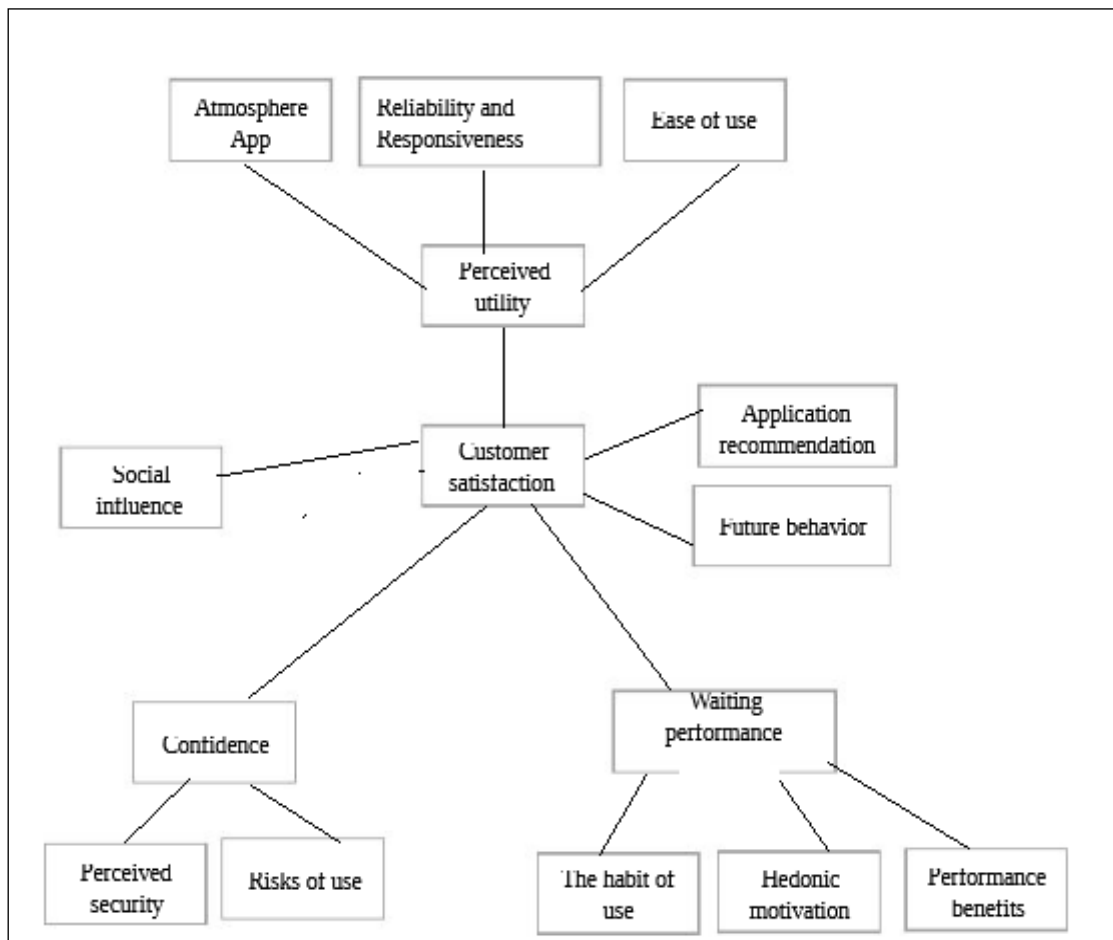
Source: developed by authors

During our research, we have aimed for getting relevant and useful information about:

- evaluation of tourist satisfaction in terms of using the mobile application
- research of the usage duration of the mobile app by tourists
- assessment of the social factors influencing the customer satisfaction in terms of application use
- identification of tourist perception about the friability of the app, their trust in using the app, and also the risks involved in using the app
- evaluation of the usage habit, hedonic motivation, performance benefits
- identification of tourists' future behaviour in using the mobile app.

The research method is inquiry. The questions included in the questionnaire are introduced in Google Forms as graphics, tables, and figures. This method of data collection was quite convenient and provided safety, trust, and speed. The questionnaire was applied to the tourists checked in at the

Hilton Hotel, naturally to those willing to answer the questions included in our survey. Later, the obtained results were interpreted.

The research instrument is the questionnaire, which is structured into 4 main sections, namely:

I: Informed Consent – the purpose of research and the generated data about the research are presented in this section

II: Use of mobile applications for accommodation – this section comprises 4 questions which help sketch the tourist profile regarding the use of apps for accommodation

III: Tourist behaviour towards Hilton and the Hilton Honors mobile app – this section includes questions from 5 to 22 which helped us investigate customer satisfaction, expectations, trust, and motivation towards Hilton Hotel and Hilton Honours app.

IV: *Identification of the respondents* – this section comprises questions from 23 to 28, and helped us identify the respondents according to age, gender, level of education, income, occupation, and social background.

On the whole, the questionnaire has 28 questions, ranging from simple to complex ones, which are focused on the achievement of the research objectives and validation of the hypotheses of the research. Altogether, there were 314 respondents to this survey. In the questionnaire, there are also open questions, where respondents had the possibility to express their own opinions regarding the reference environment, as well as closed questions, where respondents could pronounce themselves on the elements under investigation. When building up the questions, we have respected different scales such as ordinal scales, nominal scales, and the Lickert scale.

3. Research Results

Accordingly, in the following images we will present the studied sample according to variables such as gender, net monthly income, age, and country of origin. Further, we can notice that all the data with the variable concerned is in Figure 2.

As we can notice in Figure 2, the female respondents are the dominant category of respondents (52,17%), followed by male respondents (42,75%), while 5,07% of the respondents did not want to mention their gender.

Figure 2. Distribution of the sample according to demographic criteria
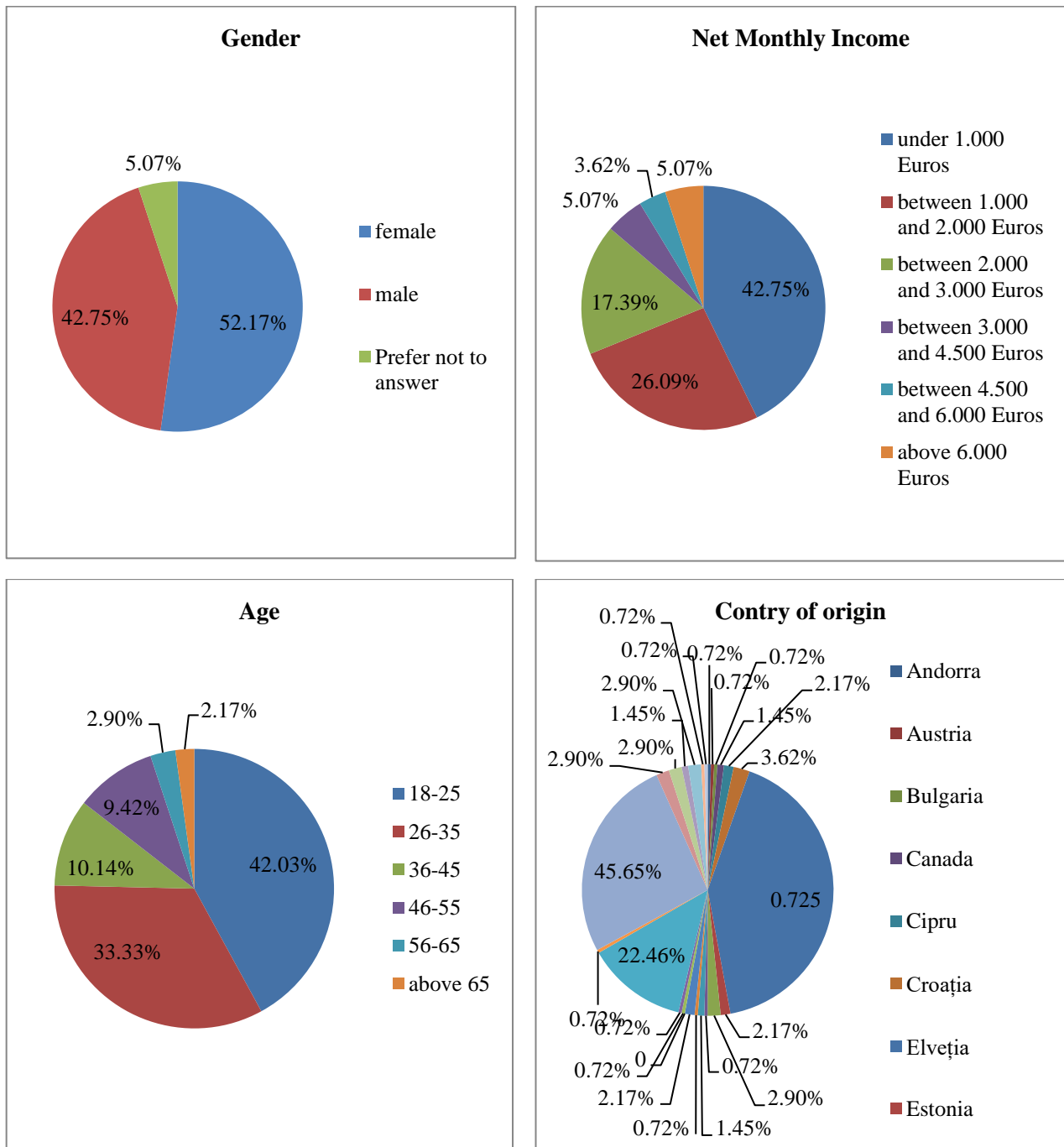
Source: developed by authors

Regarding the Age variable, the first positions are taken by the respondents between 18 and 25 years old (42,03%), followed by the 26-35 age category (33,33%), and the last position is occupied by the above 65 years old category (2,17%). On the matter of Net Monthly Income, we can firmly state that most respondents (42,75%) have an income under 1,000 Euros, followed by the category of persons whose income ranges between 1,000 and 2,000 Euros (26,09%). Further, 17,39% of the

respondents declared their income between 2, 000 and 3, 000 €. Only 5.07% of the interviewed persons have an income between 3,000 and 4,500 € or above 6.000 €. The lowest percentage (3.62%) goes to the persons whose income ranges between 4,500 and 6,000 €. The analysis of the Country of Origin variable reveals that most clients who responded to our questionnaire are Romanian citizens (45,65%). Naturally, there were also clients from all parts of the world such as Moldova (22.5%), Hungary (3.6%), Italy (2.9%), Canada (2.9%), Austria (2.2%), Switzerland (2.2%), U.S.A (2.2%) Cyprus (0.7%), Spain (0.7%), and France (0.7%). The following factor under investigation is the *Performance of Customers' Expectations* related to the Hilton Honors app. Thus, the score obtained by this factor is 3,93, equivalent to the Agreement version of the answer, close to the Total Agreement version. It stands out the scale related to the maximum control during the travelling period with an average of 4.07. Further, the factor related to meeting, in due time, customers' needs and that the app is useful in everyday life reaches the averages of 3.99 and 3.91. The last place is occupied by the feature related to the increase in productivity with an average of 3.82. The Cronbach Alpha coefficient is 0.946, which stands for a high level of trust.

Table 1. "Expectation performance" factor of the Hilton Honors app

Expectation Performance	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
The use of the app is useful in everyday life	1.4%	5.1%	22.5%	42.8%	28.3 %	**3.91**
The use of the services generated by the app increases the chances of carrying out important tasks	2.2%	5.8%	23.9%	39.9%	28.3%	**3.86**
The use of the app increases productivity	2.2%	8%	23.2%	39.1%	27.5%	**3.82**
The app is flexible in terms of meeting in due time personal needs	2.2%	4.3%	15.9%	47.1%	30.4%	**3.99**
The app provides greater control while travelling	2.9%	2.2%	14.5%	45.7%	34.8%	**4.07**
					Average score	**3.93**

Source: data processed by authors

If we analyse the data presented in table 2, we can observe that *Usage Habit* has a powerful influence on the decision of using the Hilton Honors mobile app, amassing a score of 4.17, which is equal to the answer version Agreement. The most important 2 items of the factor concerned are the ease of understanding of the application (4.19) and the interaction with the app is clear/ user-friendly

(4.17). The most important item is the multi-functionality of the app which gathered an average of 4.14. The Cronbach Alpha coefficient has a value of 0.954, showing an advanced level of trust.

Table 2. "Performance benefits" factor of the Hilton Honors app

Performance Benefits	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
It was easy to learn how to use the app	1.4%	2.9%	13%	40.6%	42 %	**4.19**
The interaction with the app is easy to understand/ user-friendly	1.4%	3.6%	10.9%	44.9%	39.1%	**4.17**
I save time and money by using the app	2.2%	1.4%	13%	44.9%	38.4%	**4.16**
I have the capacity to use multiple services/ run different processes provided by the app	1.4%	2.9%	15.2%	41.3%	39.1%	**4.14**
					Average Score	**4.17**

Source: data processed by authors

In the following paragraph, it is described the *Hedonic Motivation* factor of the Hilton Honors mobile application, which got the average score of 4.01, equivalent to the Agreement answer identified in the questionnaire. The lowest average is recorded by the item determining that the Hilton Honors app can be seen as an entertainment source as well (3.86). The most appreciated scales, totalling an identical average of 4.07, are: "Hotel reservation by the app is fun" and "The app feature evokes happiness". The Cronbach Alpha coefficient has a value of 0.915, indicating a high degree of trust.

Table 3. "Hedonic motivation" factor of the Hilton Honors app

Hedonic Motivation	Total diagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
Hotel reservation through the app is fun	1.4%	2.9%	19.6%	39.1%	37%	4.07
The use of services of choice and hotel reservation are pleasant and simple experiences compared to other apps	2.2%	1.4%	16.7%	50%	29.7%	4.04
The app can be regarded as a source of entertainment	3.6%	3.6%	26.8%	35.5%	30.4%	3.86
The app features (design, visual elements, animation, etc) evoke happy feelings	2.2%	0%	22.5%	39.9%	35.5%	4.07
					Average Score	4.01

Source: data processed by authors

The next factor is *Social Influence* with an average score by 3.83, representing the answer version of Neither, nor. The highest average is recorded by the item showing that friends have a powerful influence on the use of the app concerned (3.89). Less appreciated is the factor describing that family has also an influence on the use of the app (3.78). The Cronbach Alpha coefficient records a value of 0.948, which stands for a high level of trust.

Table 4. "Social influence" factor of the Hilton Honors app

Social Influence	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
I think that the persons who matter to me (family) should use the app	2.9%	6.5%	29.7%	31.2%	29.7%	**3.78**
The persons whose opinion I value (friends) think that it is a good idea to use the app	1.4%	5.1%	26.1%	37.7%	29.7%	**3.89**
The persons who influence my behaviour expect that I use the app	3.6%	3.6%	27.5%	38.4%	26.8%	**3.81**
					Average Score	**3.83**

Source: data processed by authors

According to the data from Table 5, we can notice that the *Usage Habit* factor has registered an average score of 3.67, equivalent to the Neither, nor version of the answer. The average of 3.86 is got by the scale representing the fact that respondents plan on time their stay with the help of the app concerned. By contrast, the average of de 3.36 accumulates the item denoting that respondents are dependent on the Hilton Honors application. The Cronbach Alpha coefficient has a value of 0.890, which stands for a high level of trust.

Table 5. "Usage habit" factor of the Hilton Honors app

Usage Habit	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
Using the app has turned into a habit	3.6%	6.5%	24.6%	38.4%	26.8%	**3.78**
I feel like i need to use the app for planning my trips ahead	2.2%	8.7%	19.6%	40.6%	29%	**3.86**
I am sort of dependent on the app/ using the app	8.7%	14.5%	27.5%	30.4%	18.8%	**3.36**
					Average Score	**3.67**

Source: data processed by authors

Recommendation of Use factor totals an average score of 4.1, equivalent to the Agreement version of the answer. The first position is occupied by the item totalling a score of 4.24, which determines the future use of the application, while the second place is taken by the item with a score of 3.96, which represents the intensification of using the Hilton Honors app. The Cronbach Alpha coefficient had a value of 0.851, which shows a high degree of trust.

Table 6. "Future behaviour" factor of the Hilton Honors app

Future Behaviour	Total disagreement	Disagreement	Neither. nor	Agreement	Total agreement	Average
I will use the app in the future	1.4%	2.2%	7.2%	49.3%	39.9%	**4,24**
I will use more the app (more benefits. services. etc.)	1.4%	4.3%	23.2%	38.4%	32.6%	**3,96**
					Average Score	**4.1**

Source: data processed by authors

In the table below it results that the Recommendation of Use factor totals a middle score of 3.68, that is equivalent to the Neither, nor version of the answer.

Table 7. "Recommendation of use" of the Hilton Honors app

	To a very little extent	To little extent	Neither, nor	To a great extent	To a greater extent	Average
Recommendation of use	6.5%	8%	15.9%	50%	19.6%	**3.68**
					Average Score	**3.68**

Source: data processed by authors

According to the Figure 3 below, it can be seen the factors influencing consumers attitude related to the Hilton Honors app. The strongest attitude is represented by the following factors *Ease-of-Use* (4.32), followed closely by *Usefulness* (4.22), and going on with *Customer Satisfaction* (4.18), and finally *Trust* (4.15). The weakest attitude is represented by factors such as *Usage Risks* (3.34), *Usage Habit* (3.67), and *Recommendation of the App* (3.68).

