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FOREWORD

Dear readers,
with pleasure we are presenting our new issue of the Journal of Accounting and Management.

After the *International Scientific and Professional Conference Accounting and Management* organized by the Association “**Croatian Accountant**” and the **RRiF College of Financial Management, Zagreb** our Journal has been enriched by the papers presented at the Conference but also with the papers directly submitted to the Journal.

Also, in this issue you can find news regarding the Erasmus + project Economics of Sustainability that RRiF College of Financial Management participated in along with partners that consisted of higher education institutions from Poland (Uniwersytet Ekonomiczny w Katowicach as project leader, Lithuania (Vilniaus Kolegija), Slovenia (Univerza v Mariboru), Italy (Universita Degli Studi di Firenze) and The Republic of North Macedonia (Integrated Business Faculty PU). The project Economics of Sustainability (EOS) was designed to address core sustainability issues which have been playing an increasingly important part in today’s business activity, individuals’ lives and have immense potential in contributing to the future development of the world.

As always, all the papers were blindly peer-reviewed, requiring the acceptance by two independent reviewers to be published in this Journal.

During each issue, and with every new day, our efforts to promote our profession are getting stronger including our commitment to strive for excellence. We hope that the knowledge presented in this Journal is useful to scholars, students and all the other interested parties.

We thank all the authors, co-authors and reviewers and invite you to use your input to contribute to our joint work.

Editor-in-Chief

Đurđica Jurić, PhD, College Professor

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Original Scientific Paper

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FINANCIAL SUCCESS OF SUBSIDIZED COMPANIES BY SIZE IN THE PERIOD 2005-2015

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ABSTRACT:

The interdependence of state subsidies and financial results of companies is still under-research category. Therefore, the subject of research in this paper is to examine the impact of state subsidies on the financial performance of companies in the Republic of Croatia in the period from 2005 to 2015 according to size. In previous research, the variable of company size is often the focus of scientific research, as well as performance (Berger and Udell., 1995; Boeri and Bellmann, 1995), but research models mainly refer to the survival of companies in relation to size. In this paper, the intention is to investigate the impact of state subsidies on the performance of companies according to their size, and the economic measures of the performance of the observed companies were selected.

The sample for estimating the parameters of the linear regression consists mainly of companies that received at least one incentive from the state in the observed period and submitted annual financial reports for all years covered by the analysis (balanced panel). For the control group, a stratified sample of companies was selected that are like companies that received state subsidies in terms of size of assets, number of employees, activity, and size. In this way, it will be possible to assess whether there are significant impacts on the performance of subsidized observed companies compared to non-subsidized companies.

The research showed that subsidies had a relatively significant impact on all companies, but with different intensity.

Keywords: *state subsidies, financial performance of the business, size of enterprise*

1. INTRODUCTION

State subsidies as part of the industrial policy of each country, among other things, have the intention of encouraging the efficiency of encouraged companies or economic branches, and thus the overall economy and employment. However, little is known about whether state aid really affects the financial performance of supported companies. From the review of recent scientific literature, it can be concluded that the authors often research certain variables of the success of companies of that size, which will be discussed in more detail later in this paper. Therefore, there remains a large research space, and the intention of this work is to examine the impact of state subsidies on the success of business operations by size in the period from 2005 to 2015 through several selected indicators.

The performance of subsidized companies according to their size is observed in the mentioned period for two reasons. First, in 2005, a register of annual financial statements was established¹.

Second, the observed period ends in 2015 to avoid a structural break in the data due to the amended Accounting Act² and the new classification of entrepreneurs by size. The new Act brought harmonization with European rules and entrepreneurs are classified into micro, small, medium, and large entrepreneurs depending on the indicators on the last day of the business year preceding the year for which the financial statements are drawn up. The criteria for classification remained unchanged: total assets, net income (instead of total income³) and the number of employees, whereby satisfaction of two of the three criteria is observed:

- micro-entrepreneurs: all entrepreneurs with assets up to HRK 2.6 million, net income up to HRK 5.2 million and an average number of employees up to or equal to 10.
- small entrepreneurs: entrepreneurs who do not exceed two of the following three conditions: total assets up to HRK 30 million, net income HRK 60 million, and the average number of employees up to or equal to 50.
- medium-sized entrepreneurs: entrepreneurs who do not exceed two of the following three conditions: total assets of HRK 150 million, net income of HRK 300 million, and the average number of employees up to or equal to 250.
- large entrepreneurs: entrepreneurs who meet two of the above three conditions and banks, housing savings banks, leasing companies, insurance companies and other financial institutions.

¹ Register of annual financial statements lead by Financial Agency in the name and for account of the Ministry of finance.

² Narodne Novine 78/15

³ Technically it's just a new name.

As already mentioned, in the subject research, the economic measures of business performance of the observed companies were selected: profit/loss and net profit margin as measures of profitability, the amount of income that reflects the market position of the company, and indicators of economy, liquidity, indebtedness, asset turnover and asset profitability (Zelenika and Toković, 2000). Since employment goals should have a significant place in the adoption of the economic and social policy of each state, it is to be expected that state subsidies to subsidized companies affect the creation of more significant employment, and therefore this indicator was also taken into consideration.

A working hypothesis was put forward: Revenues from state subsidies affect the financial performance of companies according to their size in the observed period.

As every business entity has for goal also and business motive - successful business, based on this hypothesis, the goal is to investigate the impact of the received subsidies amount on the success of the company's business according to the size of the company. Since there is no cohesive knowledge in the field of performance measurement⁴, this paper considers the economic evaluation of performance through selected parameters. In general, in the economic literature, the following economic measures of business success are considered: labor productivity, economy, profitability, accumulation capacity and reproductive capacity of the company⁵.

When talking about the success of the business, the main criteria are usually the level of income and profit. While the amount of revenue reflects the market position of the company, profit is a measure of profitability. Indicators of economy, profitability and investment are considered indicators of business success. In addition, as state subsidies are intended to stimulate economic growth and employment, the aim is to investigate the impact of subsidies on employment in subsidized companies.

As already mentioned, in previous research, the variables of company size and performance are frequent subjects of scientific research (Berger and Udell., 1995; Boeri and Bellmann, 1995), but research models mainly refer to company survival in relation to size. Many authors compared the performance of companies according to their size and determined how the size of the company affects their performance. According to a group of authors (Mata and associates, 1995), company size measured by the number of employees affects the probability of company survival. As a rule, larger companies are in a better position than small ones because they have better tax conditions and can

⁴ It is researched in different areas, and different approaches to performance measurement would lead to different definitions of performance measurement systems (Performance Measurement System – PMS).

⁵ Zelenika, R., K. Toković, Indicator of the success and stability of operations in transport company, *Hrvatska gospodarska revija*, 2000

attract a more qualified workforce. Smaller companies face more financial restrictions in capital growth, which can affect their ability to survive in certain critical moments Kovačević and Vuković (2006). However, there are also studies that have investigated the negative relationship between company size and survival (Mata and associates, 1995). According to these studies, smaller companies may have an advantage over large ones in terms of low general costs and the smaller resources needed to maintain operations. The age of the company is also an important component.

In terms of financial success, the scope of works is much wider. For example, Girma, Gorg and Wagner (2009) investigate the impact of subsidies on exports to manufacturing companies in West and East Germany and conclude that subsidies do not have a strong impact on exports. Their observations are correlated with the results of research by the authors Bernard and Jensen (2004), who investigated the impact of subsidies for export promotion at the state level in the USA and came to similar observations that subsidies do not have a significant impact on the export of companies.

In contrast, Volpe Martincus and Carballo (2009) and Helmers and Trofimenko (2009) find some positive effects of export subsidies for firms in Peru and Colombia. Furthermore, Bergstrom (1998) examines the effects of capital subsidies on the productivity of companies in Sweden, Beason and Weinstein (1996) and Lee (1996) use aggregated data with the aim of obtaining additional information on the effects of government intervention through subsidies. To study the effects of Swedish industrial policy, they collected data on subsidized and non-subsidized manufacturing firms in the period 1987 to 1993. By comparing the mentioned companies and by evaluating the production functions where they control various factors that could affect productivity, they investigate whether there are differences in productivity between companies in the years after the subsidies were granted and they concluded that there is no significant impact. Nickell and Nicolitasas (1999) observed, in addition to productivity, the increase in employment and wages, as well as the indebtedness of British companies. They found that subsidies have a positive effect, but a small effect on TFP.

One group of authors was more concerned with sectoral analyses. For example, Šimović (2008) analysed the relationship between regional aid in relation to sectoral aid and concluded that regional aid is less bad than sectoral aid, although both types significantly disrupt economic relations. Blauburger (2007) studied sector subsidies in Poland, the Czech Republic and Slovakia, and in his conclusions he apostrophes that in 2004, Poland received a negative assessment from the European Commission due to the granting of subsidies to large shipyards that were required to be restructured, and the Czech Republic due to the restructuring of the banking sector.

From a summary review of the most important recent scientific literature, it can be concluded that the authors investigated only certain performance variables and based on the set hypothesis in this paper the aim is to investigate the impact of granted subsidies on the financial performance of companies according to size through several selected indicators.

2. SAMPLE AND RESEARCH METHODOLOGY

The data used in this research are secondary and were collected from the register of annual financial statements⁶, which consists of information at the level of individual companies. Thus, the sample for estimating the parameters of the linear regression consists of companies, corporate taxpayers, who received at least one incentive from the state in the observed period and submitted annual financial reports for all the years included in the analysis (balanced panel).

For the control group, a stratified sample of companies was selected that are like companies that received state subsidies in terms of size of assets, number of employees, activities, and company size. In this way, it will be possible to assess whether there are significant impacts on the performance of the observed companies compared to non-subsidized companies.

Entrepreneurs who belong to special groups of entrepreneurs and whose received subsidies many times exceed the subsidies of other entrepreneurs such as Zagrebački holding, HŽ, HRT are excluded from the balanced panel for regression purposes. In the purpose of proving the main hypothesis, a research sample was defined, and the R software package was used for data processing.