Figure 3. Factors influencing the consumer attitude towards the Hilton Honors mobile app. Global average
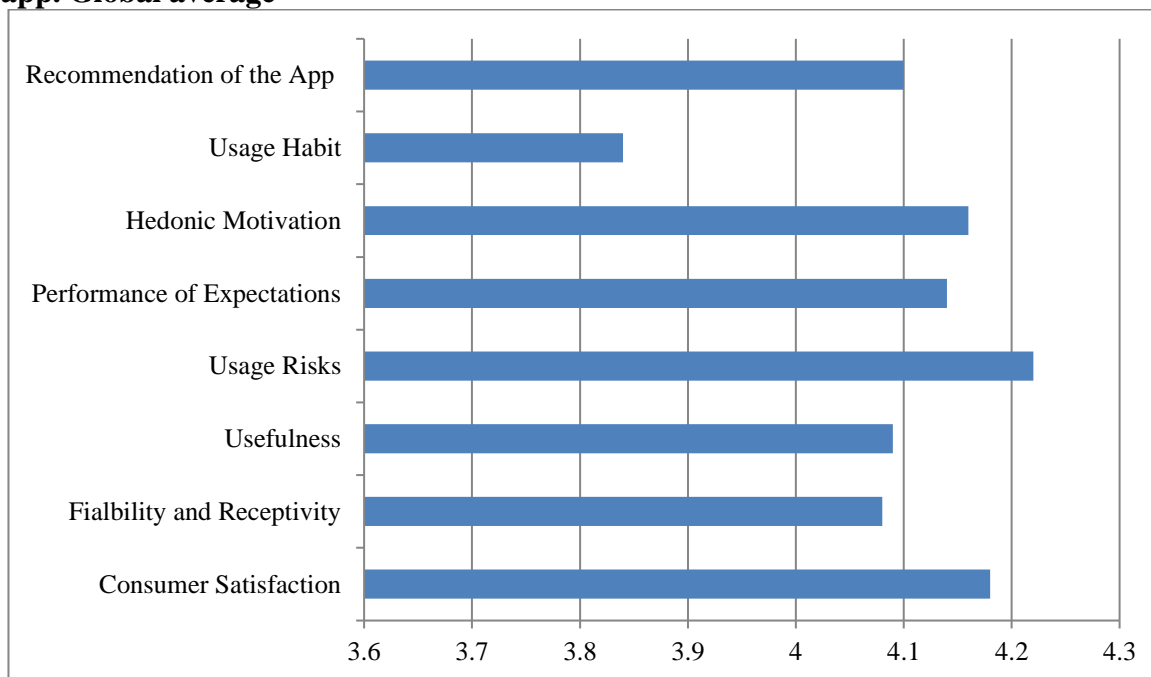
Source: developed by authors

Further on, we have chosen to do a simple linear regression to test the relation between *Customer Satisfaction* (independent variable) related to the Hilton Honors mobile app and *Recommendation of the App* (dependent variable). In the table, it can be observed that the level of *Consumer Satisfaction* has a significant statistical impact (Sig = 0.000) on the *Recommendation of the App*, which explains 14.4% of its variation (R Squared = 0.144) (Table 8).

Table 8. Simple linear regression: ANOVA estimation of "Recommendation of the App"

Model Summary 1	R	R Squared	Sig
	0.380	0.144	0.000
Coefficients	Unstandardized coeff.	Standard coeff.	Collinearity
Costumer satisfaction			
Model constant	1.494	0.380	1.00

Source: developed by authors

According to the analyses run, *Customer Satisfaction* has a significant statistical impact on the *Future Behaviour* related to the Hilton Honors mobile app (Sig = 0.000), which explains 45.6% of its variation (R Squared = 0.456).

Table 9. Simple linear regression: ANOVA estimation of "Future Behaviour"

Model Summary	R	R Squared	Sig
1	0.675	0.456	0.000
Coefficients	Unstandardized coeff.	Standard coeff.	Collinearity
Costumer satisfaction			
Model constant	1.190	0.675	1.00

Source: developed by authors

Additionally, we have performed multiple regressions, where the dependent variable is *Perceived Trust*, and the independent variables are *Perceived Security*, *Usage Risks*. To establish to what extent a group of factors influences the attitude towards the Hilton Honors mobile app, we have used the multiple linear regression analysis.

In the table below we can identify an R Squared of 0,808, which is equivalent to a percent of 80.8% from the attitude variation towards *Perceived Trust* explained by the independent variables (*Security and Usage Risks*). The model is statistically significant (ANOVA F = 127.375 and Sig. = 0.000, Table 10).

Table 10. Multiple linear regression between dependent variable (Perceived Trust) and independent variables (Security and Usage Risks) (ANOVA analysis - initial case)

Model	R	R Squared	Model	Sum of	Df	F	Sig
Summary	0.808	0.654	ANOVA	Squares	2	127.375	0.000
1			regression	52.998	135		
			Residual	28.085	137		
			Total	81.083			

Source: developed by authors

The data presented in table 10 show that a certain variable does not have a significant statistical contribution to the model (Sig. > 0.05), namely the *Usage Risk*. Out of the data introduced in tables 11 and 12, we can observe a series of collinearity problems: the correlations drop significantly from Zero Order (0.247) to Partial (0.050) and Part (0.029), while, in the table below (Initial Case – without transformations) it is confirmed the diagnostic where the Eigenvalue comes close to 0 for both factors, specifically 0.058 and 0.017. The Condition Index value of the *Usage Risks* factor gets close to the threshold value of 15.

Table 11. Coefficients - initial case (without transformations)

Model	Unstandardized coefficients		Correlations			Collinearity	
MODEL	B	Sig.	Zero-order	Partial	Part	Tolerance	VIF
Constant	0.804	0.000					
Perceived Security	0.791	0.000	0.808	0.794	0.770	0.926	1.079
Usage Risks	0.022	0.563	0.247	0.050	0.029	0.926	1.079

Source: developed by authors

Table 12. Collinearity "Initial Case" - "Final Case"

Initial Case - without transformations			Final Case - Factor Analysis		
Dim.	Eigenvalue	Condition Index	Dim.	Eigenvalue	Condition Index
1	2.925	1.000	1	1.000	1.000
2	0.058	7.119	2	1.000	1.000
3	0.017	13.072	3	1.000	1.000

Source: developed by authors

To solve the collinearity problems, dependent and independent variables were saved as standard forms in the basis (Z-Score). The regression analysis went with the new values, yet, after running the procedure, a new set of collinearity problems was identified. Therefore, we have made the first step to eliminate the collinearity problem by applying the Factor Analysis which included the reuse of Z-Scores for the independent variables. The analysis of the multiple linear regression was redone and, this time, the dependent variable in standard form was used (Z-Score) as well as the scores of the Factor Analysis factor for the independent variables. We can conclude that, in the case of the final model of regression, the same values were recorded for the following: R Squared, F and Sig. similarly to the initial one. The collinearity problems were solved: the differences between the Zero-Order and Part and Partial correlations were reduced, all the VIF values were smaller than 2, equal to 1, and all the Eigenvalue and Condition Index values are 1 ("Final Case – with Factor Analysis").

Table 13. Coefficients -final case (Factor Analysis)

Model	Unstandardized coefficients		Correlations			Collinearity	
Model	B	Sig.	Zero-order	Partial	Part	Tolerance	VIF
Constant	2.94	1.000					
Usage Risks	0.140	0.007	0.140	0.231	0.140	1.000	1.000
Perceived Security	0.796	0.000	0.796	0.804	0.796	1.000	1.000

Source: developed by authors

After making all the changes, according to table 13, we identify that variables *Usage Risks* and *Perceived Security* (Sig < 0.05) have a significant statistical influence on the *Perceived Trust* towards

the Hilton Honors mobile app. Thus, *Perceived Security* has the biggest contribution (unstandardized coeff. B = 0.796), while *Usage Risks* (unstandardized coeff. B = 0.140) has the smallest contribution.

In the following, we have analysed the comparison between the groups such as the use period of the Hilton Honors mobile app, which, in its turn breaks down into 2 types: a medium period of recent use (group 1 = 1) and a long period of use (group 2>1).

Thus, in the table below (table 14), the final results are synthesised for the analysis of both simple and multiple regressions related to group 1 of analyses, which have a medium period of recent use of the Hilton Honors mobile app (for a few months, a maximum of one year).

Worth mentioning is that, in the stage of multiple regressions, we have operated a series of changes to remove the problems related to collinearity, by saving the dependent and independent variables in standard form (Z-Score). After that, we have run again the analysis of regressions and established that not all the collinearity problems were suspended. Accordingly, we have moved to the factor analysis, where we included the Z-Score for the independent variables. The analysis of the multiple linear regression was redone with the dependent variable in standard form (Z-Score) and with the scores of the factor analysis for the independent variables.

Table 14. Regressions - recent period of use (group 1=1)

Set 1	Medium period of use			Dependent variabile	Unstandard B	Sig.
RS1_RF1 Model ANOVA regression	0,187	13,161	0.001	Recommendation of the app	0.511	0.001
RS2_RF1 Model ANOVA regression	0.593	84.584	0.000	Future behaviour	0.730	0.000
RM3_RF1 Model ANOVA regression	0.747	83.971	0.000	Perceived trust	0.831	0.000
				Security. Usage risks	0.236	0.01
RM4_RF1 Model ANOVA regression	0.789	69.893	0.000	Performance of expectances	0.664	0.000
				Benefits of performance. Hedonic motivation	0.414	0.000
				Usage Habit	0.421	0.000
RM5_RF1 Model ANOVA regression	0.880	136.305	0.000	Perceived usefulness.	0.468	0.000
				Atmosphere. Usefulness. Receptivity	0.492	0.000
				Ease-of-use	0.696	0.000

RM6_RF1 Model ANOVA regression	0.711	33.832	0.000	Perceived Usefulness	0.656	0.000
				Trust	0.203	0.000
				Performance of expectations	0.388	0.000
				Social Influence	0.468	0.000

Source: developed by authors

The first run regression was a simple one, for which the dependent variable was the *Recommendation of the App* factor and, as an independent variable, the *Consumer Satisfaction*. The final model of regressions is statistically significant (ANOVA F= 13.161, Sig=0.01), which registered an R Squared of 0.187, equivalent to 18.7%. The *Recommendation of the App* is explained by the independent variable, namely *Consumer Satisfaction*, which has a significant contribution (Unstandardized B = 0.511).

The following analysed regression was also a simple linear one, between the dependent variable as the *Future Behaviour* factor and the independent variable of *Consumer Satisfaction*. The final model of regressions is statistically significant (ANOVA F=84.584, Sig=0.000), which registered an R Squared of 0.593, equivalent to 59.3% out of which variation of the *Future Behaviour* factor is explained by the independent variable, namely *Consumer Satisfaction* (with a contribution of Unstandardized B = 0.730).

Further, we are dealing with the set of multiple linear regressions. In the first analysed set, *Security and Usage Risks* are used as the independent variables, and *Perceived Security* as dependent variable. After performing the analysis of regressions, we have set a collinearity problem, which was suspended through a series of steps, as mentioned earlier. The final model of regressions shows that it is statistically significant (ANOVA F= 83.971, Sig =0.000), which recorded an R Squared of 0.747, equivalent to 74.7%. The variation of the dependent variable, namely *Perceived Trust*, is explained by the independent variables, namely *Security* factor (which registers a high contribution: Unstand B = 0.831), and *Usage Risk* (with a significant contribution: Unstand B = 0.236).

Thus, we have established that the final model of regressions between the dependent variable, specifically *Performance of Expectations*, and the independent variables of *Performance Benefits*, *Hedonic Motivations*, and *Usage Habit* are statically significant (ANOVA F = 69.893, Sig = 0.000), which registered an R Squared of 0.789, equivalent to 78.9%. The variance of the dependent variable is explained by the independent variables. The *Performance Benefits* factor has the biggest contribution (B =0.664), followed by the *Usage Habit* factor with a significant contribution (Unstand

B =0.421), and, finally, the most insignificant contribution belongs to *Hedonic Motivations*factor (Unstand B= 0.414).

The following model of multiple regressions is between the *Perceived Usefulness* dependent variable and *Perceived Atmosphere*, *Fiability and Receptivity*, *Ease of Use* as independent variables that are statistically significant (ANOVA F = 136.605, Sig = 0.000), and which registered an R Squared of 0,880, equivalent to 88%. The variance of the dependent variable is explained by the independent variables. *The Ease of Use* factor records the highest contribution (Unstand B=0.646), followed by *Fiability and Receptivity* factor (Unstand B = 0.492), while the smallest contribution goes to the *Atmoshere* factor (Unstand B=0.468).

The last batch of regressions is connected to the dependent variable, namely *Customer Satisfaction* and the independent variables of *Perceived Usefulness*, *Trust*, *Performance of Expectations*, and, naturally, *Social Influence*, which are statistically significant (ANOVA F = 33.832, Sig=0.000), recording an R Squared of 0.711 which is equivalent to 71.1%. The variance of the dependent variables is explained by the independent variables. The *Perceived Usefulness* registers the biggest contribution (Unstand B=0.656), succeeded by *Social Influence* factor (Unstand B = 0.468), while the smallest contributions are brought by *Performance of Expectations* (Unstand B=0.388) and *Trust* (Unstand B=0.203).

In the end, following the analyses run, we can notice there are significant connections between *Consumer Satisfaction* factor and *Recommendation of the Hilton Honors app* (where B = 0.511), between *Future Behaviour* (where B=0.730), between *Perceived Usefulness* (where B = 0.656), between *Social Influence* (where B = 0.46) and *Performance of Expectations* (where B = 0.388), with a maximum period of one year. Between *Consumer Satisfaction* and *Perceived Trust* there is an insignificant connection in terms of statistics.

Conclusions

As a result of the research performed in the present paper, we have drawn more conclusions. Based on the complex research approach, we can mention that customer satisfaction is one of the key variables determining/ influencing the decision of the tourist company to develop, it is the main pillar of the evaluation performed by the client who appreciates a product/ service according to his/ her expectations.

The main SMART pillar of enhancing organisational performance and customer loyalty is represented by the successful implementation of information technologies in various domains of activity. Accordingly, the implementation of mobile applications in the tourism business is a

successful factor which improves customer satisfaction in terms of delivered services of the hotel unit concerned.

Following the analyses run within this scientific endeavour, we have noticed that there are significant connections between several factors, namely Consumer Satisfaction, Future Behaviour (where B = 0.687), Perceived Usefulness of the App (where B = 0.656), Social Influence (where B = 0.352), Performance of Expectations (where B = 0.327), for more than one-year period of the mobile application. Thus, we can conclude that each hotel unit should rethink its relationship management in terms of implementing and including new information technologies in their activity which will generate satisfied and loyal customers.

As a result of the research performed, we can observe that tourists are satisfied with the mobile applications developed by the hotel system since they make easier the reservation, provide new channels of communications, and offer feedback. At the same time, the implementation of mobile applications contribute to the overall improvement of the management process in the hotel units.

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A bibliometric analysis of the entrepreneurial profile

Geanina BRÎNZĂ[*]

Abstract

Entrepreneurship represents an innovative and optimistic perspective for economic and social development. By creating new businesses and jobs, entrepreneurship contributes to the reduction of unemployment and it helps increase the standard of living. Entrepreneurship can also be a source of inspiration for young people and the opportunity to reach their potential and pursue their passion. In this regard, the government and the decision-makers should encourage and support entrepreneurial activities through appropriate programs and initiatives. The present study is based on a bibliometric analysis of the entrepreneurial profile. The bibliometric analysis was made on the basis of 1277 scientific articles extracted from the Web of Science database, on the topic of entrepreneurial profile. Data processing was carried out with the help of the VOSviewer software. The results of the analysis highlight the evolution of the subject over the 1991-2022 period, providing a significant picture of the entrepreneurial profile for the researchers in the field.

Keywords: bibliometric analysis, entrepreneurship, entrepreneurial profile, personality traits

Introduction

Entrepreneurship is crucial for economic development by increasing economic efficiency, bringing innovation to the market and creating new jobs (Shane and Venkataraman, 2000). Drucker (1993) stressed the importance of entrepreneurship for a country's economy, arguing that lifelong learning and change acceptance should be encouraged and viewed as opportunities, not as threats. While previous studies of entrepreneurship primarily focused on the economic perspective, recently a greater emphasis has been placed on the individual skills and attitudes required by entrepreneurship (López-Núñez, Rubio-Valdehita and Díaz-Ramiro, 2022; López-Núñez *et al*., 2021).

The traits commonly linked to entrepreneurship are risk-taking, positive attitude, desire for independence, motivation for self-overcoming, optimism, self-confidence, self-discipline, energy, work, determination, adaptability, creativity and organizational skills (Camera de Comerț și Industrie Cluj, 2018; Schror, 2006; Ajzen, 2005). Entrepreneurship is essential for creating new jobs, reducing

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unemployment, economic development, stabilizing society and increasing competition. Governments and policymakers pay close attention to entrepreneurship in order to encourage and direct young people towards entrepreneurial activities. Personality traits represent the factors that predict entrepreneurial orientation (Awwad and Al-Aseer, 2021). The authors argue that entrepreneurship can be learned (Schou and Waldkirch, 2022; Fischer, 2021). Entrepreneurship is linked to previous experiences and entrepreneurial education, which are necessary to create businesses. Entrepreneurial thinking can control the emotions and the life of an individual, as well as influence others. (Portuguez Castro, Ross Scheede and Gómez Zermeño, 2020).

Most successful entrepreneurs have innate talent and represent the main sources of new ideas for the economy. The entrepreneurial profile includes the specific features of entrepreneurs, such as the need for achievement, the place of control, risk-taking, personal initiative, ambiguity tolerance, creativity, the need for autonomy and self-effectiveness (Mushtaq, 2017).

The entrepreneurial profile can be composed of several components, including: the ability to identify and exploit business opportunities (Opportunity Seeking); the spirit of initiative and the courage to take decisions (Proactiveness); the ability to take calculated risks (Risk-taking); innovation and creativity in finding new and efficient solutions (Innovativeness); the ability to lead and motivate a team (Leadership); the ability to manage and control business resources such as finance and personnel (Resource Management) (Kuratko, 2013).

The aim of this study is to understand the conceptual structure of the specialised literature on the topic of entrepreneurial profile. In order to deepen the subject, the methodology used consisted in performing a bibliometric analysis to identify the main keywords and links regarding the entrepreneurial profile, highlighting the personality traits specific to entrepreneurs and their entrepreneurial intention.

The publications that formed the basis of the study were extracted from the Web of Science database, after which a bibliometric analysis was carried out through the VOSviewer software. The results of the study distinguish the scientific fields of the entrepreneurial profile, presenting the links between the research subject and personality traits - entrepreneurial intention.

1. Entrepreneurial profile
1.1. Entrepreneurship versus entrepreneur

The concepts of entrepreneurs and entrepreneurship hold considerable significance in the economy, which refer to starting and running a business in order to make profit. Although they are often used interchangeably, there is a clear distinction between the two concepts (GEM, 2022).

Entrepreneurship refers to the process of starting and running a business, including identifying a business opportunity, developing a business plan, obtaining financing and actually launching the business. This process involves a high degree of risk and innovation, because entrepreneurs have to think outside the box and take the risk of launching a business with profit potential (Prince *et al*., 2021).

Therefore, an entrepreneur refers to the person who leads this process of entrepreneurship. Entrepreneurs are individuals with unique personalities who possess qualities such as courage, initiative, creativity and the determination to succeed. They are often described as pioneers in the business world who have a strong entrepreneurial spirit and are willing to take risks in order to achieve their goals (Rusu *et al*., 2012).

The literature emphasizes the importance of emotions in recognizing opportunities and the importance of personality traits for young people with entrepreneurial intentions (López-Núñez *et al*., 2021). Generation Z is considered the most entrepreneurial generation, due to its intentions or successes in opening a business (Tejani, 2021).

Scientific studies have shown that entrepreneurship and entrepreneurs have a significant impact on the economy. The research conducted by the University of Pennsylvania (Gimeno, Folta and Cooper, 1997) showed that entrepreneurs play an essential role in stimulating economic growth, by creating new jobs and developing new products and services. This research has also shown that entrepreneurs have a positive impact on innovation mediation by creating new technologies and processes that lead to increased efficiency and productivity.

The crisis led to an increase in unemployment and a decrease in living standards, which resulted in an acute need for new jobs and new sources of income. In this sense, entrepreneurship can be seen as a solution in order to create new jobs and stimulate economic development. By creating new businesses and developing new products and services, entrepreneurs can contribute to the growth of the economy and to the reduction of unemployment (Obschonka *et al*., 2023).

The Covid-19 crisis had a major impact on the global economy, affecting both existing and new businesses. However, from an entrepreneurial profile perspective, there are significant opportunities to adapt and develop in these difficult times. The crisis also led to an increase in the need for online products and services. Businesses which were able to quickly adapt to this trend had a considerable advantage over those that did not. Entrepreneurs who have flexible thinking and are open to new opportunities can take advantage of this trend by developing online products and services, including e-commerce, advisory services and online education (Pattinson and Cunningham, 2022).

In conclusion, entrepreneurship and entrepreneurs represent two important concepts in economics, which refer to the process of starting and running a business and the person who leads this process, respectively. Scientific studies have shown that entrepreneurship and entrepreneurs have a significant impact on the economy by creating new jobs, stimulating innovation and increasing efficiency and productivity.

1.2. Entrepreneurial profile

The entrepreneurial profile is characterized by the attitudes, behaviours and abilities specific to people who want to start and run a business. This profile is essential for the success of any business, because entrepreneurs have the ability to identify opportunities, make important decisions and take risks.

According to Howard Stevenson *"entrepreneurship is the process of creating or bringing to life something new with positive economic implications"* (Stevenson, 1985). This quote emphasizes the importance of entrepreneurs' ability to see and exploit untapped opportunities, which is essential to start and run a successful business.

Moreover, entrepreneurs have the ability to make important decisions and take risks. According to Peter Drucker, *"entrepreneurship is about making decisions"* (Drucker, 1985). This quote emphasizes the importance of entrepreneurs' ability to make quick decisions and their willingness to take risks, as they are essential to running a business.

To be a successful entrepreneur, an individual must possess a series of qualities, competencies and skills that form the entrepreneurial behaviour and profile. This profile includes innovation, creativity, initiative, flexibility, self-confidence, risk-taking, teamwork, the ability to build and manage projects in order to achieve the proposed objectives. Training entrepreneurial skills to manage, grow, identify and capitalize on market opportunities is also essential in setting up a business. (Liţoiu and Negreanu, 2011)

Entrepreneurship must be studied from the perspective of the relations with the dynamics of the market, the socio-economic and educational-formative fields, because the economic, social and educational realities outline the need for the development and growth of the new generations of entrepreneurs who possess skills such as responsibility, managerial spirit, spontaneity, initiative, flexibility and adaptability (Liţoiu and Negreanu, 2011). The development of these competences requires an adequate implementation framework, which is why it is important to create educational opportunities and diversify the curriculum for entrepreneurship.

In conclusion, the entrepreneurial profile is characterized by specific attitudes, behaviours and abilities, such as the ability to identify opportunities, make important decisions and take risks. These skills are essential to starting and running a successful business, as Howard Stevenson and Peter Drucker pointed out in their works.

The entrepreneurial profile is characterized by attitudes, behaviours and abilities specific to people who want to start and run a business. In recent years, the perspectives of this profile have evolved, due to the changes in the economic and technological environment (Martínez-Martínez and Ventura, 2020).

Entrepreneurship represents an important area that has grown considerably in recent years, but it was also affected by the global crisis. Despite these problems, the prospects of the entrepreneurial profile are positive and there are significant opportunities to develop and adapt to the new market conditions (Nicolau and Foris, 2018; Jimenez-Moreno and Wach, 2014)

One of the perspectives of the entrepreneurial profile refers to increasing the importance of social entrepreneurship. As Muhammad Yunus puts it, *"social entrepreneurship is a way of addressing social problems and of providing lasting solutions"* (Yunus, 2007). This perspective emphasizes the importance of business development which has a positive impact on the society and the environment and not just on profit.

Entrepreneurs have the opportunity to innovate and create new products and services that meet the needs and desires of consumers and investors. Through innovation and creativity, entrepreneurs can attract new customers and stimulate economic growth (Kritikos, 2014).

In conclusion, the perspectives of the entrepreneurial profile have evolved in recent years due to the changes in the economic and technological environment. The current perspectives of the entrepreneurial profile include the importance of social entrepreneurship and business development in the digital world, as a way of addressing social problems and use technology to the advantage of businesses.

1.3. Personality traits

The individuals' personality is represented by traits that include their thoughts, behaviours and feelings. The theory of trait psychology suggests that people are unique according to their positioning on the axes of some basic trait dimensions, which remain constant over time and in different situations (Diener *et al*., 2019). One of the most widely used methods of researching personality traits is the Big

Five model, which divides personality into five dimensions: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism (Wang *et al.*, 2015; Peabody and Goldberg, 1989).

Openness refers to the desire of individuals to explore new experiences, with a rich imagination and independent thinking, manifesting such traits as curiosity, intelligentsia, autonomy and flexibility. Conscientiousness is characterized by organization, self-control, persistence, hard work, planning, the fulfilment of tasks and motivation to achieve goals. Extraversion refers to traits such as assertiveness, dominance, activity, sociability and ambition. Agreeability implies the desire to maintain positive human relationships through altruism, gentleness, cooperation, conformity and openness to help other people. Neuroticism reflects the individuals' tendency to experience negative emotional states such as depression, anxiety, fear, anger, hostility, sadness, vulnerability, guilt and disgust. These traits vary from individual to individual depending on their high or low level of development (Wang *et al.*, 2015).

Entrepreneurship is closely linked to traits such as innovation, creativity, initiative, the ability to adapt to specific economic and cultural environments and risk-taking, which is why the behaviour of young can be influenced by factors such as entrepreneurship education, access to finance and the institutional environment (Furdui *et al.*, 2021).

In the specialised literature, entrepreneurs display the following most common personality traits: risk-taking, innovation, confidence in personal skills, the ability to influence people around them, the ability to identify opportunities, autonomy, perseverance, creativity, prior knowledge, motivation, proactivity, responsibility, stress tolerance, professionalism and anxiety. Some of these personality traits may be more pronounced or less obvious depending on the social context from which the individual comes (Portuguez Castro, Ross Scheede and Gómez Zermeño, 2020; Ajzen, 2005).

According to Kothari (2013), the personality traits specific to entrepreneurs include the need for achievement, the need for power, the locus of control, the ability to take risks and the recognition of opportunities.

1.4. Entrepreneurial intention

The entrepreneurial intention represents the individual's desire or motivation to develop and launch a business (Kautonen, Tornikoski and Laine, 2014). It can be influenced by various factors, such as personality traits, previous experience, education and socio-economic environment (Zhao, Seibert and Lumpkin, 2010).

A study by López-Núñez, *et al.* (2021) showed that personality traits, such as the need for achievement and tolerance to ambiguity, have a significant impact on entrepreneurial intent. Also, previous experience in entrepreneurship and entrepreneurial education can play an important role in forming entrepreneurial intention (Tejani, 2021).

In terms of socio-economic environment, a growing economy can generate opportunities for entrepreneurial intent (Shane and Venkataraman, 2000). On the other hand, a difficult economic environment, such as the economic crisis or the COVID-19 pandemic, can have a negative impact on entrepreneurial intent (Furdui *et al*., 2021).

However, the COVID-19 pandemic has also led to an increase in entrepreneurial intent among people who lost their jobs or were affected in other ways (Kautonen, Tornikoski and Laine, 2020). In addition, a study by Awwad and Al-Aseer (2021) showed that the pandemic has led to an increase in interest in entrepreneurship in areas such as technology and healthcare.

2. Methodology

Within this study we opted for a qualitative analysis, carried out through a bibliometric study, in order to identify the perspective of the entrepreneurial profile through an analysis of the specialized literature. This approach highlighted the interest in the theme addressed through an analysis of the frequency of appearance of representative keywords and the links between them. This analysis provides a clear perspective on the content addressed.

The study was conducted in three stages: data collection, bibliometric visualization and bibliometric analysis.

The data search was carried out with the help of the Web of Science database. The number of articles published in the 1991-2022 reference period is of 1277 scientific articles, which demonstrates a high interest in the research topic.

After the data extraction, the processing of data specific to the qualitative analysis was carried out through a bibliometric analysis with the help of the VOSviewer software. This software allows the analysis of keywords based on the information extracted from the Web of Science database by highlighting the links that appear between keywords. The maps that VOSviewer designs are made on the basis of articles, books, publications by extracting .xls format files, .csv, .ris and others.

VOSviewer can be used to analyse data from different fields, such as social sciences, natural sciences and humanities, and can be used by researchers, librarians and other people interested in the bibliometric analysis.

3. Results and discussions

The querying of the Web of Science database led to the identification of 1277 publications based on which the "Entrepreneurial profile" was found in the title, abstract, keywords and/or content (Full content).

Figure 1. Number of articles published and cited on *Entrepreneurial Profile* (1991-2022)
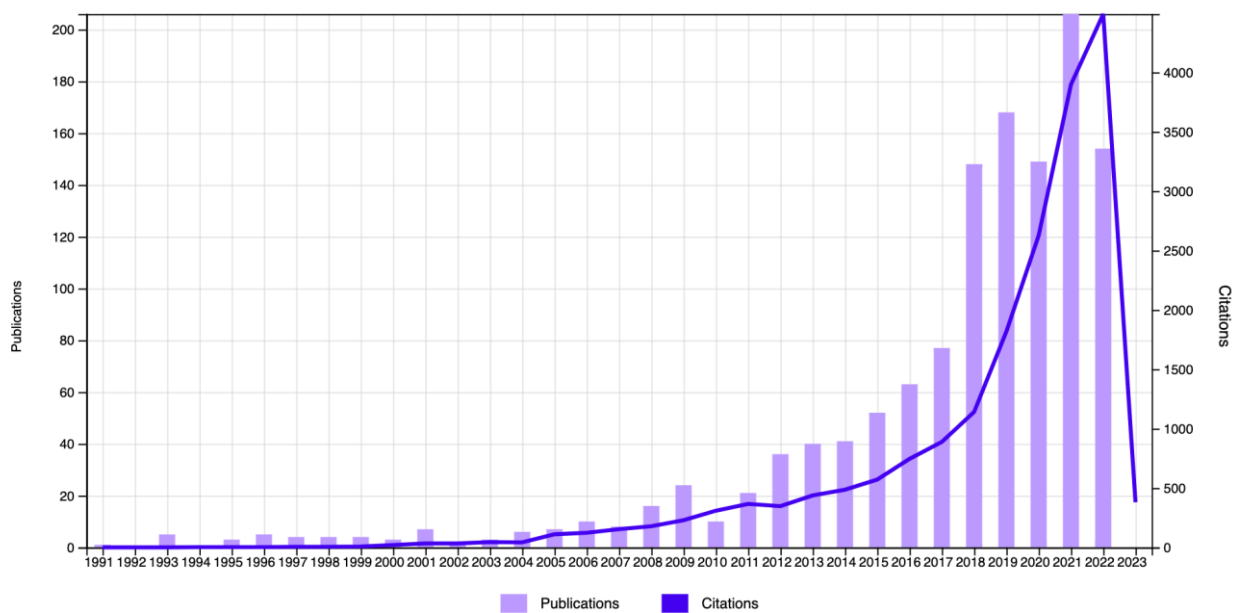
Source: Author processing Web of Science database

Figure 1 shows that the interest in the subject presents an upward trend. In 1991 there was only 1 scientific article written on the topic of "Entrepreneurial profile." During the 1991-2006 period there were no more than 10 studies published on this subject. From 2008 to 2017 up to 100 articles were written, whereas from 2018 to 2022 between 148 and 206 published scientific articles were registered, year by year. In 2021, 206 publications were registered on this topic of study. The number of publications was increasingly pronounced, with the exception of 2022 when only 153 publications were registered. The increased interest in the topic can be inferred or correlated with the development of programs for the formation of entrepreneurial skills and abilities with the aim of encouraging individuals to open new businesses (GEM, 2022; Seikkula-Leino *et al.,* 2021). At the same time, one has understood that it is important to know the profile of the individual in order to carry out programs that develop the entrepreneurial skills and competences necessary for specific business activities.

The bibliometric analysis was designed using the VOSviewer software. This is a bibliometric analysis and data visualization software that allows users to explore and analyse the relationships between different research sources, such as articles and authors. VOSviewer can be used to identify

important trends and research areas, as well as to identify collaborations and relationships between authors.

Figure 2. Entrepreneurial profile concept map
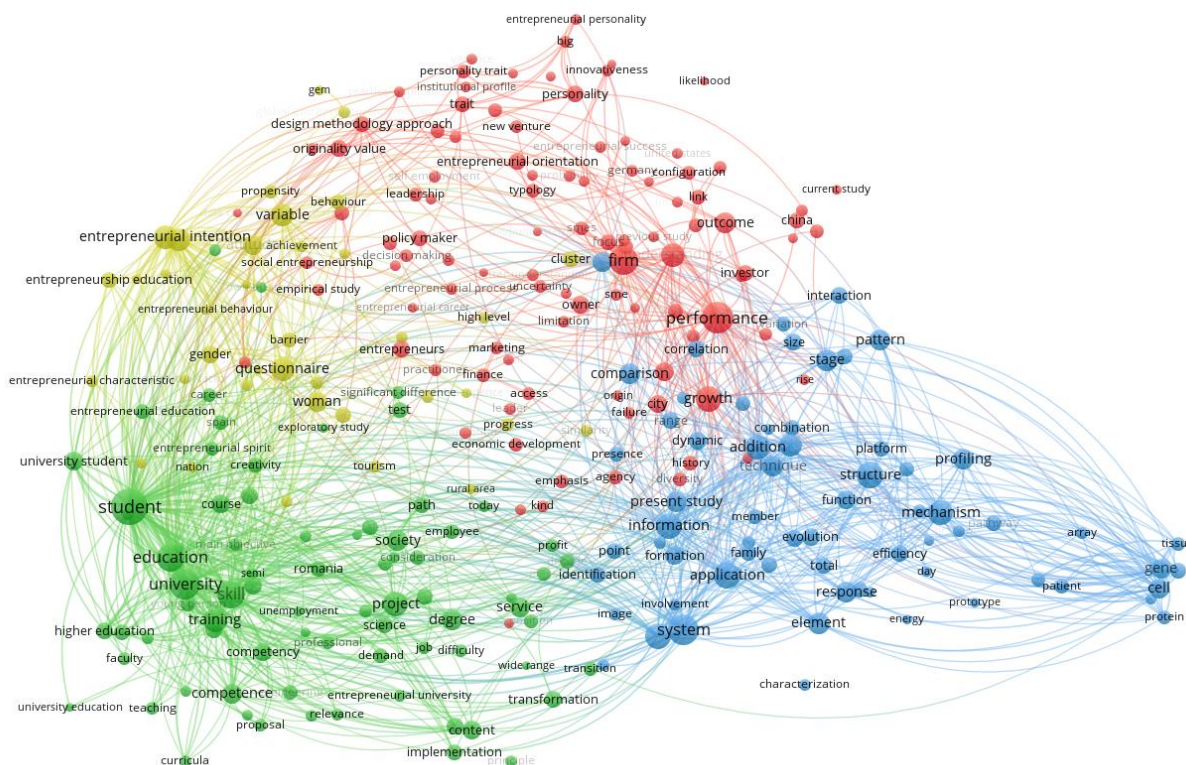
Source: Author processing using VOSviewer with data extracted from Web of Science database

After the data extraction, the bibliometric analysis was performed with the help of the VOSviewer software. The keywords co-appearance matrix on the topic *Entrepreneurial profile* was generated based on the 1277 scientific articles extracted from Web of Science (*Figure 2*). The resulting clusters (nodes) are terms which can be found in the analysis and that present the frequency of occurrence. Therefore, the more often the terms are found in articles, the greater the intensity and size of the terms.