The data used in the analyses have a panel data structure. They are determined by two dimensions, one of which is the identification code of the entrepreneur (ID), and the other is time: the year of the financial report (GOD).

A balanced panel was used in the analyses, which ensures the analysis of entrepreneurs who have business continuity in the observed period, which covers about 34 percent of observations (about 49 percent of subsidized companies). Thus, the sample for estimating the parameters of the linear regression consists primarily of entrepreneurs who received at least one incentive from the state in the observed period (2005-2015) and submitted annual financial reports for all the years covered by the analysis.

Since the regression analysis assesses the impact of income from state subsidies (support) on financial results, the key auxiliary variable is the indicator of whether the entrepreneur received at least one state support in the observed period or not: INCENTIVE. If the entrepreneur in the period 2005-2015 received state support at least once, the variable INCENTIVE=1, otherwise it is

⁶ Source: database from register of annual financial statements lead by Financial Agency.

0. The INCENTIVE indicator is applied at the level of the entrepreneur for all annual reports in the database.

Two main independent variables were selected that best describe the observed phenomena, that is the impact of subsidies on the financial success of companies according to their size in the observed period: POTPORE.LOG (income from subsidies in the current year) and pot.u.aktivi.w⁷ (share of income from subsidies in to the total assets of the company), and as an "auxiliary variable" POTPORE_U_PRIH (subsidies in total revenues) and POTICAJ=1, a dummy variable that shows whether the company received a subsidy in a certain year (1) or not (0).

The variables income from subsidies in the current year (POTPORE.LOG) and the share of income from subsidies in the total assets of the company (pot.u.aktivi.w) are by nature in some way related to the amount of subsidies. It can even be considered that the amount of the company's total assets does not change intensively and is only a constant that represents the size of the company. On the other hand, the subsidy variable in total revenues (POTP_U_PRIH-w) is quite volatile and says two things: whether the company "lives" only on subsidies (high ratio) or subsidies are insignificant with respect to total revenue. This is precisely the reason that this independent variable was combined in the multivariate analysis with the amount of subsidies (POTPORE.LOG) and with the share of subsidies in assets (potp.u.aktivi.w)⁸.

The existence of dependence of some of the measures that measure the success or failure of the business on received state subsidies is examined using linear regression, and the method of least squares (OLS - Ordinary Least Square) was used in the research.

Finding the coefficients of the model rests on the assumptions that enable solving the mathematical problem. The first assumption is the homogeneity of the model parameters, which implies that $\alpha_{it} = \alpha$ for all i and t , which is also true for $\beta_{it} = \beta$. The resulting panel model $y_{it} = \alpha + \beta T_{xit} + u_{it}$ is a standard linear panel model (pooled OLS). By finding a linear panel regression model, it is proven first of all whether there is a dependence between measures of business efficiency and received state subsidies. The results of the model (estimators and their signs, significance tests (p-values), coefficient of determination (R²), adjusted coefficient of determination (Adjusted R²), estimated standard errors of regression (Std. Error of Estimate)) also give the answer as to whether incentives and business results significantly positively or negatively correlated and

⁷ According to the formula = income from subsidies (SUPPORTS)/total assets (ASSETS)

⁸ For example, HRK 100.000 of subsidies in absolute amount will not have the same effect on a company with assets of 100.000.000 HRK as on a company with assets of 10.000 HRK. The same 100.000 HRK does not have the same effect if the company has a total income of HRK 100.000.000 pr if it has a total income (including subsidies) 110.000 HRK, regardless of the size of the assets.

to what extent the model explains errors in estimation. Regression analyses were made on two samples: on balanced panel data that includes all entrepreneurs, regardless of the status of incentives received (INCENTIVE =0;1) and on balanced panel data that includes only entrepreneurs who received an incentive in the observed period (INCENTIVE=1).

This is precisely the reason that the amount of subsidies is viewed in relations to assets and in relation to activity.

Dependent and independent variables were transformed by limiting 2% of atypical variable values to both tails of the distribution: to the 1. percentile in the lower tail of the distribution and to the 99. percentile in the upper tail of the distribution. By limiting atypical values to the n-th percentile, a better adaptation of the regression parameters to the distribution and representativeness of the regression is achieved, since atypical values (outliers) in that case, whose values can be several times higher than the main distribution, will not affect the slope of the regression line as it could be the case that they are not limited.

The data analysis started by checking the form of distribution, frequency and distribution of the results and continued with a descriptive statistical analysis of the data set in order to determine the movement of the values of the observed variables.

2.1. DISTRIBUTION OF ENTREPRENEURS BY SIZE

If the distribution of entrepreneurs according to size is observed, the entire database contains 1.047.588 observations (entrepreneur-year), while subsidized entrepreneurs in the balanced panel make up to almost a third of the total number of entrepreneurs from the balanced panel (30,7 percent).

As the balanced panel includes only entrepreneurs who submitted all annual financial reports in the period from year 2005-2015, their number is therefore always the same by age (42.596).

Table 1: Number of companies in the database and balanced panel

sample	without subsidies	subsidized	total
cijela baza	830.013	217.575	1.047.588
2005	58.860	15.735	74.595
2006	63.987	17.502	81.489
2007	69.935	18.736	88.671
2008	74.612	19.575	94.187
2009	77.731	20.113	97.844
2010	80.546	20.752	101.298

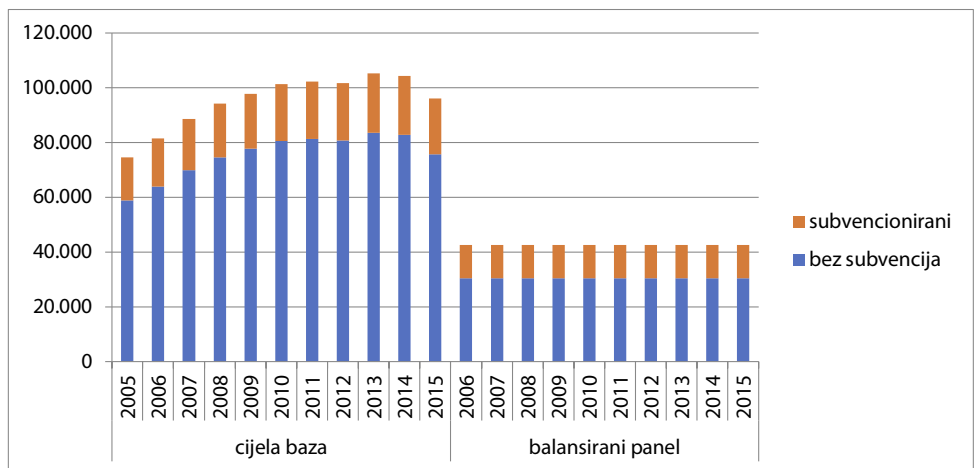
sample	without subsidies	subsidized	total
2011	81.388	20.930	102.318
2012	80.782	20.831	101.613
2013	83.530	21.686	105.216
2014	82.851	21.391	104.242
2015	75.791	20.324	96.115
balanced panel	304.640	121.320	425.960
2006.	30.464	12.132	42.596
2007	30.464	12.132	42.596
2008	30.464	12.132	42.596
2009	30.464	12.132	42.596
2010	30.464	12.132	42.596
2011	30.464	12.132	42.596
2012	30.464	12.132	42.596
2013	30.464	12.132	42.596
2014	30.464	12.132	42.596
2015	30.464	12.132	42.596

Source: work of the author

In the balanced data panel, the year of coverage was corrected (2005 to 2006) in order to satisfy the condition that all observed entrepreneurs in the panel submitted annual financial reports, which was not the case for 2005.

The distributions of subsidized and non-subsidized entrepreneurs in the entire base and in the balanced panel are shown in Figure 1.

Figure 1: Companies distribution



Source: work of the author

Table 2: Companies distribution by size

Number of entrepreneurs	Without incentives	With incentives	Total sum
Whole base	797.617	210.717	1.008.334
Small	786.900	199.861	986.761
Medium	8.245	8.315	16.560
Large	2.472	2.541	5.013
Bp	234.620	103.710	338.330
Small	228.639	96.475	325.114
Medium	4.560	5.599	10.159
Large	1.421	1.636	3.057
Total sum	1.032.237	314.427	1.346.664

Source: work of the author

Observing the distribution of companies by size in the balanced panel, as well as for all companies (entire database), it is clear that in both panels subsidized small entrepreneurs are the most represented (Table 2). The distribution of entrepreneurs by size in the balanced panel shows that out of a total of 338.330 entrepreneurs, small entrepreneurs make up (325.114) 69,3 percent, and 28,5 percent of small entrepreneurs in the balanced panel received subsidies. Medium-sized entrepreneurs participate with (10.159) 3 percent, and 55,1 percent received subsidies. The representation of large entrepreneurs is (3.057) 0,9 percent, and 53,5 percent received subsidies.

However, in relative terms, over 50 percent of medium-sized and large companies received subsidies⁹, while small companies accounted for a one fifth of companies.

The following shows the distribution of the values of the dependent and independent variables that were taken into consideration.

⁹ The listed categories include companies from the shipbuilding, transport, and agriculture sectors.