The entrepreneurial profile was studied from the perspective of four clusters, 280 keywords, which generated 34,194 links. The greatest intensity and density of terms is related to the term student, then university, education, skill, training, performance, firm, growth, system, entrepreneurial intention.

After that we identified a cluster which included the aspects that referred to the individual. This cluster integrates keywords such as: entrepreneurial personality, personality traits, entrepreneurial orientation or behaviour.

Figure 3. Link between keywords on *personality traits* in the analysis of *the Entrepreneurial Profile*

Source: Author processing using VOSviewer with data extracted from Web of Science database

The results in Figure 3 present the appearance and relationship of keywords. Keywords can be found in 4 clusters in different colours. The connection network on *personality traits* is strongly linked with the terms lived, personality, big (BIF FIVE/personality traits), entrepreneurial personality, and entrepreneurial intention. Personality traits are also analysed from the perspective of traits and personality. It is noticed that there are links between the 2 bibliometric analyses by highlighting the coinciding keywords, such as: entrepreneurial personality, entrepreneurial intention, student and questionnaire.

Bibliometric analyses present the working perspective of specialists who carried out studies on the topic of personality traits. The conclusion is that the entrepreneurial profile was studied from the perspective of personality traits, and the size of the keyword entrepreneurial intention. This highlights the fact that several publications were made on this topic.

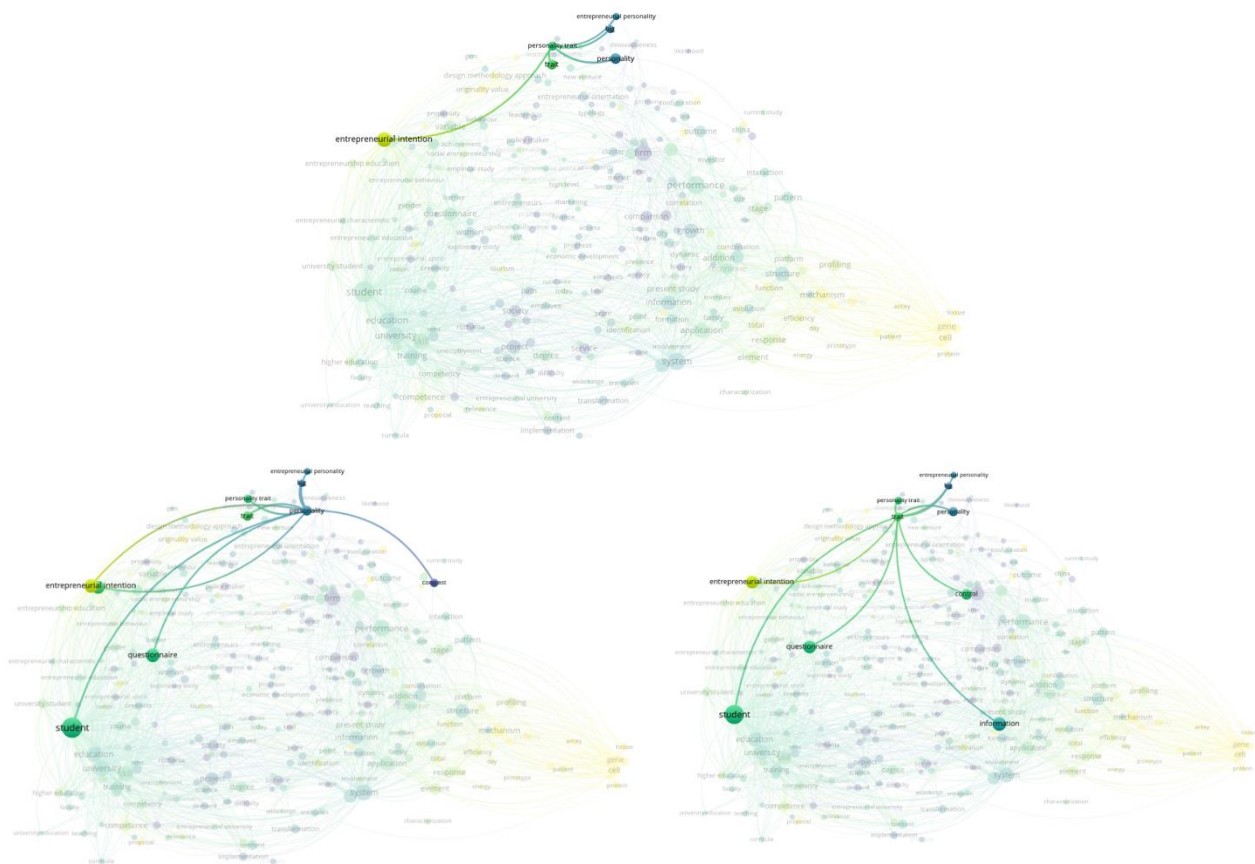**Figure 4. Link between keywords on the term *entrepreneurial intention* in the analysis of the *Entrepreneurial Profile***

Source: Author processing using VOSviewer with data extracted from Web of Science database

In the context of the bibliometric analysis of the entrepreneurial profile, it was observed, through the more pronounced dimension of the keyword entrepreneurial intention, that it often studied the entrepreneurial intention. Therefore, this aspect was studied from both the perspective of education, creating links with entrepreneurial education, student, university, training, skill, from the perspective of deepening knowledge, applying questionnaire, variable, test, control, application, response, and from the perspective of knowing the personality traits, highlighting links with keywords such as: lived, personality, personality traits.

The conclusion is that in the analysis of the entrepreneurial profile, the entrepreneurial intention occupied an important place by determining the aspects that form entrepreneurial intention among the individuals who wish to work in the field of entrepreneurship.

Therefore, the perspective of the bibliometric analysis provides an insight into the links between keywords and their semantics. It is noted that the research problem aimed at the entrepreneurial profile is found in the following areas: personality traits, entrepreneurial intent, education and the medical sphere. These represent the research trends of the entrepreneurial profile in recent years. The study is based only on documents related to the entrepreneurial profile and does not provide a detailed assessment of the characteristics of the subject of the research.

Conclusions

VOSviewer represents a powerful and flexible software for bibliometric analysis and data visualization, which can be used to identify trends and relationships on the topic "Entrepreneurial profile." The software provides users with an intuitive interface and interactive views to facilitate data understanding and can be used to analyse data from different fields.

The bibliometric analysis shows the connection between the keywords of the entrepreneurial profile. It was observed that the analysis results provide an insight into 4 clusters, as following: personality traits, entrepreneurial intent, education and medicine. It is noted that there is an interest in identifying the personality traits of the individual who intends to integrate into entrepreneurship. It is also highlighted that there is a high interest in the sphere of education, in deepening the knowledge of the aspects underlying the integration of individuals into entrepreneurial activities.

All things considered, the prospects of entrepreneurial profile would include the adaptation to the new market conditions, innovation and creativity, as well as an increased awareness of the social and environmental aspects. Entrepreneurs should be flexible and adapt quickly to environmental changes, find creative solutions and consider the social responsibility and sustainability aspects in their business decisions.

The study also presents certain limits, of which we call the use of a single database, namely the Web of Science, which does not have the capacity to cover all the scientific studies carried out over time. Also, another limit is generated by the bibliometric analysis performed with the help of the VOSviwer software, which cannot correctly and completely perform the analyses of the collected data. Secondly, an in-depth analysis of the entrepreneurial profile is suggested by integrating as much content of publications as possible on the research topic. It is also suggested that one should combine studies extracted from different databases in order to have an objective evaluation. Finally, it is suggested that one should use various tools on the basis of which it is possible to analyse trends in entrepreneurial profile research. Based on these suggestions it would be possible to compare the results and conclusions of the research.

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A comparative analysis of the evolution of the business internationalization process: the Western Balkans and the EU member states in CEE

Dumitru-Silviu MISTREANU[*]

Abstract

The term internationalization has been mainly used to show the expansion of economic activities of firms outside of their home country where they aim at capturing a bigger market. The Central and Eastern Europe region has gone through a process of market transition over the past few decades, yet the business internationalization process has played an important role in the states' economies. The aim of this paper is to analyze the firm internationalization process in the new member states and the Western Balkans countries and gain a better understanding of the process and its course over time. Due to different geopolitical circumstances, the Western Balkan countries did not attract as many investors as much as the EU member states in CEE did that have had a constant flow of investments once they were members of the EU.

Keywords: internationalization, foreign trade, evolution, business, CEE, EU, Western Balkans

Introduction

The internationalization of firms is a well-known topic in the business literature as it is appealing for both the academia and the business environment. The process of internationalization is a very complex strategy a company can follow as the movement firm's operations beyond the borders of the country of origin can take up significant resources and efforts to diversify economic activity. The term internationalization has been widely used to illustrate the external movement of a company's abroad operations (Turnbull, 1987), while Welch and Luostarinen (1988) explained the process of internationalization as the phenomenon of gradual involvement of international operations where due to innovation, companies respond to the challenges posed by the international surroundings. Nowadays, due to the process of globalization, the international business environment is increasingly complex, where small and medium-sized companies, as well as large multinational firms, adopt different internationalization strategies to serve global markets.

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The on-going process of globalization offers multiple business opportunities for companies when considering going international (Zain and Ng, 2006), and these opportunities usually tend to impact international growth. The International Monetary fund defines globalization as the increase in economic interdependence of countries around the world by increasing the volume and variety of goods and services traded across borders (IMF, World Economic Forum, 1997).

In the past few decades countries from Central and Eastern Europe have been going through different changes, and as it different as they may seem to be, these states do have much in common in terms of economic and social policies. Since 1989, countries in this region have been through the process of transition from centrally planned economies to market economies, and the main objective for these countries has been to be part of the European Union (EU). The evolution of the internationalization process is a main indicator of how well the countries have managed to adapt to the new political, social, economic changes and what their main advantages are in terms of foreign trade and investments.

The largest enlargement of the EU took place in 2004 when ten more countries from Central and Eastern Europe have joined: Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, and Slovenia, followed by Romania and Bulgaria in 2007, and Croatia in 2013, therefore the boundaries of the European Union have shifted towards east. These eleven countries mentioned above are called the new member states (NMS) as they have been the latest countries to join the EU.

Although the European Union showed its commitment to enlargement, there are multiple states that have not met the set requirements yet; the EU also developed policies to grant access to the Western Balkan countries (Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, and Serbia), Croatia being the first country from the area to join in 2013. Given the different paths that the two groups of countries have had after the fall of communism, the aim of this paper is to analyze the firm internationalization process in both regions of Central and Eastern Europe and gain a better understanding of how the process evolved over time.

1. Literature Review

The internationalization process has been studied in the literature through a variety of frameworks and theoretical models, however, it is a topic that was not widely covered before the 1970s. when the Uppsala model came out, written by Johanson and Vahlne (1977), and it's currently one of the most cited models in the company internationalization literature. The two authors claim that the company's internationalization process is a gradual process of involvement in foreign

markets, and the economic environment and the problems faced by the company during this process determine the pace of internationalization.

Fernandez and Nieto (2005) claim that the process of internationalization is considered the most complex strategy that a company can implement and when it comes to taking the decision whether to internationalize or not, the first question that needs to be answered is why a company would want to proceed in expanding globally. The term internationalization has been widely used to illustrate the external movement of a company's abroad operations (Turnbull, 1987). Welch and Luostarinen (1988) explained the process of internationalization as the phenomenon of gradual involvement of international operations where due to innovation, companies respond to the challenges posed by the international environment.

The technological advancements and the improved communication and transportation have led to the significant decrease of physical distance between countries, goods and services being now available to consumers in less accessible geographical areas. According to Beer *et al*. (2017), increased trade can lead to more efficiency and productivity, thus have a positive effect on economic growth. Consumers take advantage of a great product variety and lower prices, and in an interconnected world characterized by a high degree of specialization, products can no longer be produced exclusively in-country, or profitably sold only within the domestic market (Felmery *et al.*, 2020).

In Central and Eastern Europe, after the fall of communism, due to the economic transition, a significant number of companies had started participating in international markets (Ipsmiller and Dikova, 2021). Since the fall of the Iron Curtain, international business research focused on Central and Eastern Europe has received considerable academic attention (Jaklič *et al*., 2020). Meyer and Peng (2005) stated that the region is a "fascinating research laboratory", showing the high-degree of interest that the region has had over time.

Central and Eastern European countries have experienced faster changes in the last few decades than any other region in the world, as illustrated by several indicators. Using the database from the Fraser Institute, figure 1 below shows the evolution of economic freedom and the accessibility to start a business for selected CEE countries (Poland, Slovakia, Romania, Slovenia, Bulgaria, Hungary, Lithuania, Latvia, Croatia, Czech Republic, Serbia and Moldova) and the European Union countries between 1995 and 2019.

Figure 1. Freedom to trade & Ease to start a business – EU area vs CEE countries
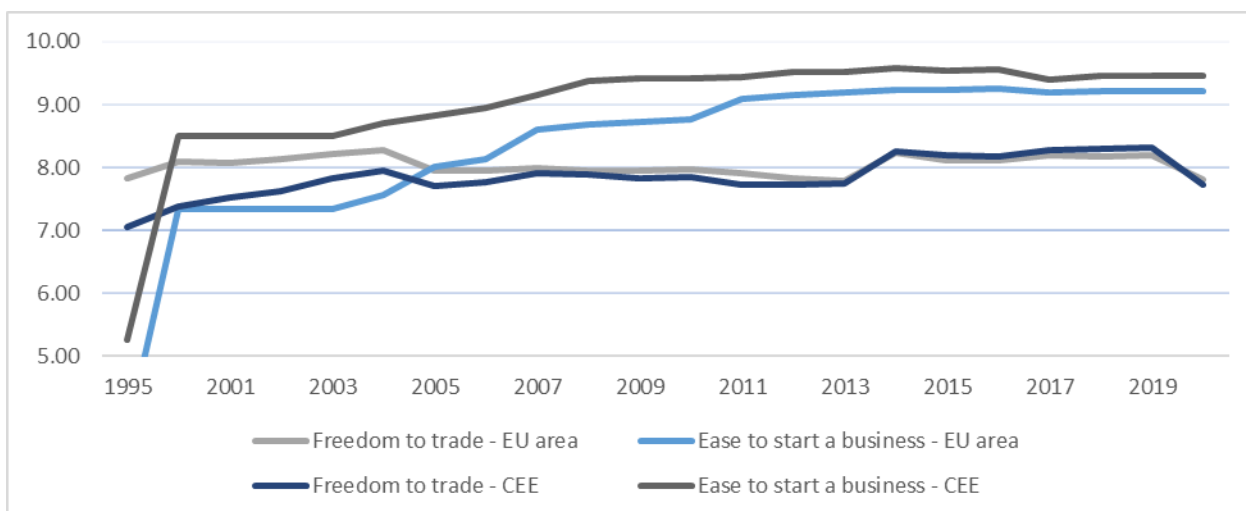
Source: Fraser Institute, Freedom of the World: 2022 Annual Report

The freedom to trade index measures the amount of tax on international trade as a share of exports and imports, while the ease to start a business indicator measures how easy it is, in terms of resource involvement, to start a business. The data were only available for some of the CEE countries.

According to Dabic and Lamotte (2017), the two most important reasons that explain the patterns showed above are (1) the internal reforms that took place in CEE countries to reduce the cost of international trade and (2) the access of these countries to the World Trade Organization and the European Union as significant free-trade agreements have been established. After the fall of the Berlin wall, the transition phase for Central and Eastern European countries has been quite different, smoother for some countries, while a bit bumpier ride for others.

Economic transition in Central and Eastern Europe has forced a significant increase in firm internationalization, where different types of companies, from large multinational entities to small born global companies, are choosing to participate in international markets. Since the fall of the communism system in the 90s, the process of internationalization has followed an increasing path as the markets were now free and the governments were not fully in charge of the flow of products and services.

2. New member states – firm internationalization evolution

At the beginning of 2000s, a significant number of countries started to meet the fundamental set standards by the European Union and joined the western countries on both economic and institutional terms, thus, allowing the free flow of products, services, knowledge into this region. The

largest enlargement of the EU took place in 2004 when ten more countries from Central and Eastern Europe have joined: Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, and Slovenia, followed by Romania and Bulgaria in 2007, and Croatia in 2013, therefore the boundaries of the European Union have shifted towards east by adding granting access to the new member states.