Table 3. Distribution of the values of the dependant and independent variables

Sample	Variable	Average	St. dev.	Minimum	q1	q25	Median	q75	q99	Maximum	N	N.miss
bp	DOBUB.LOG	8,07	5,05	0,00	0,00	4,20	9,74	11,75	15,91	21,69	338.330	0
bp	KOEF_TEK_LIK.w	5,78	22,41	0,00	0,02	0,78	1,37	2,82	187,85	187,85	338.330	0
bp	KOEF_ZADUZ.w	0,93	2,61	0,00	0,01	0,35	0,65	0,91	8,19	40,10	338.330	0
bp	KOEF_EKON_POSL.w	105,26	45,25	0,00	0,27	100,10	102,36	109,71	315,79	435,82	338.330	0
bp	KOEF_RENT_IMO.w	0,01	0,49	-7,33	-1,41	0,00	0,02	0,10	0,76	0,83	338.330	0
bp	KOEF_OBRT_IMO.w	1,68	1,92	0,00	0,00	0,57	1,23	2,10	10,40	15,84	338.330	0
bp	KOEF_NETO_MARZA.w	-19,01	200,16	-2.865,60	-368,52	0,00	0,02	0,07	0,59	0,74	338.330	0
bp	ZAP_SATI.w	9,99	21,79	0,00	0,00	1,00	3,00	8,00	123,00	123,00	338.330	0
bp	NOVA_VR.LOG	11,36	4,36	0,00	0,00	11,02	12,45	13,76	17,43	22,26	338.330	0
bp	DOB_X_ZAP.LOG	8,43	6,42	0,00	0,00	0,00	10,33	13,36	20,44	30,46	338.330	0
the whole base	DOBUB.LOG	6,24	5,35	0,00	0,00	0,00	8,18	10,84	15,18	21,70	1.008.334	0
the whole base	KOEF_TEK_LIK	159,00	54.197,34	-0,09	0,00	0,54	1,12	2,32	187,85	52.102.740,00	1.008.334	18.365
the whole base	KOEF_ZADUZ	1.447,54	205.041,08	0,00	0,00	0,41	0,78	1,00	40,10	128.658.200,00	1.008.334	638
the whole base	KOEF_EKON_POSL	181,81	22.696,23	0,00	0,00	79,58	101,11	107,69	435,82	21.277.500,00	1.008.334	10.001
the whole base	KOEF_RENT_IMO	-225,43	111.097,10	-39.244.500,00	-7,33	-0,05	0,01	0,07	0,83	57.271.830,00	1.008.334	638
the whole base	KOEF_OBRT_IMO	446,03	108.583,32	0,00	0,00	0,20	1,00	2,03	15,84	60.151.500,00	1.008.334	638
the whole base	KOEF_NETO_MARZA	-499,29	176.848,59	-169.572.300,00	-2.865,60	-0,13	0,01	0,06	0,74	1.305,15	1.008.334	55.256
Sample	Variable	Average	St. dev.	Minimum	q1	q25	Median	q75	q99	Maximum	N	N.miss
the whole base	ZAP_SATI	9,34	104,37	0,00	0,00	0,00	1,0	4,0	123,0	14.687,00	1.008.334	0
the whole base	NOVA_VR.LOG	9,05	5,57	0,00	0,00	0,00	11,42	12,96	16,68	22,26	1.008.334	0
the whole base	DOB_X_ZAP.LOG	6,00	6,34	0,00	0,00	0,00	5,19	11,74	18,92	30,46	1.008.334	0
incentives	POTPORE.LOG	3,25	5,03	0,00	0,00	0,00	0,00	8,92	14,63	21,60	210.717	0
incentives	pot.u.aktivni	7,79	1.790,72	0,00	0,00	0,00	0,00	0,00	1,85	617.927,00	210.717	8
incentives	TROS_PLACA_REL	0,34	0,27	0,00	0,00	0,12	0,29	0,54	0,98	1,00	210.717	0
incentives	MAT_TROS.LOG	12,32	3,44	0,00	0,00	10,92	12,70	14,43	18,41	23,21	210.717	0
incentives	POTP_U_PRIH	0,09	16,78	0,00	0,00	0,00	0,00	0,00	0,95	7.500,00	210.717	0
incentives	INVESTILOG	4,98	5,97	0,00	0,00	0,00	0,00	11,12	16,47	22,13	210.717	0
incentives	IZVOZ.LOG	8,62	6,79	0,00	0,00	0,00	11,99	14,23	18,27	23,27	210.717	0

Source: work of the author

For the purposes of analysis, on a balanced panel of data, models were tested for 11 dependent variables¹⁰ that represent the data set and whose changes are monitored in relation to the set hypothesis:

- ZAP_SATI.w – number of employees based on working hours
- ZAP_SATI.wd – increase in the number of employees based on working hours compared to the previous year
- NOVA_VR.LOG – newly created value
- DOBGUB.LOG – profit/loss of the period
- DOB_X_ZAP.LOG – period profit x number of employees based on working hours
- KOEF_NETO_MARZA.w – net profit margin
- KOEF_OBRT_IMO.w – coefficient of turnover of total assets
- KOEF_TEK_LIKV.w – coefficient of current liquidity,
- KOEF_ZADUZ.w – debt ratio
- KOEF_EKON_POSL.w – business efficiency coefficient
- KOEF_RENT_IMO.w – coefficient of profitability of total net assets¹¹.

Furthermore, independent variables were selected, for variables that are manipulated and whose influence on the measured phenomenon is monitored. In doing so, two main versions of each model were made: using as independent variables POTPORE.LOG (income from subsidies in the current year), or pot.u.aktivi.w (share of income from subsidies in the total assets of the entrepreneur¹²), in combination with other independent variables:

- TROS_PLACA:REL – relative staff costs
- MAT_TROS.LOG – material costs
- POTP_U_PRIH – subsidies in company income
- INVEST.LOG – investments
- EXPORT.LOG – export.

2.2. CORRELATION AND UNIVARIANT ANALYSIS

Correlation analysis was used to verify the level of statistical connection between the impact of subsidies on the financial results of entrepreneurs on a balanced panel of entrepreneurs and the mutual correlation of independent variables as well as independent and dependent variables. The mutual correla-

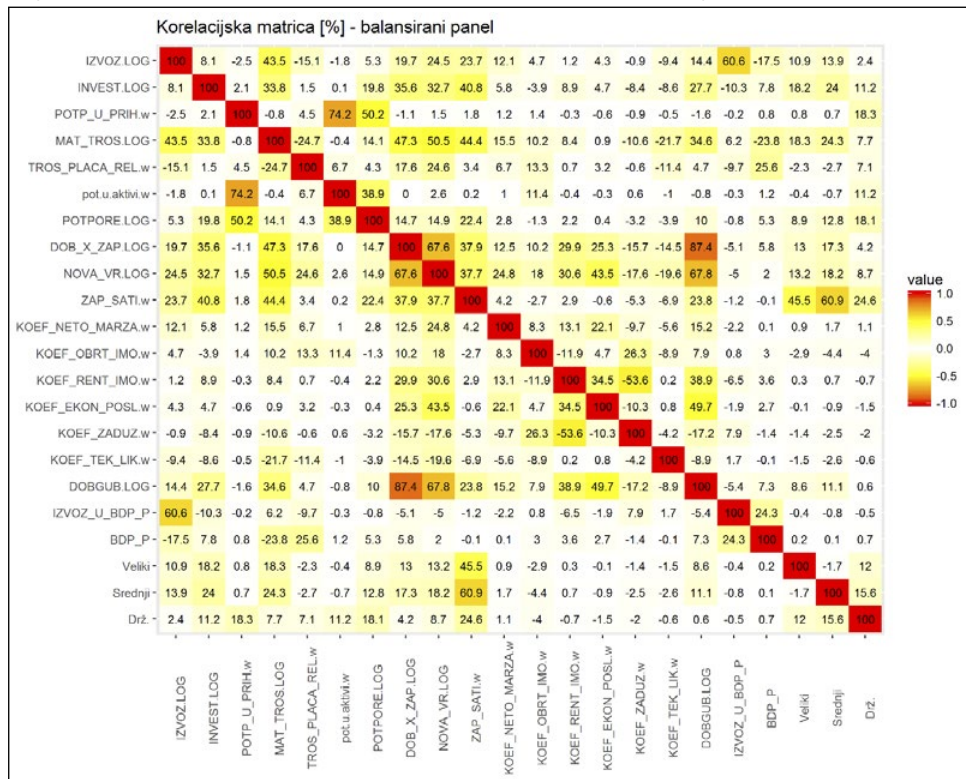
¹⁰ Values 1. and 99. percentile were used to limit atypical values of the variables. The entire base of entrepreneurs was used for the dependent variables, and the distribution of entrepreneurs who received at least one state subsidy in the observed period from 2005. to 2015. was used for the independent variables, and the way and reasons for limiting atypical values are described in chapter 4.4.1 Limiting atypical values of variables.

¹¹ The selected dependent variables are in accordance with the economic measures of business performance of the company (Zelenika and Toković, 2000.) and set hypotheses.

¹² According to the formula = revenues from subsidies (SUPPORT) / total assets (ASSETS)

tions of the variables are shown in the form of a thermal map that shows their correlations on a balanced panel using a colour scale.

Figure 2: Correlation matrix of used variables (in percentages) – balanced panel



Source: work of the author

Correlation analysis on a balanced panel of data revealed that the variables DOBGUB.LOG (profit/loss of the period), ZAP_SATI.w (number of employees based on working hours) and DOB_X_ZAP.LOG (profit/loss of the period x number of employees based on working hours) have the highest correlation coefficients as expected, given that the variable DOB_X_ZAP.LOG = log (DOBGUB * ZAP_SATI.w). Although their correlation coefficient is above 80 percent, the variables are not used in the same models, so there is no risk of multicollinearity.

DOBGUB.LOG (period profit/loss) and NOVA_VR.LOG (newly created value) have a high correlation coefficient, the value of which exceeds 60 percent, but they are also variables from the dependent side of the regression equation in different models. The other variables were not correlated to the extent that there would be a risk of a significant influence of the multicollinearity effect on the regression results.

2.3. PRESENTATION OF TOTAL TURNOVER AND RECEIVED SUBSIDIES ACCORDING TO THE SIZE OF THE COMPANY

Given that company revenues are gross inflows of economic benefits during the period that result from the regular activities of entrepreneurs and result in an increase in capital, total revenues and received subsidies were analysed according to the size of the entrepreneur in the observed period. The intention was to determine the share of state subsidies in the total income of entrepreneurs by size in absolute amounts.

Table 4: Income from state subsidies in total income

Years	SMALL		MEDIUM		LARGE		TOTAL	
	Total income (000 kn)	Support (000 kn)	Total income (000 kn)	Support (000 kn)	Total income (000 kn)	Support (000 kn)	Total income (000 kn)	Support (000 kn)
2006	24.388.953	650.444	24.989.792	494.473	56.303.410	1.064.715	105.682.155	2.209.632
2007	22.546.212	696.038	22.958.094	496.134	61.882.476	1.254.301	107.386.782	2.446.473
2008	18.275.453	748.021	19.373.949	722.869	60.758.731	1.618.016	98.408.133	3.088.907
2009	12.954.490	718.531	15.591.502	615.953	43.045.348	1.562.970	71.591.340	2.897.454
2010	14.482.815	722.514	17.590.589	622.268	41.566.697	1.288.751	73.640.101	2.633.533
2011	15.324.723	738.510	18.799.066	633.761	45.770.505	1.260.865	79.894.295	2.633.136
2012	13.837.930	657.099	16.643.579	627.068	46.086.196	1.321.259	76.567.705	2.605.427
2013	14.411.151	1.702.080	15.857.244	517.216	46.837.157	1.574.216	77.105.552	3.793.512
2014	14.837.157	636.228	16.763.010	476.501	41.151.195	1.396.781	72.751.361	2.509.510
2015	15.528.442	670.594	17.938.903	551.664	42.537.374	1.286.644	76.004.719	2.508.902
Total sum	166.587.327	7.940.058	186.505.729	5.757.908	485.939.089	13.628.519	839.032.145	27.326.485

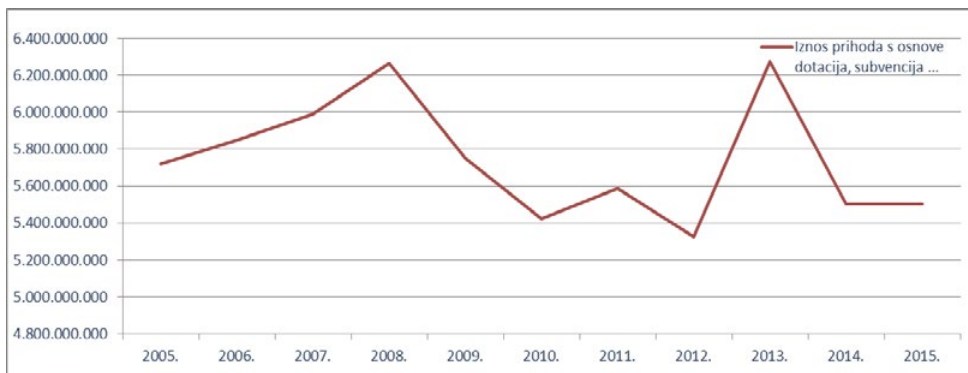
Source: work of the author

From the data presented, it is clear that large companies received the most subsidies in absolute terms (HRK 13,6 million) in the observed period. They are followed by small (HRK 7,9 million) and medium-sized companies (HRK 5,7 million). In the observed period, in 2008, large entrepreneurs received the largest amount of subsidies (HRK 1.6 million), as well as medium-sized enterprises (HRK 722 million), while in 2013, small entrepreneurs received HRK 14,4 million in subsidies.

If the share of state subsidies in the total income of entrepreneurs is observed by size in absolute amounts in the observed period, then the situation is different. The share of subsidies in total revenues is the highest among small companies and amounts to 4,8 percent, followed by medium-sized companies with 3,1 percent and large companies with 2,8 percent, which is expected considering the structure of the total revenue generated by entrepreneurs by size.

If we look at the average amount of subsidies granted per entrepreneur, that average was the highest in 2009 (HRK 1,43 million), and the year 2008 stands out for the average amount of subsidies granted, with the amount of 1,32 million kuna per entrepreneur. The reason is high sectoral subsidies, especially to the transport, shipbuilding, and HRT sectors¹³. The lowest average amount of subsidies per entrepreneur was awarded in 2015 (HRK 757.000), which corresponds to the amount awarded in 2006, when it amounted to HRK 760,000, and is the result of the implementation of the state aid policy guidelines of the Republic of Croatia¹⁴.

Chart 1: Income of entrepreneurs from subsidies in the observed period



Source: Financial Agency, Register of annual financial statements

Below is a regression analysis of the impact of subsidies on the business performance of entrepreneurs according to size on a balanced panel.

3. RESULTS OF THE ANALYSIS OF THE INFLUENCE OF INCOME FROM STATE SUBSIDIES ON THE FINANCIAL SUCCESS OF THE COMPANY BY SIZE

The significance of the regression coefficients at the level greater than 99,9 percent (p-value < 0.1 percent) for the dependent variables and models included in the rest of the analyses (based on the results of univariate and multivariate analysis) are:

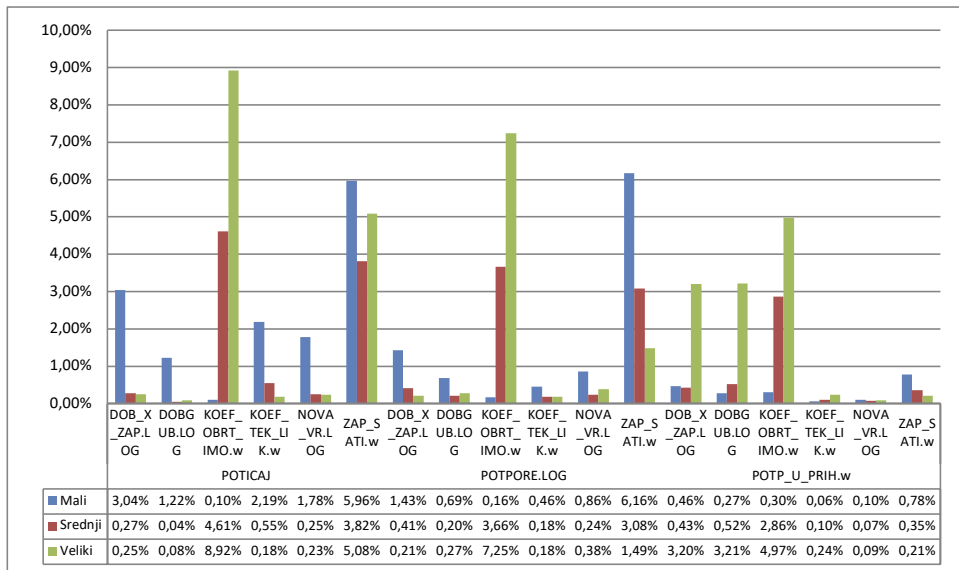
DOB_X_ZAP.LOG (profit/loss of the period x number of employees based on working hours)

¹³ http://www.aztn.hr/uploads/documents/mediji_o_nama/Industrijska_politika_i_dravne_potpore_u_Hrvatskoj.pdf (pristupljeno 2. 10. 2018.)

¹⁴ Government of the Republic of Croatia (2015). Decision on enactment of state aid policy guidelines for the period 2015.-2017., Zagreb. Available at <http://www.mfin.hr/adminmax/docs/Smjernice%20politike%20drzavnih%20potpora%202015.%20-%20201799.%20-%20NN%20147-14.pdf>.

DOBGUB.LOG (profit/loss of the period)
 KOEF_OBRT_IMO.w (turnover coefficient of total assets)
 KOEF_TEK_LIK.w (coefficient of current liquidity)
 NEW_VR.LOG (newly created value)
 ZAP_SATI.w (number of employees based on working hours).
 independent variable POTPORE.LOG

Chart 2: Presentation of the relative influence of subsidies on business success according to the size of the entrepreneur (sample: bp.vel.w.z)



Source: work of the author

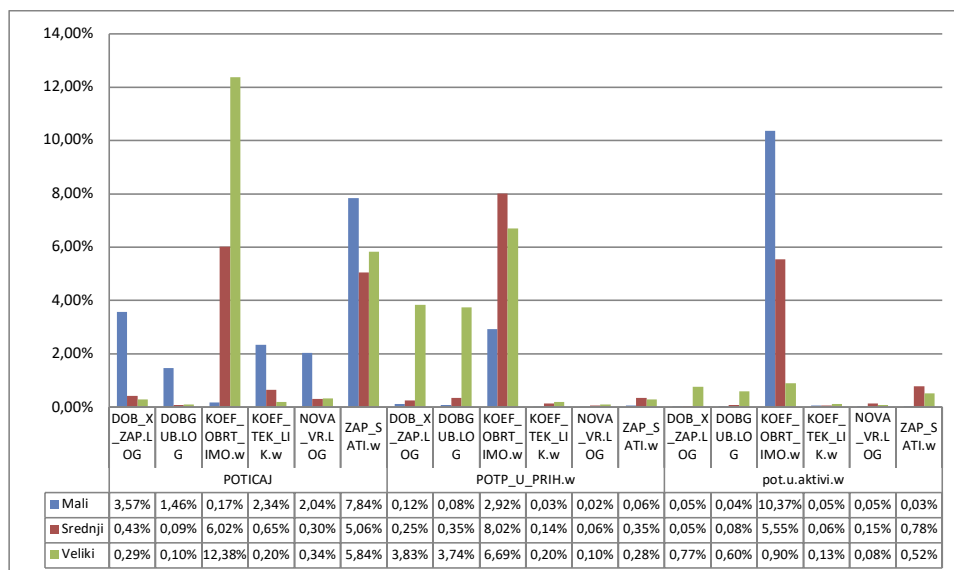
It can be concluded that the relative influence of subsidies is most pronounced among large entrepreneurs, and this is based on the indicators of the asset turnover ratio (7,25 percent) and the number of employees based on working hours (ZAP_SATI.w; 1,49 percent). The very fact that they received subsidies (INCENTIVE variable) had a significant impact on these variables (for example: for the asset turnover ratio it is 8,92 percent), and for small entrepreneurs on the profit/loss variable for the period (1,22 percent).

The influence of the auxiliary independent variable POTP_U_PRIH is also significant. Next are medium-sized and small entrepreneurs. For medium-sized enterprises, the relative impact of subsidies is on the same indicators as for large enterprises, but with a lower relative intensity. In the case of small entrepreneurs, the relative impact of subsidies had the greatest impact on the number of employees based on working hours (variable ZAP_SATI.w is 6,16 percent).

independent variable pot.in.asset.w

Chart 3 shows the relative influence of the second independent variable - support in assets on the success of entrepreneurs according to size on a balanced panel. It shows that subsidies in assets had the greatest impact on the asset turnover ratio of small (10,37 percent) and medium-sized entrepreneurs (5,55 percent), as well as the auxiliary independent variable POTP_U_PRIH.w.