The enlargements process was not only considered beneficial for Europe by creating a larger single market, but it was also seen as beneficial for the post-communist states and their democratic evolution. The addition of the new member states created uncertainty at first, for both the EU and new members, yet the inclusion created new economic circumstances, policies, and social and institutions orders. In order to join the EU, any European state must meet some set requirements that respect the union's values, and the candidate state, once accepted, is willing to promote them. Ever since 2004 when the biggest enlargement of the union took place, there have been some rough times economically taking into consideration the financial crisis starting in 2008 and the COVID worldwide crisis in 2020. The GDP per capita is an important indicator of progress considering that economic growth is driven by technical progress, skilled labor, and increased capital. In the figure below it is shown the evolution of the GDP per capita (current U.S. dollars) of all the Central and Eastern European countries that have joined the EU.

Figure 2. GDP per capita (current $) - New Member States

Source: World Data Bank, http://databank.worldbank.org/
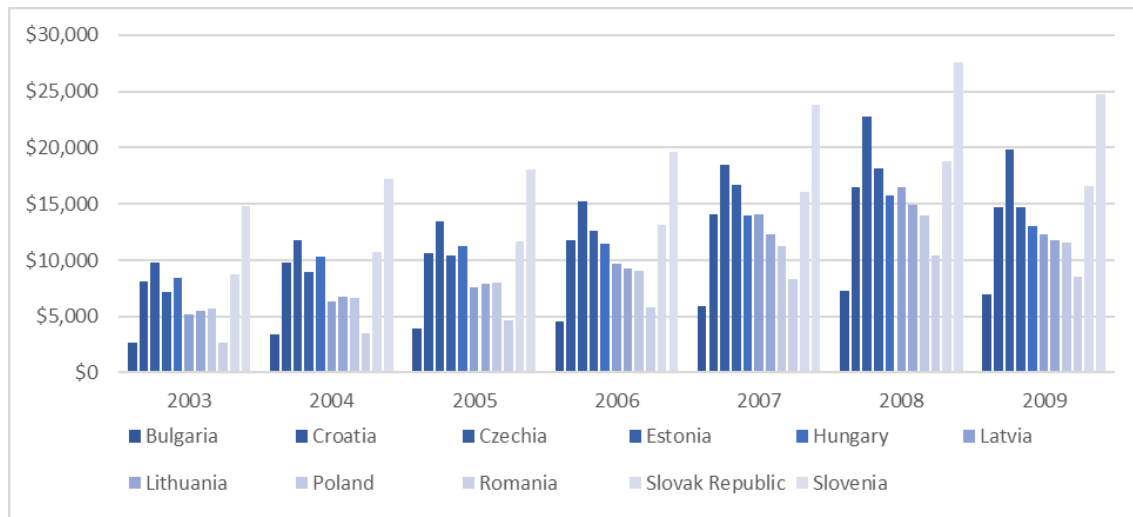
In figure 2 above it is shown that in 2005, all the countries that have joined the EU a year before had an increase in absolute values of GDP per capita, with a significant impact on Czech Republic, Latvia, Lithuania, and Poland, while the same trend was followed by Romania and Bulgaria soon after their accession in 2007.

International trade is an important component of the globalization process, and countries all around the world have been making great efforts to reduce barriers to trade and open their economies to foreign competition. The European Union has trade agreements in place with various countries worldwide, and multiple agreements in focus that could increase the trade flow.

Trade openness of a country can be measured by looking at the flow of exports and imports as a percentage from total value of the gross domestic product, and in the figure below we have the evolution of the exporting flows as of GDP value for all the CEE countries that have joined the EU.

Figure 3. Evolution of Export flows as of GDP (%) 2001-2021 – New Member States

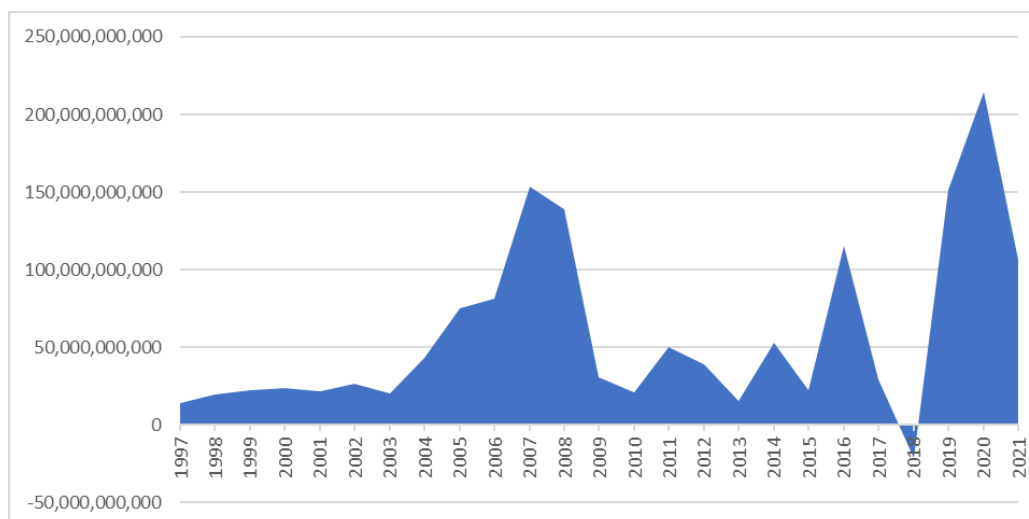Source: World Data Bank, http://databank.worldbank.org/
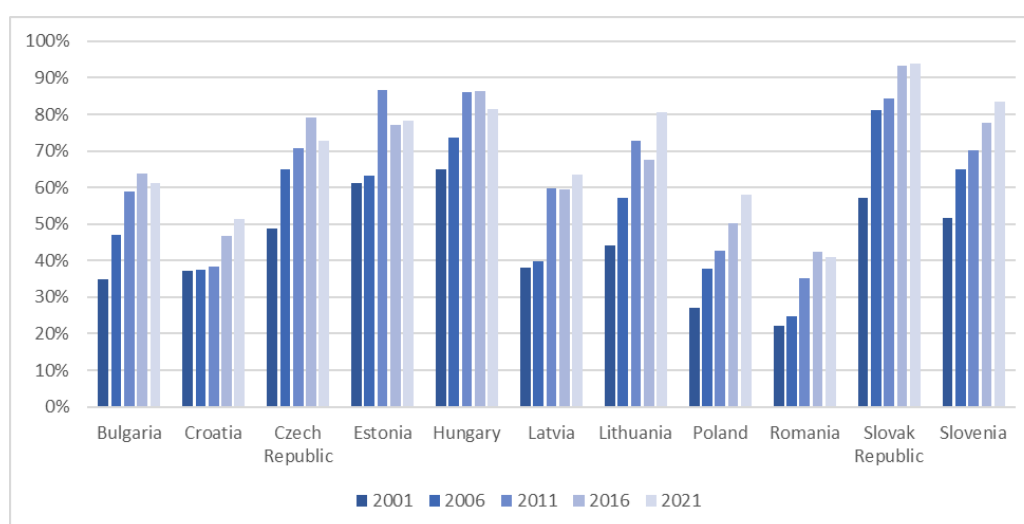
As figure 3 reveals, all the countries mentioned had a steady increase in exports flows as a percentage of GDP, with a slight decrease in 2021 for Bulgaria, Czech Republic, Hungary, and Romania possibly due to COVID crisis that restricted foreign trade. It is also noticeable that Croatia had a significant increase of almost 10% soon after it was granted access to the EU, as well as Czech Republic, Hungary, Lithuania, Poland, Slovenia, and Slovak Republic as their export flows went up after the joined the EU. According to Palankai (2010), the new member states produced an exceptionally rapid integration in the last decades, some countries having the most globalized economies in the world.

Foreign direct investment can play a crucial role in making progress toward economic growth as it drives technological development, and although FDI has the potential to offer sustainable growth for a country, policy makers have to be careful as they play an important role in obtaining this goal. Foreign direct investment continues to be seen as an important source of capital, with significant

contribution to the development of the economies, given the positive spillovers generated in host economies (Hayat, 2019).

Multiple multinational companies have made the decision to invest or relocate to Central and Eastern Europe as these countries have made great efforts to attract investments. Studies generally indicate a positive direct impact of FDI in terms of accumulating financial capital, technology transfer into the host economy, innovation, managerial knowledge, specialized workforce, tax payments to the national or local budge (Horobet and Popovici, 2021). The new member states of the European Union have attracted a cumulative total gross FDI of over 1 trillion dollars between 2004 and 2021 (figure 4 below). Therefore, it is a continuous desire for the new member states of the European Union to implement reforms in order to attract FDI.

Figure 4. Evolution of FDI inflows (current $) 1997-2021 – New Member States

Source: World Data Bank, http://databank.worldbank.org/

The FDI inflows saw a significant increase soon after the EU membership and foreign direct investment has also contributed to exports, employment, and productivity growth. The three largest economies in the region (Poland, Hungary, and Czech Republic) captured almost two thirds of the total FDI inflows, and the service sector dominated FDI inflows counting for almost two thirds of FDI stock invested. Large inflows into services sector were explained by privatization, development of trade, transport, and communications sectors. Together, financial services and wholesale and retail trade account for over 40 percent of total FDI stock in the new member states.

3. New Western-Balkans – firm internationalization evolution

In order to join the EU, any European state must meet a set of accession criteria, as well as to respect and promote the European values. The prospect of EU membership is a very strong incentive for change and reforms, and the Western-Balkans countries are guided by the pre-accession criteria and EU support. In 2013, Croatia was the first country to join the EU, and building off of that experience, the Commission of the European Union suggested further improvements for all the other countries in the area (Serbia, North Macedonia, Montenegro, Albania, Bosnia and Herzegovina).

The West-Balkan countries have already been making great progress in terms of political and economic development. Furthermore, when looking at some key global indicators, the countries in this region are outperforming some of the current EU countries. For instance, in the World Justice Project's Rule of Law index, North Macedonia ranks better than Hungary (Hoxha, 2022). Also, the Doing Business Ranking from the World Bank, North Macedonia is ranked 4 out of all the EU states. Moreover, in the 2021 Corruption Perception Index, Montenegro is seen as less corrupt than Romania, Hungary, and Bulgaria. However, the main factor that separates the West-Balkan countries from the EU member states is the GDP per capita. Although the region has come a long way in the last few decades in terms of economic progress, steadily increasing its GDP per capita values, all 5 countries shown in the table below have lower GDP per capita than all EU countries. The figure below shows the GDP per capita (current U.S. dollars) progress over the years.

**Figure 5. GDP per capita (current $) 1997-2021 – West Balkan countries**

Source: World Data Bank, http://databank.worldbank.org/
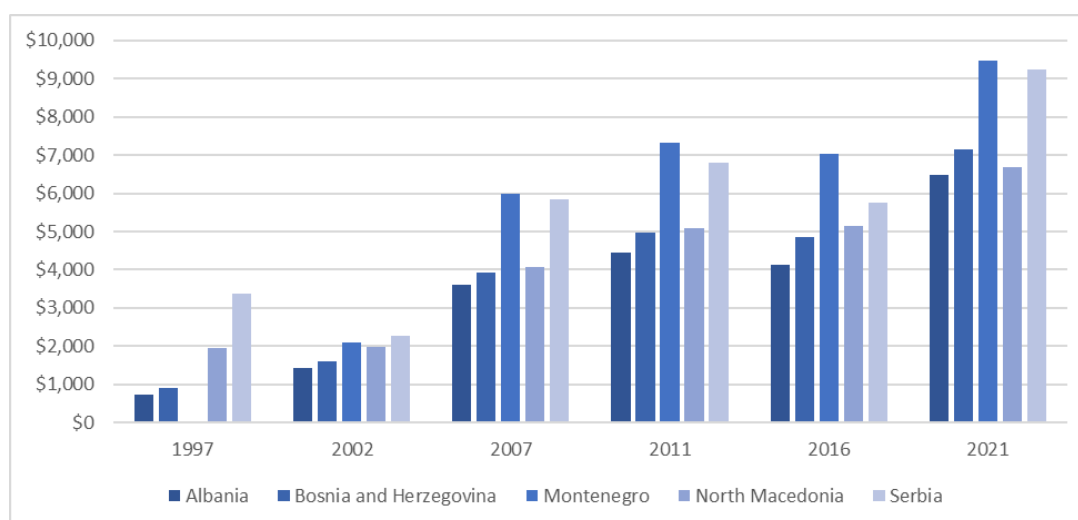
It can be seen that all countries in the region have been managing to increase the GDP per capita and slowly align to the EU standards; the region's close location to other fully developed countries, its deep connections with the EU and with the help of digitalization, the West-Balkan region can become extremely attractive for future partnerships and strategic priorities. The GDP per capita values in this region are higher compared to the other countries that are not part of the EU, yet they were part of the communist bloc. During the first two decades after the fall of communism, the region managed to move away from its old negative Balkanization paradigm towards a new positive one of Europeanization (Jano, 2008).

The Western-Balkans countries have had a late start in terms of European integration and global economy due to their hectic civil war, ethnic struggle, and financial crisis, however, the countries have been making great efforts to enhance exports, foreign direct investments, and growth performance. The figure below summarizes the exporting of goods and services evolution as of percentage of GDP between 2001 and 2021.

Figure 6. Evolution of exports as of percentage of GDP 2001-2021 – West Balkan countries

Source: World Data Bank, http://databank.worldbank.org/
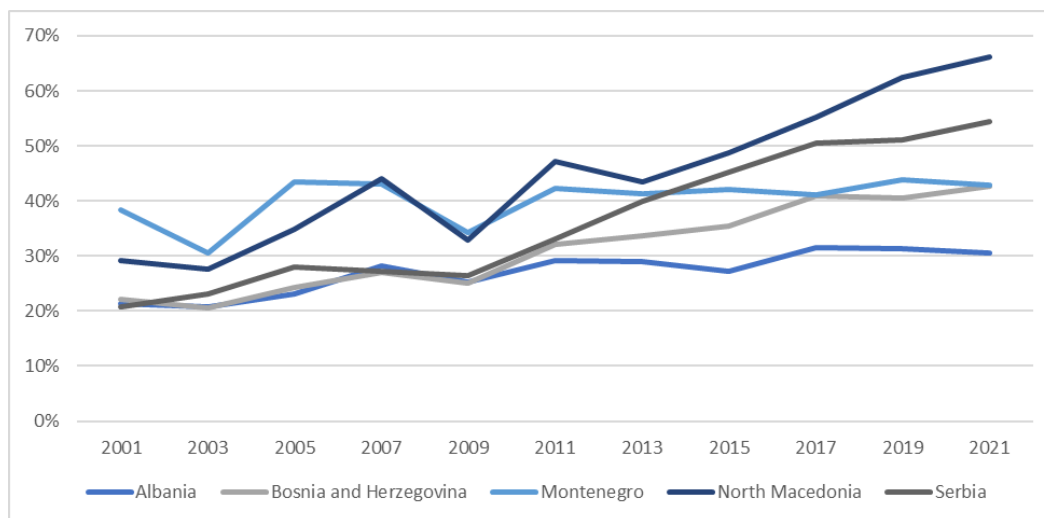
The Western-Balkan countries have been having un upward trend since 2001 in terms of exports, with a small drop during the 2008-2009 financial crisis, and their percentages are not surprisingly much lower than the ones posted by the new member states. The figure below summarizes the Western Balkans Trade with the EU and other main partners.

Figure 7. Main partners exports & imports of West-Balkan countries

Source: World Data Bank. http://databank.worldbank.org/
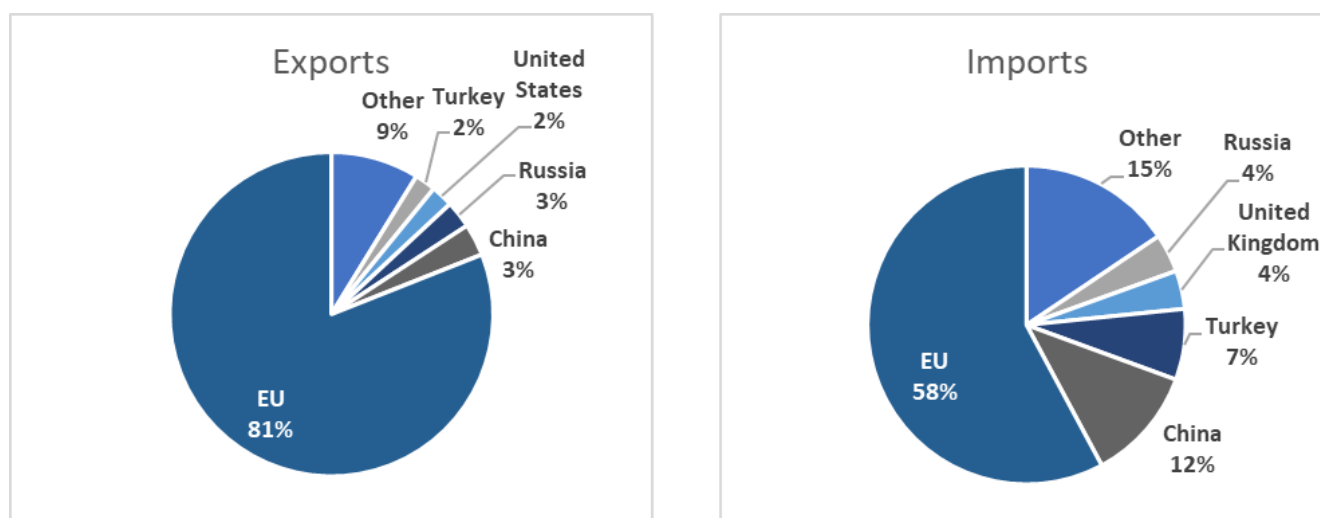
The European Union is the main partner, both in exports (81%) and imports 57.9%), while China is also an important import partner (11.6%), yet it has a small share in terms of exports (3.2%).

Figure 8. Evolution of FDI inflows ($) 1997-2021 – West Balkan countries

Source: World Data Bank. http://databank.worldbank.org/
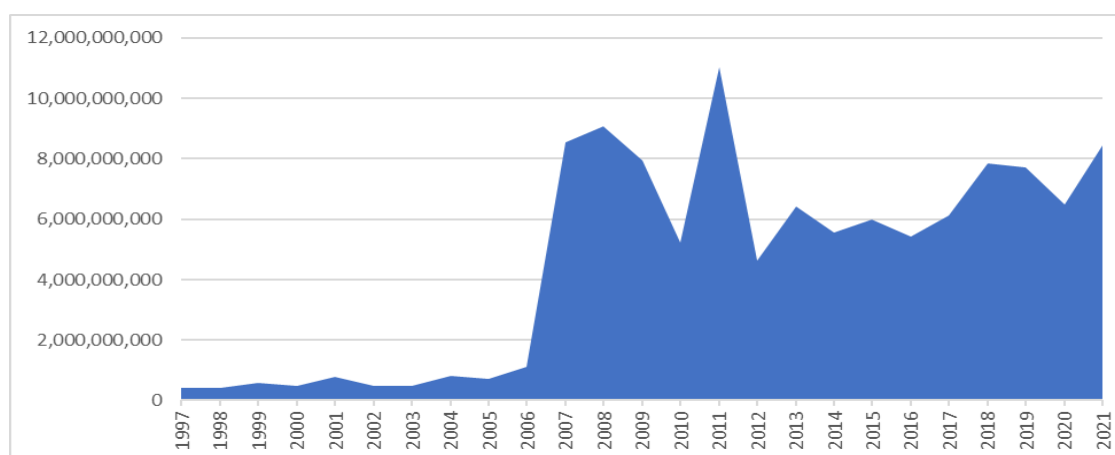
An important challenge that the region had to accomplish was to create a degree of stabilization for sustainable growth, yet, even when there was political will to create the proper environment, authorities frequently lacked the financial and administrative capabilities to implement reforms and policies (Bechev and Andreev, 2005). To attract investors, the West-Balkan countries have provided generous financial incentives in the form of investments credits, which is a common practice particularly for developing countries. Andersen (2017) stated that nearly 50% of the developing

countries introduced tax benefits for investors, although studies show that they are not cost effective over time. Figure 8 shows the FDI inflows evolution from 1997 to 2021 in the West-Balkan countries.

Following the lack of interest of foreign investors at the beginning of 1990s, the region saw a significant increase in FDI during the 2000s due to the privatizations of enterprises and banks and improved economic environment. The European Union played an important role in reducing uncertainty of transition, and the target of membership status has sped up the progress and motivated the countries to implement new reforms.

Conclusions

The process of firm internationalization is a dynamic, continuously changing process where many factors play a decisive role, such as political or social changes. The business internationalization phenomenon has been mostly studied in the western countries, leaving some gaps in the literature in terms of the evolution of this process in the Central and Eastern European countries. The fall of communism brought significant changes social, economic, political changes to all countries in the region, thus, forcing them to create new paths to becoming market economies.

The EU membership has helped the new member states gain a competitive advantage in comparison to all the other former communist, non-member states by gaining access to various markets in terms of exporting and importing, and by being an interesting target for foreign investors due to the highly skilled human force, yet relative low wage. Once they were granted access, all states took advantage of the benefits of being part of the EU, managing to develop a sustainable business environment where companies could invest and grow, yet provide better working conditions for the people. The single market phenomenon also helped countries by intensifying foreign trade within the union, thus, helping the countries progress economically and socially, providing better living conditions.

The Western-Balkans countries had a slower start in terms of internationalization as the area was impacted by the effects of the war at the beginning of 1990s, thus, foreign investors were not as interested in developing their business in environments characterized by uncertainty. In order to be admitted, the aspiring countries in the region have to strictly comply with the set EU political, economic, and legal requirements. Even though the Western-Balkans had a late start, the trade agreements that the region has with the EU are helping the countries continue their upward trend in terms of foreign trade and investments, thus, they are doing great efforts to keep up with the new member states. Motivated by the potential access to the EU, authorities within the region have tried

to create a safe business environment implementing various reforms that would attract investors and help intensify foreign trade. Careful consideration of the literature shows that there are many arguments and explanations as to why the two regions analyzed have evolved a certain way, yet further attention needs to be shed in order to offer a true picture of the regions as they have been impacted by many transformations and challenges within a relatively short period of time.

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A comparative study of Romanian students' perceptions on cryptocurrencies before and after the 2022 cryptocurrency market cap collapse

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Abstract

Since the year of 2022 was marked by many significant and rapid changes on the cryptocurrencies market, this comparative study explores perceptions of Romanian students about cryptocurrencies before and after the market collapse. A qualitative approach has been used to understand attitudes towards cryptocurrencies in March 2022 (when prices of most cryptocurrencies were higher) and then the same study was conducted during August-November 2022 (when the prices of most cryptocurrencies were lower after a dropout in prices that lasted all throughout the summer). Descriptive and inferential statistics were used to compare the results. Our findings show that cryptocurrencies were associated with more negative words in the second wave of the study, but surprisingly, the willingness to invest in such assets did not change that much. However, the willingness to invest seemed to be influenced by how secure/trustworthy respondents perceived cryptocurrencies. Implications and future research suggestions are finally discussed.

Keywords: cryptocurrencies, cryptocurrency market, perceptions on cryptocurrencies, cryptocurrencies associations, willingness to invest

Introduction

As most innovations require time to be assimilated (Hairudin *et al.*, 2022) and do not happen without controversy (Treiblmaier and Gorbunov, 2022), cryptocurrencies are not an exception. Therefore, there is still a debate on whether they provide more advantages or disadvantages to companies, consumers and the society and economy in general (Knežević *et al.*, 2020). Currently, regarding this debate, attitudes started to be even more "in extremes", due to multiple events and rapid changes happening on the cryptocurrency market. For example, at the end of 2021, Bitcoin had reached its maximum of $68.000 in November 2021, but dropped to approximately $35.000 in

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January 2022. However, in March 2022, it started to rise again and almost reached $50.000 (DeMatteo, 2020). Quickly after that, a dropout that lasted all throughout the summer made Bitcoin value around $20.000 in September, with its value going even lower in November, making Bitcoin around $16.000, which is actually the value by which this digital currency started the year 2023. Such massive changes in the market have been discussed on the news and social media. Social networks were proven in multiple studies to influence sentiments towards investment markets (in general and cryptocurrency market) (Kyriazis *et al.*, 2022; Reis and Pinho, 2021; Gurdgiev and O'Loughlin, 2020), values and prices of different cryptocurrencies (Ortu *et al.*, 2022; Pongodi *et al.*, 2021; Mai *et al.*, 2018), the trading volume (Ante, 2023) and opinions about cryptocurrencies (Alghobiri, 2019). The same stands for news about cryptocurrencies, which were found to influence cryptocurrencies returns and volume (Rogone *et al.*, 2020) and sentiments towards these assets (Yao *et al.*, 2019). Taking this into consideration, the idea that this study had as a starting point was the fact that all the massive changes on the cryptocurrency market that happened during 2022 and which were popularized on social media and on the news could have influenced people's perceptions of cryptocurrencies. This aspect was also supported by the article of Treiblmaier and Gorbunov (2022) who proved that information people are exposed to plays an essential role in shaping attitudes towards new technologies. In their study, people exposed to positively-skewed information about cryptocurrencies manifested a more positive attitude towards cryptocurrencies' trustworthiness and risk than those exposed to negatively-skewed information. From a marketing perspective, this finding is an important one in regard to how consumers' attitudes towards cryptocurrencies can be influenced. However, the study of Treiblmaier and Gorbunov was a case-control study, measuring different quantitative variables like trust, security, perceived risk and privacy of cryptocurrencies for two controlled groups (one being exposed to positive information about cryptocurrencies and the other one being exposed to negative one). Taking this into consideration, we wanted to add to the scientific literature a qualitative study, aiming to explore people's perceptions about cryptocurrencies and how they change not in a controlled environment, but without the researchers interfering with the respondents, over a long period of time marked by many important events on the market. To do so, we have chosen two different contexts: a more 'optimistic' context, when events on the cryptocurrency market seemed to be promising, with prices rising in general, and a more 'pessimistic' context, characterized by price dropouts. Hence, we conducted a first study regarding Romanian students' perception of cryptocurrencies in March 2022 (when there was an overall optimistic attitude towards the cryptocurrency market and Bitcoin was around $50.000) (Faraonel *et al.*, 2022). The same study was then conducted during August-November 2022, when prices of multiple

cryptocurrencies were down (and Bitcoin was around $20.000, decreasing to $16.000 at the beginning of November). The results of the two studies aimed to help us explore perceptions about cryptocurrencies in a bull market (i.e. a market characterized by cryptocurrency-price rising – Zhang *et al.*, 2020) VS perceptions about cryptocurrencies in a bear market (i.e. market characterized by cryptocurrency-price falling – Zhang *et al.*, 2020). Thus, the main objectives of our study were:

O1. *To identify differences in respondents' perceptions of cryptocurrency from March 2022 compared to August-November 2022.*

O2. *To identify the current willingness to invest in cryptocurrencies given the circumstances of the cryptocurrencies market.*

O2a. *To identify the main reasons for the current willingness to invest of respondents.*

O3. *To identify the main media outlets utilized by respondents as sources of information pertaining to cryptocurrencies.*

Here, it must be mentioned that even if there was no interfering with our subjects, attitudes towards cryptocurrencies could have also been influenced by other factors like the knowledge people have about the technology behind this phenomenon, previous experiences with cryptocurrencies and perceptions of the expected benefits, as the literature notes (Breward *et al.*, 2017). However, taking into consideration the complexity of blockchain technology that cryptocurrencies are based on, with just a few people being completely aware of how this technology works, the other ones have to rely on information provided by companies (Treiblmaier and Gorbunov, 2022) and/or other sources like media, social media, influencers and even individuals to shape their perception about cryptocurrencies (Ante, 2023; Alaklabi and Kang, 2021; Breidbach and Tana, 2021). Thus, it seems obvious that events happening on the market which were intensively popularized have influenced people's perception of cryptocurrencies. Hereby, the next section will briefly summarize the extant literature regarding cryptocurrencies and more specifically, perceptions of cryptocurrencies and attitudes towards them. We then present our methodology and our findings. For the findings section, our results will be compared with the findings of the first study (Faraonel *et al.*, 2022), so we can discuss after that if and how subjects' perceptions have changed. Finally, conclusions, limitations and future research directions are discussed.

1. Literature Review

In 2008, a whitepaper entitled "Bitcoin: A Peer-to-Peer Electronic Cash System" was published and authored under the pseudonym Satoshi Nakamoto (Nakamoto, 2008). This document outlined a

revolutionary concept for facilitating digital transactions without the need for intermediaries, such as traditional financial institutions. The article proposed a system which would utilize cryptography to ensure security instead of relying on centralized entities, such as central banks, law enforcement, or anti-counterfeiting measures. This is what Bitcoin and other cryptocurrencies possess as specific fundamental characteristics: decentralization, pseudo-anonymity, and transparency, which are integral to their underlying structure and operation. (Narayanan *et al.*, 2016). Hence, by all these innovations, the cryptocurrency market was considered a revolutionary one (Knežević *et al.*, 2020). However, like any other innovation, cryptocurrencies were no exception to controversy (Treiblmaier and Gorbunov, 2022).

Exploring these controversies and what people thought of this revolutionary market did receive attention in the literature, with multiple studies analyzing people's perceptions, attitudes, and opinions towards cryptocurrencies. Scientists studied what these opinions are, but also what can influence them. By now, what was covered were opinions and perceptions about cryptocurrencies of public officials' (Cagigas *et al.* 2022), cryptocurrencies owners (Steinmetz *et al.*, 2021), the South African virtual community (Walton and Johnston, 2018) and internet users in general (Hassan *et al.*, 2021).

Regarding comparisons about cryptocurrencies opinions (which was the trigger of this study), there are indeed studies comparing opinions of users VS nonusers of cryptocurrencies (Voskobojnikov *et al.*, 2020; Xianyi *et al.*, 2016), perceptions of generation Y VS perceptions of generation Z towards Bitcoin (Gafar *et al.*, 2021), attitudes towards cryptocurrencies in Sweden VS Japan (Grassman *et al.*, 2021) and novice smartphone users' perceptions of paying with Bitcoin VS paying with credit/debit cards (Alshamsi and Andras, 2019). To summarize the main results of the extant studies on the topic of perceptions of cryptocurrencies, even if both users and non-users of cryptocurrencies sometimes misunderstand digital currencies and how they work (Voskobojnikov *et al.* 2020; Xianyi *et al.*, 2016), there are more positive sentiments towards cryptocurrencies amongst internet users (Hassan *et al.*, 2021). However, for cryptocurrencies to be accepted as an official form of payment by public administrations, there is still need for a more public configuration of certain aspects of the blockchain (Cagigas *et al.*, 2022). This is also the reason people perceive cards' usability higher than Bitcoin (Alshamsi and Andras, 2019), even if they do believe in cryptocurrencies' potential to be a future payment method (Baur *et al.*, 2015).

Regardless of what people's opinions about cryptocurrencies are, it is also important to note what influences these opinions, attitudes, and perceptions. Most important such factors found in the consulted research papers are subjective norms (Alaklabi and Kang, 2021; Alzahrani and Daim, 2019), security risk, perception of utility, and enjoyment (Alaklabi and Kang, 2021), technology

awareness and social influence (Dabbous *et al.*, 2022), but also, as mentioned in the introduction section, social media posts (Kyriazis *et al.*, 2022; Reis and Pinho, 2021; Gurdgiev and O'Loughlin, 2020; Alghobiri, 2019) and news (Yao *et al.*, 2019).

When exploring the extant literature on people's perceptions of cryptocurrencies, there are two major gaps identified. The first one was also discussed in the introduction section. Comparing people's opinions about cryptocurrencies was approached in the literature, but most studies have done so at a given period of time, by looking at the perceptions of different groups (Treiblmaier and Gorbunov, 2022; Gafar *et al.*, 2021; Grassman *et al.*, 2021; Voskobojnikov *et al.*, 2020; Xianyi *et al.*, 2016). Thus, we believe that there is a need for more studies covering how perceptions of cryptocurrencies can change over time. The second gap identified is that with a few exceptions (Voskobojnikov *et al.*, 2020; Xianyi *et al.*, 2016; Baur *et al.*, 2015), most studies on the topic of perceptions and attitudes towards cryptocurrencies use a quantitative approach, relying on big data like news (Yao *et al.*, 2019), tweets (Hassan *et al.*, 2021; Alghobiri, 2019) and other social media posts (Grassman *et al.*, 2021) to explore this area. This is of course useful, but it might lack a more in-detail exploration of people's feelings, opinions and associations about cryptocurrencies. To fill the gaps identified in the literature, the aim of this study is to qualitatively analyze people's perceptions of cryptocurrencies and to see if and how these can change over a long period of time if comparing expression of these in a more 'optimistic' context (in March 2022, when the cryptocurrencies market was up) and in a more 'pessimistic' one (during August-November 2022, when prices to most cryptocurrencies were down).

2. Data & Methodology

With this being a comparative study, the same methodology as in the study representing the first wave (conducted in March 2022) (Faraonel *et al.*, 2022) was used for the second wave whose results are reported in the next section. Thus, we have opted for the same qualitative approach, using semi-structured interviews to obtain associations students make when thinking about cryptocurrencies, but also other information like how reliable, trustworthy and secure they perceive cryptocurrencies, what is their willingness to invest in such digital assets and how they get information about this topic. To better highlight what questions we asked our respondents, we will reiterate our main objectives below:

O1. To identify differences in respondents' perceptions of cryptocurrency from March 2022 compared to August-November 2022.

To analyze perceptions, the interviews included questions based on the Top of Mind (Donoghue, 2000) and Chinese Portrait (Duszczyk, 2022) qualitative techniques. Hence, for the former technique, respondents were asked what were the first three words that came into their mind when thinking of cryptocurrencies. For the latter technique, they were asked multiple questions regarding association they would have made between cryptocurrencies and things like currencies, gender, age, occupation and nationality (e.g. *If cryptocurrencies were a gender, then what gender would they be?*, *If cryptocurrencies were an occupation, then what occupation would they be?*, *If cryptocurrencies were a nationality, then what nationality would they be?* etc). After applying these two techniques for gathering mental associations subjects make when thinking of cryptocurrencies, our respondents were asked how secure, reliable and trustworthy they perceive these digital currencies on a scale from 1 to 10.

O2. To identify the current willingness to invest in cryptocurrencies given the circumstances of the cryptocurrencies market.

O2a. To identify the main reasons for the current willingness to invest of respondents.

Respondents were also asked questions about their past/future (if applicable) investments in cryptocurrencies and also what their motivations were for investing/not wanting to invest at all/not wanting to invest anymore (if they had invested before and decided to stop).