Chart 3: Presentation of the relative influence of the independent variable pot.u.aktivi.w on business success according to the size of the entrepreneur (sample: bp.vel.w.z)



Source: work of the author

From the summary presentation of the main variables of the model and their influence on the dependent variables according to the size of the entrepreneur, several observations can be made.

The relative influence of subsidies (POTPORE.LOG) is most pronounced on the dependent variables asset turnover ratio (7,25 percent) in large companies and the number of employees based on working hours (variable ZAP_SATI.w – 6,2 percent) in small entrepreneurs, followed by medium-sized entrepreneurs with 3,1 percent.

On the other hand, the relative influence of the independent variable subt. aktivi.w is most pronounced for the asset turnover ratio of small entrepreneurs (10,4 percent), followed by medium-sized entrepreneurs with 5,5 percent and large entrepreneurs with 0,9 percent.

However, if the auxiliary independent variables POTP_U_PRIH.w (subsidies in total income) and INCENTIVE (that they received subsidies) are also observed, then their relative influence on the dependent variable asset turnover coefficient is different on both terms according to size of the entrepreneur, and on significance.

For example, the most pronounced relative influence of the variable INCENTIVE (that they received subsidies) on the turnover ratio of total assets is for large entrepreneurs (12,4 percent), medium-sized entrepreneurs 6,0 percent, and for small entrepreneurs the relative influence is only 0,2 percent.

On the other hand, the relative influence of the independent variable POTP_U_PRIH.w (subsidies in total revenues) on the dependent variable asset turnover ratio is most pronounced in medium-sized enterprises (8,0 percent), followed by large enterprises with 6,7 percent and small enterprises with 2, 9 percent.

It can be concluded that the income from subsidies as well as the participation of subsidies in assets have a relatively significant positive impact on the activity of entrepreneurs expressed by the asset turnover ratio, but at the same time a higher share of subsidies in the total income of entrepreneurs indicates a weaker activity of the entrepreneur (reduces the asset turnover ratio), which points to the conclusion that the greater the dependence of a company's business on subsidies, the worse the business results are.

Given that the asset turnover ratio is one of the indicators of the efficiency of entrepreneurs and shows how much one monetary unit of assets generates monetary units of income, it is expected that the turnover ratio for both models is most pronounced in large entrepreneurs. It indicates a faster turnover of funds in large companies, which means that they financed the same volume of business with smaller amounts of working capital.

A relatively significant positive impact they have on employment as well as the absolute amounts of received subsidies, which leads to the conclusion that subsidies affect employment, but not in those companies where subsidies are in a high share of total revenues. A high positive correlation with the number of employees, while at the same time a negligible impact on the increase in the number of employees shows that larger amounts of subsidies were received by companies with a larger number of employees (Buneta, 2020).

Similar observations can be made for the variable realized profit/loss of the period.

Table 5: Multivariant analysis – a summary of the influence of the independent variables on explaining the variance of dependant variables expressed by relative contributions in the adjusted coefficient of determination and the sign of the regression coefficient

Relative impact			Independent variable (sign estimators)				
Dependant variable	Model ord.no.	r2	POTPORE.LOG	pot.u. aktivi.w	POTICAJ	POTP_U_PRIH.w	Total sum
ZAP_SATI.w	8.1	31,83%	8,10% (+)		3,71% (+)	0,77% (-)	12,58%
	8.2	30,66%		0,04% (-)	5,19% (+)	0,07% (+)	5,31%
DOB_X_ZAP.LOG	10.1	43,79%	1,77% (+)		3,10% (+)	0,48% (-)	5,35%
	10.2	43,70%		0,05% (-)	3,68% (+)	0,12% (-)	3,85%
NOVA_VR.LOG	9.1	61,14%	1,17% (+)		1,93% (+)	0,11% (-)	3,22%
	9.2	61,09%		0,04% (-)	2,25% (+)	0,02% (+)	2,32%
DOBGUB.LOG	1.1	44,03%	0,83% (+)		1,30% (+)	0,30% (-)	2,43%
	1.2	43,98%		0,04% (-)	1,56% (+)	0,09% (-)	1,69%
KOEF_TEK_LIK.w	2.1	8,35%	0,52% (+)		2,31% (-)	0,06% (-)	2,89%
	2.2	8,34%		0,05% (+)	2,45% (-)	0,03% (-)	2,53%
KOEF_OBRT_IMO.w	6.1	13,31%	0,44% (-)		0,09% (-)	0,33% (+)	0,87%
	6.2	15,10%		10,84% (+)	0,21% (-)	3,12% (-)	14,17%
KOEF_NETO_MARZA.w	7.1	9,33%	0,21% (-)		0,85% (+)	0,12% (+)	1,17%
	7.2	9,34%		0,09% (+)	0,88% (+)	0,16% (+)	1,13%
KOEF_ZADUZ.w	3.1	34,81%	0,07% (+)		0,14% (-)	0,02% (-)	0,24%
	3.2	34,82%		0,06% (-)	0,16% (-)	0,03% (+)	0,25%
KOEF_RENT_IMO.w	5.1	37,49%	0,03% (-)		0,08% (+)	0,01% (-)	0,12%
	5.2	37,49%		0,02% (+)	0,09% (+)	0,02% (-)	0,13%
KOEF_EKON_POSL.w	4.1	16,84%	0,01% (+)		0,03% (-)	0,03% (-)	0,07%
	4.2	16,85%		0,02% (-)	0,03% (-)	0,02% (+)	0,07%
ZAP_SATI.w.d	11.1	0,86%	10,22% (+)		0,98% (-)	0,87% (-)	12,07%
	11.2	0,79%		0,52% (-)	0,66% (+)	0,14% (-)	1,32%

Source: work of the author

Several important observations can be made from the summary of the multivariate analysis (Table 5), for example from the summary of the influence of the independent variables on explaining the variance of the dependent variables expressed by the relative contribution in the adjusted coefficient of determination and the sign of the regression coefficient:

First, companies with a higher proportion of subsidies in total revenues are less active and efficient, and the criteria for achieving efficiency are economy and profitability. How is it in market economies, the basic criterion for achieving efficiency is profitability, that means that if the profitability rate is satisfactory, the company operates efficiently. However, as it is the share of subsidies in total revenues is most pronounced in large and medium-sized enterprises and they are predominantly state-owned, the obtained observations are expected (saving jobs and "losers"). Furthermore, subsidies to entrepreneurs show a relatively significant positive impact on the profitability of entrepreneurs (profit/loss of the period, newly created value and on profit * employees), as well as the impact of their relative amount on activities, which directly proves the hypothesis¹⁵.

The share of *subsidies in assets* has a positive effect on activity (larger share of subsidies in assets increases the asset turnover ratio) of the entrepreneur, but at the same time a higher share subsidy in business income points to weaker activity of entrepreneurs (reduces asset turnover ratio).

Negative effect (negative sign of the estimator) of the subsidy allocation indicator to entrepreneur (INCENTIVE variable, "cleaned" of the influence of absolute and/or relative amount of subsidies) to the indicator of liquidity of the entrepreneur (KOEFLIKV.w) refers to the fact that subsidies were requested and received primarily by entrepreneurs with lower liquidity.

Subsidies did not have a significant impact on other indicators of the company's operations. Still, the relative coefficients of determination for subsidies are not dominant in relation to the effects of other business inputs to the financial operations of entrepreneurs, so it cannot be claimed that subsidies have a significant positive effect on the operations of the entire economic sector of companies, but they are only marginal. The reasons for this lie in the relatively low share of subsidy in total income (< 1 %) and a small number of entrepreneurs to whom subsidies are granted (< 10 %).

4. CONCLUSION

Examining the impact of income from state subsidies on the financial results of companies, corporate profit taxpayer, according to size, is still insufficiently researched. The assumption is that such a situation is the result of difficult access to comprehensive data on state aid and subsidies, which are maintained in various databases and in accordance with different methodologies. Besides that, the so-called AOP positions in the annual financial state-

¹⁵ The results are consistent with the research of Leibenstein (1966) i Bergstrom (1998), who also concluded that the absolute amount of subsidies has the greatest effect on increasing profitability.

ments combine data on subsidies, grants and state aid and are used as such in this research, which is a kind of limitation of this work. In one position are synthesized data on subsidies, grants, and state aid without the possibility of analytical presentation.

Given that the conducted research is based on the annual financial statements of observed entrepreneurs and calculated financial ratios with the inclusion of selected macroeconomic variables from the environment (in one of the models) in order to determine the impact of the environment on the financial results of subsidized entrepreneurs, this is at the same time an advantage and disadvantage in this research. An advantage because research based solely on financial ratios is generally criticized for ignoring the impact of the environment in which companies operate. The disadvantage is because the introduction of variables that depict the macroeconomic environment in the economy has shortcomings, such as, for example, the lack of data on sectoral GDP that would adequately reflect the macroeconomic movement of GDP in certain economic activities.

For the purposes of the research, indicator variables were also created, for example binomial variables whose values take on two states: 0 or 1 depending on whether the reference condition is met or not. As the conceptual part of the research is based on regression analysis on a balanced panel, in which the variables are classified according to their role in the regression analysis, by adding indicator and macroeconomic variables to the regression, the stability of the regression coefficients of the independent variables was tested. The influence of indicator and macroeconomic variables was examined on a balanced panel, while only a set of models for dependent variables was used for the analysis by company size because they showed a higher degree of correlation with independent variables based on subsidies.

As a summary of the conducted research, it is possible to state that the formed statistical models confirmed the research hypothesis of the connection of the influence of subsidies on the financial performance of entrepreneurs according to size.

Analysis of the impact of subsidies on the performance of companies on a balanced panel of entrepreneurs according to size showed that subsidies had the greatest relative impact on the asset turnover ratio of large companies, as well as subsidies in assets, and on the ratio of current liquidity and profit * employed. In the case of medium-sized companies, the relative impact of subsidies on the asset turnover ratio and the number of employees based on working hours is also the greatest. In the case of small entrepreneurs, the biggest relative impact of subsidies is on the number of employees, newly created value, and the coefficient of current liquidity. The influence of the auxiliary in-

dependent variable of subsidy in total income (POTP_U_PRIH) is also extremely significant on the coefficient of current liquidity, which points to a relatively significant contribution of subsidies in the total income of small entrepreneurs to their liquidity.

The research also showed that the share of subsidies in the total income of the entrepreneur is correlated with the size of the entrepreneur. The share of subsidies in total income is the highest among small companies, followed by medium-sized and large companies, which is expected considering the structure of the total income generated by entrepreneurs according to size.

One of the recommendations for future research, given the lack of research of the financial performance of subsidized companies through multiple indicators and company size, would be to examine the aforementioned interrelationship with other statistical methods in order to compare the obtained results and thus the knowledge itself.

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FINANCIJSKA USPJEŠNOST SUBVENCIONIRANIH PODUZEĆA PREMA VELIČINI U RAZDOBLJU 2005. – 2015. GODINE

SAŽETAK RADA

Međuovisnost državnih subvencija i financijskih rezultata poduzeća još uvijek su nedovoljno istražena kategorija. Stoga je predmet istraživanja u ovom radu ispitati utjecaj državnih subvencija na financijsku uspješnost poduzeća u Republici Hrvatskoj u razdoblju od 2005. do 2015. godine prema veličini. U dosadašnjim istraživanjima varijabla veličina poduzeća je često u fokusu znanstvenog istraživanja kao i uspješnost (Berger i Udell, 1995; Boeri i Bellmann, 1995), ali istraživački modeli uglavnom se odnose na preživljavanje poduzeća u odnosu na veličinu. U ovom radu je intencija istražiti utjecaj državnih subvencija na uspješnost poslovanja poduzeća prema veličini, a odabrana su ekonomska mjerila uspješnosti poslovanja promatranih poduzeća. Uzorak za procjenu parametara linearne regresije čine u provom redu poduzeća koja su u promatranom vremenskom razdoblju primila barem jedan poticaj od države i predali godišnja financijska izvješća za sve analizom obuhvaćene godine (balansirani panel). Za kontrolnu skupinu odabran je stratificirani uzorak poduzeća koja su slična poduzećima koja su primila državne subvencije po veličini aktive, broju zaposlenih, djelatnosti i veličini. Na taj način bit će moguće procijeniti postoje li signifikantni utjecaji na uspješnost poslovanja subvencioniranih promatranih poduzeća u odnosu na nesubvencionirana poduzeća. Istraživanje je pokazalo da subvencije imale relativno značajan utjecaj kod svih poduzeća, ali različitog intenziteta.

Ključne riječi: državne subvencije, financijska uspješnost poslovanja, veličina poduzeća

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PERSPECTIVES OF FINANCING STARTUPS IN CROATIA WITH RISK CAPITAL

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ABSTRACT:

In the Republic of Croatia, the necessary legal framework has been adopted that defines the rules for establishing and investing of Venture capital (VC) and Private equity (PE) funds. PE&VC funds provide the necessary financing for startups in the form of long-term equity, in order to enable their growth, development and business success. VC funds invest in startups in the phase of early growth / development and expansion, while PE funds invest in the equity of other companies regardless of the stage of growth / development of the companies in which they research. A survey by the consulting company PwC from 2020 showed that almost 90% of startups have been operating for five years or less and have up to ten employees, which indicates that the startup ecosystem in Croatia is still in the early development phase. A total of 62% of surveyed startups received an investment for the development of their business, and 50% of them generate income. In order to ensure adequate sources of financing for the growth of entrepreneurial activities, the European Investment Fund (EIF) together with HBOR launched several initiatives for the development of the venture capital market, which resulted in an increase in the number of PEVC funds in Croatia and their increased investments in Croatian startups in recent years. PEVC funds invested approximately EUR 126 million in the Croatian startup ecosystem in 2020, which represented an increase of 54% compared to 2019. It was also encouraging that more than 50% of funds were invested in the development and expansion phase of startups (growth phase). It is expected that the establishment of PEVC combined with increased activity of foreign PEVC funds in Croatia, will contribute to further growth of the PEVC market in 2021 and that it can justifiably be expected 30 to 50 new inves-

tments in Croatian startups. Successful examples of Croatian “unicorn” startups, such as Infobip & Rimac Automobili, whose value exceeds one billion USD, confirm this.

Key words: *Startups, Venture Capital (VC), Private Equity (PE), Risk capital, the European Investment Fund (EIF); the Croatian Bank for Reconstruction and Development (HBOR).*

1. LEGAL DEFINITION OF VENTURE CAPITAL IN THE REPUBLIC OF CROATIA

The provisions of the Alternative Investment Funds Act (ZAIF, 2018) prescribe the conditions for the establishment and operation of alternative investment funds (hereinafter: AIF) and alternative investment fund management companies (hereinafter: UAIF). The provisions of the Ordinance on Types of Alternative Investment Funds (Regulation, 2019), Article 25, Paragraph 1, Point a) and b) define that “UAIF in the Republic of Croatia can establish an AIF with a private offering of any type, in accordance with the provisions of ZAIF and the provisions regulations of the European Union, including, but not limited to: a) AIF of risk capital (PE-Private equity), b) AIF of entrepreneurial capital (VC-Venture capital).” The provisions of Article 29, paragraph 1 of the Ordinance define a venture capital AIF (hereinafter: PE - Private equity) as “AIF with a private offering whose assets, in accordance with the rules of the AIF, are predominantly invested in business entities with the aim of optimizing their business and financial success, and in anticipation of realizing a return on invested funds” (Pravilnik, 2019).

Venture capital AIF investments in business entities must be in the form of equity instruments or equity-like instruments, which include the following financing instruments: (a) subordinated loans; (b) silent participation; (c) participating loans; (d) profit participating rights; (e) convertible bonds; (f) bonds with warrants (eng. bonds with warrants), and as a possible supplement to the mentioned instruments from the assets of the entrepreneurial capital AIF, it is allowed to give secured or unsecured loans such as bridge financing. Venture capital AIF shares can be offered to investors who, in accordance with the law governing the capital market, are considered professional investors or can be treated as professional investors at their own request, and to qualified investors in venture capital AIF. A risk capital AIF can only be established for a certain period of time, and the lowest amount of the total payment obligation of an individual investor in a risk capital AIF is HRK 2,000,000.00. The UAIF is obliged to prescribe the minimum number of investments and the dynamics of investment of assets of the risk capital AIF in the rules of the risk capital AIF. The provisions of Article 33, paragraph 1 of the Ordinance define an AIF of en-

entrepreneurial capital (hereinafter: VC - Venture capital) as "AIF with a private offer whose assets, in accordance with the rules of the AIF, are predominantly invested in business entities that are newly established or are in the initial stages of business, and according to the UAIF's assessment, they show the potential for business growth and expansion".

Venture capital AIF investments must be in the form of equity instruments or the previously mentioned equity-like instruments, and as a possible supplement to the mentioned instruments from the assets of the venture capital AIF, secured or unsecured loans such as bridging financing are permitted. In order to ensure that the venture capital AIF does not contribute to the development of systemic risks and that such AIF in its investment activities concentrates on investing in business entities that are newly established or are in the initial stages of operations, the use of financial leverage is not permitted at the level of the venture capital AIF. The above-mentioned business entities must have fewer than 250 employees, generate less than HRK 400 million in revenue per year, and their total assets must amount to a maximum of HRK 344 million. Shares of entrepreneurial capital AIF can be offered to investors who, in accordance with the law governing the capital market, are considered professional investors or can be treated as professional investors at their own request, and to qualified investors.

2. THE ROLE OF VENTURE CAPITAL IN FINANCING STARTUPS

Launching, building and expanding a promising startup is the ambition of many entrepreneurs and is one of the most significant sources of job creation. All of the above requires capital, and difficult access to financing sources still often represents a major obstacle to the growth and development of a large number of micro, small and medium enterprises (hereinafter: SMEs), which can rarely be overcome by family, friends, business angels or banks. Therefore, financing by venture capital funds represents a growing and increasingly significant source of financing for startup companies with high growth potential. The goal of venture capital is to help as many startups realize their ambitious growth plan by providing them not only with financing, but also with strategic advice and information at a critical stage of their development. Venture capital funds provide financing to SMEs in the form of long-term equity capital to help them realize their growth, development and business success. Likewise, venture capital financing is an option not only when you want to start a company or expand its operations, but also when you want to buy a part of the company or the whole company or restructure and revitalize the company. By performing their role of allocating capital to innovative and growing companies with quality development strategies and dedicated management, venture capital

funds enable the development and application of new technologies. By focusing on improving the fundamental business results of the companies in which they invest, venture capital funds contribute to improving the productivity of the economic sectors in which these companies operate. The fact that the venture capital fund shares the business fate, and thus the risks, with the company in which it has invested financial resources, contributes to its exceptional motivation and engagement of all available resources (financial and human) in order to achieve the business success of that company, in order to create added value required return on invested funds for its investors, thus indirectly maximizing the effects for the existing owners of SMEs. The investment cycle of most venture capital funds is generally 3 to 7 years, after which they focus on portfolio management and secondary investments in the existing portfolio. Venture capital investors, unlike banks, evaluate the growth potential of the investment, not the certainty of the return of the invested funds. Therefore, the reward they expect in the form of a return is significantly higher. On average, annual internal rates of return of 25 to 40% are expected. (Ognjenović Đ.)