O3. To identify the main media outlets utilized by respondents as sources of information pertaining to cryptocurrencies.

Finally, respondents were asked how they got information about this topic. If applicable, they were also asked which crypto influencers they were following. Knowing such details was considered useful from a marketing perspective.

While the first wave of our study gathered answers from 98 students, in the second wave, only 79 answers were valid. The sample structure (of the second wave of the study) is presented in Table 1.

Table 1. Sample structure

Category		Wave 1	
		No. of respondents	**Percentage**
Gender	Female	42	53.2%
	Male	33	41.8%
Age	<20	31	39.2%
	21-27	43	54.4%
	28-34	3	3.8%
	35-41	1	1.3%
	>42	1	1.3%

	Economics	71	89.9%
	Geography	1	1.3%
	Letters	2	2.5%
Field of study	Law	1	1.3%
	Psychology	1	1.3%
	Sociopolitical Sciences & Philosophy	1	1.3%
	Technical	1	1.3%
	<500 RON (~100EUR)	24	30.4%
	501-1000 RON (~101-200EUR)	19	24.1%
Monthly income	1001-2000 RON (~201-400EUR)	12	15.2%
	2001-3000 RON (~401-600EUR)	10	12.7%
	>3001 RON (~601EUR)	14	17.7%

Source: own processing

The information was collected through online interviews. For the ease of collecting data and representing it, we asked the respondents to give their answers in a Google Form aiming to gather the words they would associate cryptocurrencies with. In order to interpret our results, we transposed our data into tables in Excel and IBM SPSS Statistics. Even though our study uses qualitative techniques, and it is mainly exploratory research, we decided to highlight the data using quantitative representations, since they are easier to read and comprehend. Descriptive and inferential statistics were also needed in order to make comparisons between the two waves of the study.

3. Findings

Firstly, respondents were asked what are the first three words that come into their mind when they heard the word "cryptocurrency". This top of mind test showed that the majority of subjects think of money (with 24 people mentioning just the word "money", but more mentioning this word in structures like "digital money", "virtual money" and "online money"), Bitcoin (24 mentions) and scam (9 mentions). The most mentioned two words in this wave were also the most mentioned in the first wave. However, in the first wave, the third most mentioned word was "future" (with 14 mentions), followed by "investment", "ETH" (both with 10 mentions) and "scam" (9 mentions) (Faraonel *et al.*, 2022). Instead of "future", in the second wave, the third most mentioned word was "scam" (9 mentions). "Future" was still mentioned by the respondents in the study's second wave, but more rarely (ranking lower in Table 2). A reason for this could be that the price dropouts that took place on the market in the last months made some people reconsider if cryptocurrencies are really "the future". An important observation here is that the second study collected more negative words associated with cryptocurrencies than the first study. Whilst in the first wave, negative associations

to note (the ones mentioned more than once) were "scam" (9 mentions), "risk" (3 mentions), "insecurity" (2 mentions) and "fraud" (2 mentions) (Faraonel *et al.*, 2022), in this wave, the negative words were "scam" (9 mentions), "volatility" (3 mentions), "fraud" (2 mentions), "loss" (2 mentions), "speculation" (2 mentions), "uncertainty" (2 mentions) and "volatile" (2 mentions).

Table 2. Most mentioned words for the Top-of-Mind test in the second wave of the study (words mentioned only once were not included)

Word	Frequency	Percentage (%)
Bitcoin	24	30.38
Money	24	30.38
Scam	9	11.39
Profit	8	10.13
Blockchain	7	8.86
Technology	7	8.86
Investment	6	7.59
Future	5	6.33
Digital	4	5.06
Volatility	3	3.80
Currency	2	2.53
Elon Musk	2	2.53
Ethereum	2	2.53
Fraud	2	2.53
Loss	2	2.53
Online	2	2.53
Payment	2	2.53
Polkadot	2	2.53
Revolut	2	2.53
Speculation	2	2.53
Uncertainty	2	2.53
Virtual money	2	2.53
Volatile	2	2.53

Source: own processing

Moving on to the Chinese Portrait Technique, after this question, respondents were asked what currency they would have associated cryptocurrencies with. Here, as in the first study, most participants associated cryptocurrencies with Bitcoin (23 of them). This was expected because Bitcoin is the first cryptocurrency that appeared on the market, the most popular one (Chan *et al.*, 2017) the most valuable one, and in general, the behavior of Bitcoin dictates the behavior of the whole market (Nepp and Karpeko, 2022). Bitcoin was followed by USD Dollars (with 15 respondents saying they associate cryptocurrencies with dollars) and EURO (11 mentions).

Furthermore, we wanted to know what associations respondents make between cryptocurrencies and gender, age, nationality, and occupation. Answers were again similar to the ones our respondents gave in the first wave of the study. Hence, concerning the gender, cryptocurrencies were rather associated with a man (with 43 of respondents saying that), which could suggest that they are perceived as strong, tough or "down to earth". However, respondents could also have offered this answer because in general, more men invest in cryptocurrencies or are interested in this field (Morning Consult, 2022; Senkardes and Akadur, 2021). Consequently, there were significantly less respondents saying they would have associated cryptocurrencies with a female (only 22 of them). A few people said that they saw neutrality or no gender in cryptocurrencies (6 mentions) or that cryptocurrencies could be both genders (male and female as well) (1 mention). Turning to age, as in March 2022, most answers lay between 18 and 25 years old (as shown in Figure 1). This could imply that market volatility and multiple changes made respondents associate cryptocurrencies with late teenagers, who are considered more unpredictable and more prone to adopt a change in their life. Table 3 shows no massive change between associations with an occupation from the first and the second wave. Most students associated cryptocurrencies with occupations related to the economic/business field. For nationalities, again, as in the first wave, most students (42, which is more than half of them) associated cryptocurrencies with American nationality. This could be because the United States are known for 'moving' the cryptocurrency market through their influencers and/or important personalities like Elon Musk (Ante, 2023; Hussain Shahzad *et al.*, 2022; Huyhn, 2022), Donald Trump (Huyhn, 2021) or through their market regulations.

Figure 1. Respondents' associations between cryptocurrencies and age
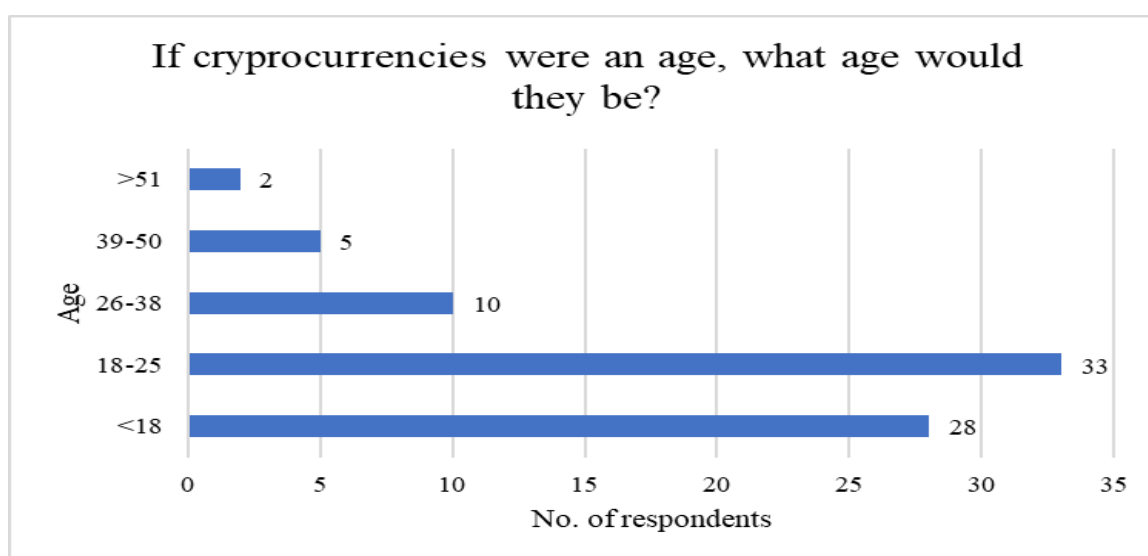
Source: own representation

Table 3. Respondents' associations between cryptocurrencies and occupation (words mentioned just once were not included)

Word	Frequency	Word	Frequency
Business man	6	Banker	8
Trader	4	Investor	5
Investor	4	Freelancer	4
Real estate agent	4	Business man	3
Entrepreneur	3	Broker	2
Politician	2	Entrepreneur	2
Manager	2	Financial analyst	2
Freelancer	2	Lawyer	2
Explorer	2	Teacher	2
Accountant	2		
Banker	2		
Wave1		**Wave2**	

Source: own processing

Top of Mind and Chinese Portrait techniques questions were followed by three questions, asking respondents how reliable, secure, and trustworthy they found cryptocurrencies on a scale from 1 to 10 (with 1 meaning not reliable/secure/trustworthy at all and 10 meaning very reliable/secure/trustworthy). Respondents were explained that by "reliability" we referred to whether cryptocurrencies were reliable over a long period of time and by "trustworthiness" we wanted to know if they were perceiving cryptocurrencies as trustworthy in the moment they were given us the answer. For all the three dimensions, we can notice in Table 4, that the mean is lower with around 1 point for each in the second wave than in the first wave, this implying that the changes on the market could have indeed changed our respondents' minds. However, when running an independent-sample t-test, there was no significant difference in mean between how reliable/secure/trustworthy respondents perceived cryptocurrencies in the first wave and in the second wave (see Table 5).

Table 4. Means of how reliable/secure/trustworthy respondents perceived cryptocurrencies (on a scale from 1 to 10) in the first wave VS in the second wave

	Wave	N	Mean	Std. Deviation	Std. Error Mean
Reliable	1,00	98	6.1633	2.63870	0.26655
	2,00	79	5.0253	2.63592	0.29656
Secure	1,00	98	6.1020	2.74140	0.27692
	2,00	79	5.0000	3.00000	0.33753
Trustworthy	1,00	98	5.7347	2.69613	0.27235
	2,00	79	4.6076	2.77081	0.31174

Source: own processing

Table 5. Differences in means of how reliable/secure/trustworthy respondents perceived cryptocurrencies (on a scale from 1 to 10) (not statistically significant)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Reliable	Equal variances assumed	0.061	0.806	2.853	175	0.005	1.13795	0.39879	0.35089	1.92501
	Equal variances not assumed			2.854	167.189	0.005	1.13795	0.39875	0.35072	1.92518
Secure	Equal variances assumed	0.999	0.319	2.549	175	0.012	1.10204	0.43237	0.24871	1.95538
	Equal variances not assumed			2.524	160.040	0.013	1.10204	0.43659	0.23982	1.96426
Trustwo rthy	Equal variances assumed	0.936	0.335	2.731	175	0.007	1.12710	0.41273	0.31252	1.94167
	Equal variances not assumed			2.723	165.145	0.007	1.12710	0.41395	0.30978	1.94442

Source: own processing

Respondents were also asked if they had ever invested in cryptocurrencies, and 32 out of 79 from the second wave (40,5%) said they had done so. Using this information, we wanted to compare how reliable, secure, and trustworthy respondents perceived cryptocurrencies based on their previous investments in such assets. Whilst concerning reliability, there was no statistically significant difference in how reliable cryptocurrencies are perceived by those who had previously invested in such assets VS by those who had never done so (see Table 6, where Sig value>0.05), concerning security and trustworthiness, we can notice (in Table 7 and Table 8, respectively) that there is a statistically significant difference between how secure/trustworthy cryptocurrencies are perceived by those who had previously invested in these assets VS by those who had not done so before (with a 99% confidence interval for security, where Sig<0.01 and 90% confidence interval for trustworthiness, where Sig<0.10). Thus, those who had previously invested in cryptocurrencies tend to perceive them with 2 points more secure and with 1,18 points more trustworthy (on a scale from 1 to 10) on average than those who had never done so.

Table 6. Differences in levels of reliability of cryptocurrencies as perceived by students who had invested and who had never invested in cryptocurrencies (not statistically significant)

Group Statistics					
previous_investment_in_crypto_wave2		N	Mean	Std. Deviation	Std. Error Mean
Reliable_wave2	No	47	5.17	2.435	0.355
	Yes	32	5.44	2.341	0.414

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Reliable_wave2	Equal variances assumed	0.654	0.421	-0.486	77	0.628	-0.267	0.549	-1.361	0.827
	Equal variances not assumed			-0.490	68.452	0.626	-0.267	0.545	-1.355	0.821

Source: own processing

Table 7. Differences in levels of security of cryptocurrencies as perceived by students who had invested and who had never invested in cryptocurrencies (statistically significant with a 99% confidence interval)

Group Statistics				
previous_investment_in_crypto_wave2		N	Mean	Std. Deviation	Std. Error Mean
Secure_wave2	No	47	4.1915	2.48157	0.36197
	Yes	32	6.1875	3.32573	0.58791

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Secure_wave2	Equal variances assumed	8.449	0.005	-3.054	77	0.003	-1.99601	0.65356	-3.29741	-0.69461
	Equal variances not assumed			-2.891	53.752	0.006	-1.99601	0.69041	-3.38034	-0.61168

Source: own processing

Table 8. Differences in levels of trustworthiness of cryptocurrencies as perceived by students who had invested and who had never invested in cryptocurrencies (statistically significant with a 90% confidence interval)

Group Statistics				
previous_investment_in_crypto_wave2		N	Mean	Std. Deviation	Std. Error Mean
Trustworthy_wave2	No	47	4.1277	2.53340	0.36953
	Yes	32	5.3125	2.98855	0.52831

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Trustworthy_wave2	Equal variances assumed	3.016	0.086	-1.897	77	0.062	-1.18484	0.62472	-2.42881	0.05913
	Equal variances not assumed			-1.838	59.204	0.071	-1.18484	0.64472	-2.47483	0.10515

Source: own processing

Regardless of their previous investments in cryptocurrency, respondents were asked if they were willing to (re)invest in such digital assets. Even if our subjects tended in general to find cryptocurrencies less reliable, secure, and trustworthy than in the first wave, more than half of them (60,8%) said they would (re)invest a certain amount of money in such assets. This was also the case in the first wave, when around 68,4% of respondents said that they would have (re)invested in cryptocurrencies. Thus, although the prices on the market have dropped significantly between the two waves, we can only see an 8% decrease in willingness to (re)invest in cryptocurrencies. Table 9 shows a comparison between the results.

Table 9. Willingness to (re)invest in cryptocurrencies (in RON) of respondents from the second wave (left) compared to willingness to (re)invest in the first wave (right)

	Willingness to invest in RON wave 2		Willingness to invest in RON wave 1	
	Frequency	Percent	Frequency	Percent
Not willing to invest	31	39.2	31	31.6
less than 100 RON	18	22.8	23	23.5
101-500 RON	18	22.8	16	16.3
501-1000 RON	6	7.6	14	14.3
more than 1000 RON	6	7.6	14	14.3
Total	79	100.0	98	100.0

Source: own processing

The current willingness to invest in cryptocurrencies did not seem associated with previous investment in cryptocurrencies (as our Chi Square test in Table 10 suggests no relationship between these two), but we found a statistically significant difference in how secure/trustworthy respondents perceived cryptocurrencies based on the amount they were willing to invest in these assets (not applicable for how reliable they perceived them). Hence, Table 11 shows no statistically significant difference in how reliable respondents perceived cryptocurrencies based on their willingness to invest in these assets. However, Table 12 shows statistically significant differences between the means of perceived security of respondents not wanting to invest at all in cryptocurrencies and those willing to invest larger amounts of money (more than 500 RON, which is approximately 100 EUR). Thus, on average, on a scale from 1 to 10, those not willing to invest at all in cryptocurrencies perceive them 4,82 less secure than those who want to invest more than 1000 RON (approximately 200 EUR) and 3,82 less secure than those willing to invest 501-1000 RON (approximately 101-200 EUR). This suggests that the more secure people perceive cryptocurrencies, the larger the amount they are willing to invest. The same stands for how trustworthy people perceive cryptocurrencies. Hence, as shown in Table 13 those not willing to invest at all in cryptocurrencies perceive them, on average, on a scale

from 1 to 10, 5,13 less trustworthy than those who want to invest more than 1000 RON (approximately 200 EUR), 4,13 less trustworthy than those willing to invest 501-1000 RON (approximately 101-200 EUR) and 2,07 less trustworthy than those willing to invest no more than 100 RON (approximately 20 EUR). In addition, those willing to invest a small amount (101-500 RON, which equals approximately 21-100 EUR) in cryptocurrencies perceive them, on average, on a scale from 1 to 10, with 3,38 less trustworthy than those willing to invest more than 1000 RON (approximately 20 EUR) (which is a larger amount of money).