3. DISTRIBUTION OF INVESTMENTS IN RISK CAPITAL

Investing in risk capital is divided into informal and formal risk capital. (Rasila T.) By informal risk capital we mean the so-called business angels, i.e., natural persons with previous investment experience and capital, as well as managerial skills and a clear intention to invest in the company and devote part of their time helping its management. The term venture capital investment is usually used as a name for VC venture capital funds that acquire stakes in propulsive small and medium enterprises in the seed stage, the initial stage (Startup phase) and the expansion stage (Later stage funding). Investment in Private equity (PE), as a broader term, includes, in addition to investment in risk capital, the following subtypes: investments in mostly minority shares of mature companies that are looking for capital to improve and expand their business and to enter new markets in order to accelerate growth (Growth capital); financing the takeover of companies by buying a majority stake (Buyout); investments in companies with financial difficulties, followed by restructuring with the aim of stabilizing the business (Rescue/Turnaround) and investing in the purchase of shares in the company from another PE fund or from another shareholder (Replacement capital). (Makek, M. et al)

4. INFORMAL RISK CAPITAL - BUSINESS ANGELS

Business angels are successful entrepreneurs, successful company leaders and wealthy individuals who have proven themselves in life and who are interested in investing in innovative startup ideas and companies. Investments al-

ways take place in such a way that the investor takes an ownership stake and provides assistance in the further development and commercialization of projects. Until now, it has happened many times that several investors jointly invest in one project in order to monitor their investment more easily, but most often one lead investor is selected, who participates more actively in the project on behalf of others. The greatest value of business angels is "smart financing" - providing expertise, skills and business contacts. Business angels primarily invest in sectors they understand and in a region they know. The most common reasons why business angels invest are profit, encouragement of entrepreneurship, business activity, but also fun in creating new value. The Croatian Network of Business Angels (CRANE) is a non-profit association that gathers private and institutional investors who are interested in investing in innovative companies at the early stage of startup development, when they are faced with a lack of financial resources (Early-stage financing). Venture capital funds tend to invest in a later, somewhat less risky phase of business. CRANE's mission is to connect ambitious entrepreneurs and innovative projects with investors who will invest their money, expertise, skills and business contacts in them. The criteria for project selection and investment realization are following: (a) quality project description/business plan/presentation; (b) strong entrepreneur and quality team; (c) strong market potential of the project/product; (d) enabled cooperation-willingness of the entrepreneur to involve a business angel and (e) realistic evaluation of the project before the realization of the investment. The indicative investment range of CRANE members, which has been proven in practice so far, is from EUR 10,000 to EUR 150,000. (CRANE, 2021)

5. FORMAL VENTURE CAPITAL – VC AND PE FUNDS

Risk Capital Funds in the narrower sense are Venture Capital funds that invest in companies in the initial phase, that is, the phase of early growth / development and expansion. Formal risk capital implies the active engagement of representatives of the risk capital fund in the management of companies in which the fund invests collected funds, consulting and constant monitoring of the development of the portfolio company. (Cvijanović et al)

Risk Capital Funds in a broader sense or Private Equity funds are funds that invest in the equity capital of other companies, regardless of the stage of growth/development of the companies they invest in and regardless of the type of financial operation that was used for that purpose. With this type of risk funds, the investor's involvement in company management can be both active and passive, which depends on the fund's investment strategy. The fund's involvement in company management will not be large in cases where the fund's investment horizon is short. The goal of the risk capital fund (and indi-

rectly its investors) is not to take complete control of the company, but to help it create new value so that after a certain number of years, upon exiting the company, it would realize a capital gain, as a result of a significant increase in the value of the portfolio company. This type of financing is often colloquially called "patient capital", because it tends to profit in the long term from capital gains, rather than from short-term profit payments through the payment of dividends. Depending on the type of investment in risk capital, the stage of development of the portfolio company and the investment strategies of risk capital funds, annual returns on investments can range from 20% to over 50% for investments in startups and for successfully implemented financial restructuring of companies. There are different ways that a risk capital fund can exit an investment or disinvest. Exit strategies of risk capital funds are Trade sale; Entrepreneur or management team repurchase; Sale of the investment to another financial purchaser; Initial public offering (IPO) and Liquidation. When considering potential investments, risk capital funds look for SMEs with high growth potential and competitive products or services. It is important that the company is managed by a quality and stable management team with a vision, which has the knowledge and ability to fulfill the agreed business plan. Furthermore, it is also important that there are quality and transparent management procedures or the potential to establish them in the short term if they are missing. Equally important is the existence of aligned interests between the company and the risk capital fund. In exchange for investing in the company, the risk capital fund expects supervision over the management of the company, control in making strategic decisions and a clear exit option. It should be noted that in this phase, risk capital funds "buy" a business plan or an investment study of a company and invest in a company whose potential has yet to be realized. Fulfilling their role, they perform a kind of "filtering" of projects.

Statistics of the industry of risk capital funds show that only 5% of all projects offered to risk capital funds for financing manage to get funds and achieve a partnership. Risk capital funds bring numerous benefits to the startups they invest in: (a) long-term capital base for realizing the company's growth and development plan; (b) increased visibility of the company to bankers, suppliers and customers; (c) partnership, with sharing of risks and rewards; (d) an investment whose terms are defined by a firm contract; (e) adoption of high standards in company management; (f) strategic and operational support with financial consulting in times of crisis; (g) assistance in financial operations; (h) networking with a network of contacts and other companies from its investment portfolio (i) a partial or complete exit strategy. (Pelajić, Z.)

6. RESEARCH OF THE TRANSFORMATION OF CROATIAN STARTUPS

Numerous countries are focused on the development of the startup ecosystem and are investing considerable efforts for their faster development and success on the market (e.g., legal framework, financing mechanisms). This is because startups contribute significantly to the level of employment and growth of the economy in a broader sense. On the other hand, many countries in the development of the startup ecosystem see an opportunity to accelerate growth and development, to skip a few steps and become relevant in the global context.

At the end of 2020, the consulting company PwC Croatia conducted research on the adaptation and transformation of startups due to the market circumstances caused by the COVID-19 pandemic. The research was conducted in the form of a questionnaire, and over 100 startups participated in it. The analysis of the collected data enabled an insight into the existing trends in the market and improved the understanding of future challenges. (Research, 2020) The aforementioned research showed that the Croatian startup ecosystem is still in the early development phase, bearing in mind the fact that almost 90% of startups have been operating for five years or less and have up to ten employees.

A total of 62% of the surveyed startups received an investment for the development of their business, and 50% of them generate income. Likewise, the research showed that a significant part of startups (41%) became aware of the necessity of transforming the business model and adapted products and services to the newly emerging market circumstances. The fact that in the last few years there has been a relatively significant growth in the number of startups and investments in startups and the creation of support mechanisms is encouraging. The establishment of venture capital funds with the support of the European Investment Fund (EIF) and private capital and the increased availability of grants from EU funds for research and development activities further contributed to the development of the startup ecosystem in the Republic of Croatia. In 2020, the Republic of Croatia got its first unicorn, the company Infobip, whose value is estimated at over one billion US dollars. In addition, 2020 saw the biggest acquisition in the Croatian startup ecosystem so far - the Swedish company Stillfront, one of the world's leading gaming companies, bought the startup Nanobit for EUR 125 million. According to data from StartupBlink, the Republic of Croatia ranked 39th among 200 countries in the global scale of development of the startup ecosystem in 2020, improving its position by 11 places compared to 2019. (Startup Blink, 2020)

This shows that the Croatian startup scene is developing and becoming more and more dynamic. Startup events and conferences, the number of which increases every year contribute to this trend. In this context, the startups Infobip, Rimac Automobili, Nanobit, Infinum, Photomath, Agrivi, etc. should be highlighted, which with their success stories contributed to the creation of additional incentives for the creation and development of the startup ecosystem. Along with other successful startups that were founded in the last five years, the above examples are proof of how it is possible to create a technological ecosystem in the Republic of Croatia. However, the success of participants in that ecosystem is still negatively affected by slow and complex bureaucracy, as well as legal regulations, which often create obstacles for entrepreneurs. However, reasons for additional optimism can also be found in the fact that in the period 2021-2027, the Republic of Croatia will have EUR 22 billion available from the EU budget, as part of the Recovery and Resilience Plan (an EU instrument of the next generation) and the Multiannual Financial Framework 2021-2027. It is expected that operational plans for the use of these funds will support innovation and digital transformation of the Croatian economy and strengthen the networking and cooperation of startups with Croatian companies in the context of digital transformation. The PwC Croatia survey shows that the majority of startups (89%) have up to 10 employees, which indicates that most of the survey participants are still in the initial phase of the startup life cycle. It is known that this initial phase of business, in which the business model and strategy are still being developed, brings the greatest risk of failure and for many represents the key phase of survival. (Failory, 2020). Furthermore, 48% of startups stated that they had one founder, and 43% had two or three founders. The fact that most startups in the Republic of Croatia have one founder can further limit the ability of startups to attract investors. Investors view single-founder startups through increased investment risk. The result for two or three founders is in line with EU indicators, where the average number of founders per startup is 2.5, which is the preferred choice of most investors when investing in startups (Steigertahl et al, 2018).