Table 10. Association between previous investment in cryptocurrencies and the current willingness to invest in these assets (not statistically significant)

previous_investment_in_crypto_wave2 * Willingness_to_invest_atm_wave2 Crosstabulation			Willingness_to_invest_atm_wave2		Total
			Yes	No	
previous_investment_in_crypto_wave2	No	Count	27	20	47
		Expected Count	28.6	18.4	47.0
	Yes	Count	21	11	32
		Expected Count	19.4	12.6	32.0
	Total	Count	48	31	79
		Expected Count	48.0	31.0	79.0

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.534[a]	1	0.465		
Continuity Correction[b]	0.246	1	0.620		
Likelihood Ratio	0.537	1	0.464		
Fisher's Exact Test				0.492	0.311
Linear-by-Linear Association	0.527	1	0.468		
N of Valid Cases	79				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 12,56.
b. Computed only for a 2x2 table

Source: own processing

Table 11. Differences in how reliable respondents perceived cryptocurrencies based on their willingness to invest in these assets (not statistically significant)

ANOVA					
Reliable_wave2					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.336	4	1.334	0.225	0.924
Within Groups	438.538	74	5.926		
Total	443.873	78			

Source: own processing

Table 12. Differences in how secure respondents perceived cryptocurrencies based on their willingness to invest in these assets (statistically significant)

ANOVA					
Secure_wave2					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	165.948	4	41.487	5.727	0.000
Within Groups	536.052	74	7.244		
Total	702.000	78			

Multiple Comparisons

Dependent Variable: Secure_wave2
Tukey HSD

(I) Willingness_to_invest_atm_wave2_inRON		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Not willing to invest	less than 100 RON	-1.48925	0.79757	0.344	-3.7194	0.7409
	101-500 RON	-1.43369	0.79757	0.383	-3.6638	0.7965
	501-1000 RON	-3,82258*	1.20042	0.018	-7.1792	-0.4660
	more than 1000 RON	-4,82258*	1.20042	0.001	-8.1792	-1.4660
less than 100 RON	Not willing to invest	1.48925	0.79757	0.344	-0.7409	3.7194
	101-500 RON	0.05556	0.89715	1.000	-2.4530	2.5642
	501-1000 RON	-2.33333	1.26877	0.359	-5.8810	1.2144
	more than 1000 RON	-3.33333	1.26877	0.076	-6.8810	0.2144
101-500 RON	Not willing to invest	1.43369	0.79757	0.383	-0.7965	3.6638
	less than 100 RON	-0.05556	0.89715	1.000	-2.5642	2.4530
	501-1000 RON	-2.38889	1.26877	0.336	-5.9366	1.1588
	more than 1000 RON	-3.38889	1.26877	0.068	-6.9366	0.1588
501-1000 RON	Not willing to invest	3,82258*	1.20042	0.018	0.4660	7.1792
	less than 100 RON	2.33333	1.26877	0.359	-1.2144	5.8810
	101-500 RON	2.38889	1.26877	0.336	-1.1588	5.9366
	more than 1000 RON	-1.00000	1.55391	0.967	-5.3450	3.3450
more than 1000 RON	Not willing to invest	4,82258*	1.20042	0.001	1.4660	8.1792
	less than 100 RON	3.33333	1.26877	0.076	-0.2144	6.8810
	101-500 RON	3.38889	1.26877	0.068	-0.1588	6.9366
	501-1000 RON	1.00000	1.55391	0.967	-3.3450	5.3450

*. The mean difference is significant at the 0.05 level.

Source: own processing

Table 13. Differences in how trustworthy respondents perceived cryptocurrencies based on their willingness to invest in these assets (statistically significant)

ANOVA					
Trustworthy_wave2					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	197.312	4	49.328	9.091	0.000
Within Groups	401.523	74	5.426		
Total	598.835	78			

Multiple Comparisons

Dependent Variable: Trustworthy_wave2
Tukey HSD

(I) Willingness_to_invest_atm_wave2_inRON		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Not willing to invest	less than 100 RON	-2,07885*	0.69027	0.028	-4.0090	-0.1487
	101-500 RON	-1.74552	0.69027	0.095	-3.6756	0.1846
	501-1000 RON	-4,13441*	1.03892	0.001	-7.0394	-1.2294
	more than 1000 RON	-5,13441*	1.03892	0.000	-8.0394	-2.2294
less than 100 RON	Not willing to invest	2,07885*	0.69027	0.028	0.1487	4.0090
	101-500 RON	0.33333	0.77646	0.993	-1.8378	2.5044
	501-1000 RON	-2.05556	1.09808	0.341	-5.1260	1.0149
	more than 1000 RON	-3.05556	1.09808	0.052	-6.1260	0.0149
101-500 RON	Not willing to invest	1.74552	0.69027	0.095	-0.1846	3.6756
	less than 100 RON	-0.33333	0.77646	0.993	-2.5044	1.8378
	501-1000 RON	-2.38889	1.09808	0.200	-5.4593	0.6815
	more than 1000 RON	-3,38889*	1.09808	0.023	-6.4593	-0.3185
501-1000 RON	Not willing to invest	4,13441*	1.03892	0.001	1.2294	7.0394
	less than 100 RON	2.05556	1.09808	0.341	-1.0149	5.1260
	101-500 RON	2.38889	1.09808	0.200	-0.6815	5.4593
	more than 1000 RON	-1.00000	1.34487	0.945	-4.7605	2.7605
more than 1000 RON	Not willing to invest	5,13441*	1.03892	0.000	2.2294	8.0394
	less than 100 RON	3.05556	1.09808	0.052	-0.0149	6.1260
	101-500 RON	3,38889*	1.09808	0.023	0.3185	6.4593
	501-1000 RON	1.00000	1.34487	0.945	-2.7605	4.7605
*. The mean difference is significant at the 0.05 level.						

Source: own processing

We have also explored reasons people have for investing in cryptocurrencies, for not investing at all in cryptocurrencies or for not wanting to invest anymore in such assets. When asked about reasons for currently investing in cryptocurrencies, the majority of respondents that reported to do so (8 out of 14) said that investing in cryptocurrencies did not offer them an additional income at the moment of the interview, but that they believed it could have done so in the future. This supports the results of previous studies discovering that the most encouraging factor for investing in cryptocurrencies is the rapid increase in cryptocurrencies value (Smutny *et al.*, 2021), which suggests that a major motivation for investing in these assets is an expected (rapid) profit. However, our finding also contradicts other studies which discovered that profit expectancy is not always a motivational factor when investing in cryptocurrencies. People do it also because they support Bitcoin technology (Mattke *et al.*, 2021).

Concerning reasons for not investing at all, out of 48 respondents, 30 mentioned that they did not have enough knowledge about it, 25 that they did not have enough money for investing, 23 that

they were not sure about how secure/trustworthy the crypto market was, and 18 that they did not trust crypto market at all. The most frequent answer (not having enough knowledge about it) highlights the complexity of blockchain technology and supports the affirmation of Treiblmaier and Gorbunov (2022) who state that in general, just a few people are really aware of how the cryptocurrencies work.

Regarding reasons for stopping cryptocurrencies investments, most of the respondents (9 out of 18) reported that they had lost money. However, this contradicts previous research, which discovered that a negative experience with investment in cryptocurrency constitutes the most minor barrier, while the biggest one is the lack of experience with investment in general (Smutny *et al.*, 2021) (which was frequently mentioned by our respondents too).

We have also asked our respondents where they got information about cryptocurrencies from. Data shown in Figure 2 indicates that participants were interested in obtaining information about cryptocurrencies despite the market conditions.

Figure 2. Main sources of information about cryptocurrencies
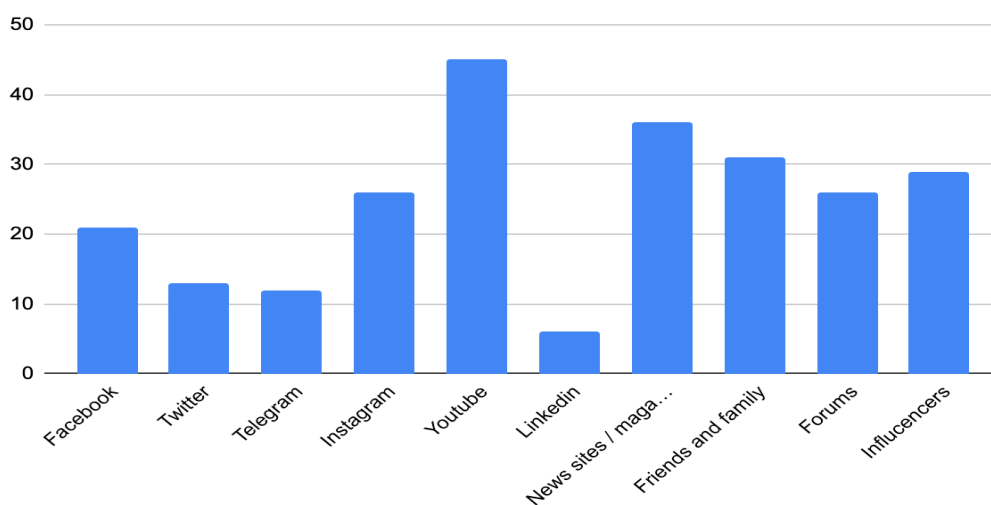
Source: own representation

Respondents' most prevalent sources of information were YouTube and news sites/magazines. This suggests that the participants may have been seeking more general information about the technology and the innovations behind cryptocurrencies rather than focusing solely on their current market value. Social media platforms, such as Facebook, Instagram, and Twitter, were also identified as popular sources of information. This indicates that the participants may have been exposed to much information about cryptocurrencies through their friends and family, who may have shared articles, posts, or videos about the topic. Telegram, Forums, and Influencers were also

mentioned. This suggests that the participants may have been seeking more specialized or niche information about cryptocurrencies, such as trading strategies, technical analysis, or expert opinions from others in the field. LinkedIn was the least popular source of information. This may be because LinkedIn is more of a professional networking platform and less focused on general news and discussion, which may be less relevant to the participants' interests in cryptocurrencies. To summarize, the data indicates that participants were interested in obtaining a wide range of information about cryptocurrencies, from general information to more specialized and niche topics. As in the first study (Faraonel *et al.*, 2022), social media platforms seemed to play a huge role in the cryptocurrencies space. These findings can aid in identifying new ways to communicate with the audience interested in cryptocurrencies, depending on the types of information they seek.

Based on our previous study (Faraonel *et al.*, 2022), we also assumed that the respondents followed cryptocurrency influencers and asked them what influencers exactly they followed (if applicable). Interestingly, most respondents mentioned that they did not follow any crypto influencer (38 respondents, which represents 48,1% of the total respondents). This may indicate that they are not actively seeking information or advice from influencers in the cryptocurrency space and may have their own methods for researching and understanding the cryptocurrency market. However, if we compare the data with our previous study (Faraonel *et al.*, 2022), when only 20 respondents said that they did not follow any crypto influencer (which represented 20,4% of the total respondents) we can see that the Romanian students are more drawn back by the idea of following any influencer in a bear market than in a bull market.

Elon Musk was the most popular influencer among the respondents who said they did follow at least one crypto influencer (with 31 mentions). Following Elon Musk may happen due to his well-known reputation as an entrepreneur and his recent involvement in the cryptocurrency space, especially by his tweets about Dogecoin, which caused a significant increase in its value (Ante, 2023). The second most popular influencer amongst our respondents was Cristian Chifoi (mentioned 17 times), which may indicate that Romanian students are interested in influencers who provide market analysis and investment advice. George Buhnici and CryptoRo are also popular among the students. This could be due to their expertise in the crypto market and their ability to provide valuable insights in the Romanian language. Changpeng (CZ) Zhao, Pomp (APompliano), The Wolf of all Streets, The Crypto Dog, Coin Bureau, Barry Silbert, BitBoy and Daniel Mihai were also mentioned, but they are less popular amongst our respondents.

4. Discussions

O1. To identify differences in respondents' perceptions of cryptocurrency from March 2022 compared to August-November 2022.

To tackle our first objective, perceptions of cryptocurrencies did change from some points of view from March 2022 until August-November 2022. Most respondents still thought of money and Bitcoin when hearing the word cryptocurrency (with these two words being the most mentioned words in both studies), but the second wave of the study registered more negative associations than the first one (gathering associations like 'scam', 'fraud', 'loss' or 'volatility'). One of the reasons for it could be the drastic changes in the cryptocurrency market during the summer. Another significant change worth mentioning is the drop of 1 point in the mean of the answers in how secure, reliable and trustworthy respondents felt cryptocurrencies. Here, respondents who have previously invested in cryptocurrencies tend to perceive them more secure and trustworthy than those who have never done so.

Besides all the changes that have happened during the time between the two studies, there are some characteristics and perceptions that did not change. The constant associations respondents made with cryptocurrencies were young (for associations with age), which indicates volatility, man (for associations with gender), which indicates strength, American (for associations with nationality) and economic/business field (for associations with occupations).

O2. To identify the current willingness to invest in cryptocurrencies given the circumstances of the cryptocurrencies market.

When exploring our respondents' willingness to invest in cryptocurrencies, we have noticed only an 8% decrease in willingness to (re)invest in cryptocurrencies from March 2022 to August-November 2022. A worth mentioning fact (and also worth exploring in future research) is that those who perceive cryptocurrencies as more secure and trustworthy, could be more likely to invest larger amounts of money in these assets.

O2a. To identify the main reasons for the current willingness to invest of respondents.

Concerning reasons for investing/not investing at all or stopping cryptocurrency investments, our findings did both support and contradict previous studies. Most of the respondents who were investors reported that they did not get a regular income from their investments, but they thought they could have done so in the future. This suggested that they were expecting a certain profit, supporting the view of Smutny *et al.* (2021), who identified that the most encouraging factor for investing in cryptocurrencies is the rapid increase in cryptocurrencies value (which can lead to a rapid profit). At the same time, our finding contradicted other studies which discovered that profit expectancy is not

always a motivational factor when investing in cryptocurrencies since people do it also because they support Bitcoin technology (Mattke *et al.*, 2021).

The most frequent answer for not investing at all in cryptocurrencies was not having enough knowledge about it, which highlights the complexity of blockchain technology spotted by Treiblmaier and Gorbunov (2022) who state that in general, just a few people are completely aware of how the cryptocurrencies work. Our finding also supports the view of Smutny *et al.* (2021), who found that the lack of experience with investments is a major deterrent in investments.

Regarding reasons for stopping cryptocurrencies investments, most of the respondents reported that they had lost money. However, this contradicts previous research, since a negative experience with investment in cryptocurrency constitutes the most minor barrier in investing, while the biggest one is the lack of experience with investment in general (Smutny *et al.*, 2021).

O3. To identify the main media outlets utilized by respondents as sources of information pertaining to cryptocurrencies.

We observed that there were no big differences between the media channels used by respondents to get information about cryptocurrencies in March 2022 compared to August 2022. The most used media channel in both studies was YouTube, but our respondents mentioned multiple and various sources of information (especially social media platforms). This suggests that participants seemed interested in obtaining a wide range of information about cryptocurrencies, from general information to more specialized and niche topics, but also supports the importance of social media in gathering information (in general and about cryptocurrencies). Our findings could aid in identifying key opinion leaders and influencers in the crypto space and could be useful for crypto-related businesses when targeting their marketing efforts. One interesting fact is that Telegram was not mentioned that much in this wave (and neither in the first wave), even if it is considered 'the ultimate hub' for communication and information for cryptocurrencies (Melinek, 2022).

Conclusions, limitations of the study and future research directions

In conclusion, even if the summer of 2022 brought significant changes to the cryptocurrency market, perceptions of cryptocurrencies did not change that much. Indeed, respondents tended to associate cryptocurrencies with more negative words like 'scam', 'fraud' or 'loss'. However, their willingness to invest in such assets was not vanished by these perceptions. Our respondents seemed to wish to 'try their luck' with cryptocurrencies, stating that they would invest (most of them) small amounts of money in cryptocurrencies.

By this qualitative approach aiming to explore opinions, attitudes and perceptions Romanian students have towards cryptocurrencies, this paper significantly contributes to academic knowledge about cryptocurrencies in multiple ways. First of all, using students as respondents offers a better understanding of how the new generation perceives the new technology of cryptocurrencies, especially because this generation is known to be more open to new technologies and also more likely to adopt and use them, as they are considered "tech-savvy" (Ramgade and Kumar, 2021, p. 338). Also, studies have found that current owners of cryptocurrency are significantly younger than those who have never owned any (Steinmetz *et al.*, 2021). Secondly, knowing this generations' perceptions of cryptocurrencies is significantly useful for exploring, understanding, and even predicting trends in the cryptocurrencies market. Youngsters are known to spend a lot of time on social media (Ramgade and Kumar, 2021) and they sometimes share their thoughts on social networks (Georgescu and Popescul, 2018). They also use social networks as a medium to get information from, as discovered in our study but also in previous research (Hamid *et al.*, 2016; Westerman *et al.*, 2014). Since the cryptocurrencies market is strongly influenced by social media (Ante, 2023; Kyriazis *et al.*, 2022; Ortu *et al.*, 2022), knowing what people who spend more time on social networks think of cryptocurrencies becomes valuable for traders and researchers in this field as well. Such information is also useful from a herding-behavior perspective since the cryptocurrencies market is characterized by such behaviors (de Souza *et al.*, 2020). Finally, we believe that our research can also be useful for regulators of the cryptocurrencies market, as it is important for them to know what people think of cryptocurrencies, with a focus on what risks they perceive and reasons for investing/not investing at all/not investing anymore.

This study has limitations too. The main limitation was also mentioned in the introduction section, and it is that we cannot be sure that the results of the first study differ from the results of the second study only due to changes in the cryptocurrencies market. The long period of time passed between the two waves of the study could be marked by other events making respondents change their opinions (discussions with friends/relatives, encountering financial gains/difficulties etc). However, we still believe that knowing students' perceptions of cryptocurrencies is valuable, even if through this study it cannot be said exactly what are the factors making people have these opinions. To fill this gap, further research could explore motivations people have when expressing an opinion towards cryptocurrencies, since the current study only asked respondents what the reasons were for investing/not investing in cryptocurrencies but did not ask the respondents to elaborate on why they make certain associations or why they perceive cryptocurrencies in a certain way.

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