Startups in the Republic of Croatia operate and are represented in almost all sectors of the economy. Based on the research results, 13% of startups create business software solutions for companies, while 9% of startups deal with the application of advanced technologies in medicine (MedTech), as well as e-commerce. If these results are put in the context of the EU, the conclusion is that it is a similar structure. Research at the EU level indicates that 99% of startups, regardless of the sector in which they operate, are engaged in providing certain online solutions. Also, although a sector such as software development is the most represented (19%), new startups are also founded in sub-sectors that have received the most attention in the last few years, namely the financial

sector and environmental technologies. Approximately one third of startups in the Republic of Croatia (34%) have a developed product or service and are currently collecting feedback from the market in order to further adapt it. On the other hand, 50% of startups are in the commercialization phase, which means that they are already generating income, and some of them are even making a profit (32%). More than 57% of startups state that their product or service is used by large companies, which indicates a great potential for cooperation between startups and these companies. The primary market for startups to acquire customers / users is the EU (44%) and the Republic of Croatia (29%). More than 54% of them stated that they generate more than 80% of their income in these markets. The research results showed that the majority of startups are targeting the EU and Croatian market in the next 12 months. A few also plan to operate in the markets of the USA (13%) and Southeastern Europe (12%). The reason why Croatian startups are focused on the EU market may also be related to the low level of available investments, which in the early stages may be insufficient to penetrate markets such as the USA. Further analysis shows that startups in the Republic of Croatia received investments mainly from venture funds (37%), and domestic or international organizations in the form of grants (31%). Accelerator investments in startups amounted to 13%, and business angels 4%. Funds from the founders, their families and friends (3F) amounted to only 3%, as well as funds from EU funds. The sources of funding in the EU are different. The largest share (29%) is invested by business angels, venture capital accounts for 26%, while mass financing through crowdfunding platforms is used by 18% of startups. Grants are not such a common source of funding. All of the above confirms the fact that in the Republic of Croatia there are fewer funds available for financing startups considering the needs, as well as the fact that most startups are in the earliest stages of development. (Istraživanje, 2020)

7. EIF AND HBOR INITIATIVES FOR THE DEVELOPMENT OF THE RISK CAPITAL MARKET IN THE REPUBLIC OF CROATIA

A series of analyzes indicate that Croatian small and medium-sized enterprises, especially those innovative and with a higher degree of risk (newly established enterprises, enterprises in phases of accelerated growth or in propulsive branches of activity) or those operating in sectors with lower rates of return, face the challenge of finding adequate sources of financing due to the insufficiently developed risk capital market and the dominance of traditional sources of financing. For this reason, HBOR launched several initiatives for the development of the venture capital market, in order to ensure adequate resources to help the growth of entrepreneurial activities. The EIF implements

the financial instrument ESIF Venture Capital Fund. This financial instrument is aimed at the earlier stages of investment for innovative entrepreneurs in technological sectors with high growth potential, especially in those sectors identified in the Smart Specialization Strategy of the Republic of Croatia. In a competitive process, through the Public Call for Expressions of Interest for the selection of the manager of the ESIF Venture Capital Fund from June 2018, the EIF selected Fil Rouge Capital as the Fund Manager, which will invest EUR 42 million in the entire spectrum of start-up entrepreneurs, from the earliest stage of incubation, through acceleration and finally, to the stage of growth and foreign expansion.

FRC2 Croatia Partners SCSp is a venture capital fund started partly from ESIF financial instruments through cooperation with EIF. The fund is managed by the management company FRC2 GP S.à r.l. One of the investors in the fund is HBOR, but it does not participate in the selection of companies in which the fund invests. The fund consists of two components: (a) an accelerator program dedicated to innovative start-ups that only have a business idea (Startup School) or a prototype (Accelerator) and (b) equity capital (VC) investments intended for companies that are already operating and have their first customers and which have already passed the early stage of development. Investment amounts in individual companies depend on the level of development and range from EUR 10,000 through the "Start-up School" to EUR 1 million through VC investments. The fund invests in companies in the Republic of Croatia that have the necessary innovation and desire for success, in the earliest stages of development. The accelerator has more than EUR 9 million at its disposal, while the VC part amounts to about EUR 33 million. The first generation of Startup School and Accelerator started in September 2019.

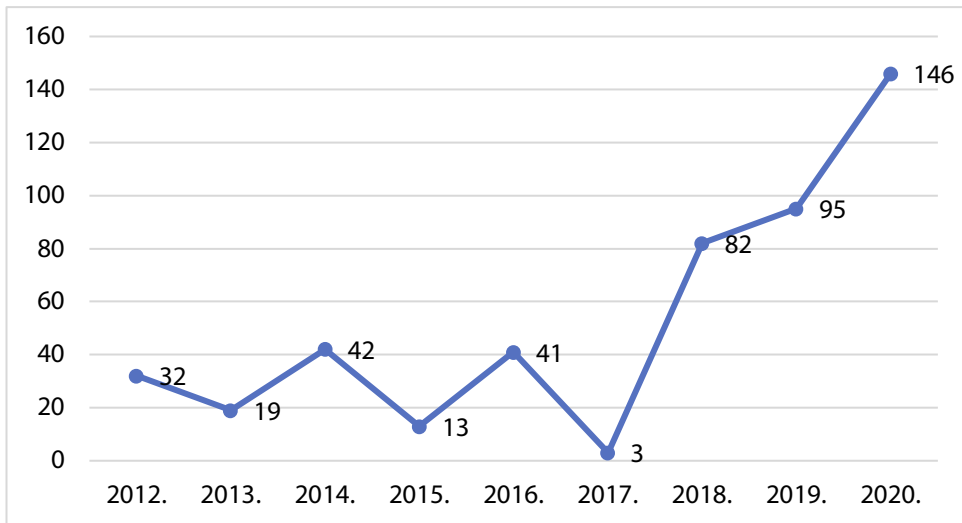
The Croatian Growth Investment Program (CROGIP) is a financial program established by the EIF as part of the cooperation of the Investment Plan for Europe with national development institutions, the so-called NPI Equity platform at the EU level. As one of the founding institutions, HBOR joined the creation of this platform and in 2019 signed a contract with a total value of EUR 70 million with the EIF, which launched the CROGIP initiative, with aims to encourage investments in small and medium-sized enterprises. In August 2020, the amount of the contract was increased to EUR 80 million. In addition to the general goal of providing support to Croatian companies and creating jobs by ensuring the availability of equity/risk capital, the purpose of CROGIP is also the development of the market and institutional capacities for equity/risk capital financing in the Republic of Croatia by supporting fund management companies that direct a significant part of their investments in growth and development of Croatian companies. EIF implements CROGIP through investments in venture capital

funds and co-investing together with funds and private investors on market terms. HBOR did not participate in the selection of funds and opportunities for co-investment, but as a local partner of the EIF is available to provide local support to management companies that want to increase their presence in the Republic of Croatia. The funds for these investments are intended for small and medium-sized and medium-capitalized companies (up to 3,000 employees), regardless of the sector in which they operate, which are not in the initial stages of development, which were founded in the Republic of Croatia and which conduct the majority of their business in the Republic of Croatia and/or which will start long-term operations in the Republic of Croatia with the planned investments, employing a significant number of workers. (HBOR, 2020)

8. RISK CAPITAL INVESTMENT TRENDS IN THE REPUBLIC OF CROATIA

The following is a figure showing venture capital investments in the Republic of Croatia in the period from 2012 to 2020. (Figure 1).

Figure 1: Risk capital investments in Croatia in millions of EUR (2012-2020)



Source: Invest Europe: "Central and Eastern Europe Statistics 2020", June 2021

It can be seen that venture capital investments have achieved solid growth in the period 2018-2020 and that they have not stopped in 2020 either. Information was also provided on the number of startups in the Republic of Croatia that have received risk capital investments in the period 2017-2020. In the mentioned period, a total of 31 startups have received risk capital investments

in the Republic of Croatia, of which 3 startups in 2017, 8 startups in 2018, 7 startups in 2019, and 13 startups in 2020. If we look at risk capital investments as a percentage of gross domestic product (GDP) in 2020, the Republic of Croatia is in 17th place out of a total of 32 European countries, with a percentage share of 0.293% of risk capital in GDP. In 1st place is Estonia with a percentage share of 1.282%, followed by the Netherlands with a percentage share of 0.953% and Great Britain with a percentage share of 0.902% of risk capital in GDP. At the bottom of the list are Serbia with a percentage share of 0.011% and Slovenia with 0.006% of risk capital in GDP.

9. PROSPECTS OF RISK CAPITAL FINANCING IN THE REPUBLIC OF CROATIA

According to the conditions of the CROGIP initiative and its internal procedures, the EIF has selected three funds in which the funds will be invested. These are the Adriatic structured equity fund; Prosperus growth fund and Croatian mezzanine debt fund. The managers of the mentioned funds will also have to raise funds from private investors. The mentioned funds must direct at least 75% of the funds into investments in the Republic of Croatia. Recently, two new risk capital funds were founded: Invera Equity and Feelsgood Capital, which have an investment potential of over EUR 60 million. Invera Equity will focus on investment opportunities and consolidation in sectors such as: food and beverages, manufacturing and industry, ICT technologies, services, including healthcare, transportation and hospitality. It will target a diversified portfolio with a typical size of EUR 4 to 12 million.

On the other hand, Feelsgood Capital is a fund that will strategically focus on investments with social impact (Impact investing), and the investment strategy will be determined according to the possibility of achieving measurable impacts on environmental protection, social betterment, as well as improving corporate governance in the target companies. With the support of the EIF and the local development bank, two risk capital funds are being established in Slovenia, which are expected to invest not only in Slovenia, but also in Croatian startups. Therefore, one can rightly expect the awakening of the risk investment market in 2021. Risk capital funds usually invest 5% to 15% of the fund's size in one company, that is, one fund usually invests in 6 to 10 companies. If we take into account only the five mentioned risk capital funds, 30 to 50 new investments can be expected in the future. (Lider, 2020)

10. CONCLUSION

The potential of the Croatian startup ecosystem to take a step forward and better position itself on global markets certainly exists, and successful examples of startups whose value exceeds one billion USD confirm this. In order for this potential to create more significant added value for the entire economy in the future, it is necessary to devise additional support mechanisms. Likewise, the analysis of the situation in the Republic of Croatia in the period from 2015 to 2020 shows a trend of increasing the level of investments in startups, as well as an increase in the number of active risk capital funds.

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PERSPEKTIVE FINANCIRANJA STARTUPOVA U HRVATSKOJ RIZIČNIM KAPITALOM

SAŽETAK RADA:

U Republici Hrvatskoj (u daljnjem tekstu: RH) je donesen potreban zakon-ski okvir te su definirana pravila osnivanja i ulaganja Alternativnih investicijskih fondova (u daljnjem tekstu: AIF) rizičnog kapitala (PE - Private equity) te AIF-ova poduzetničkog kapitala (VC - Venture capital). Fondovi rizičnog kapitala osigura-vaju potrebno financiranje startupova u obliku dugoročnog vlasničkog kapitala, kako bi pomogli njihov rast, razvoj i poslovni uspjeh. VC fondovi ulažu u startu-pove u fazi ranog rasta/razvoja i ekspanzije, dok PE fondovi ulažu u vlasničku glavnica portfeljnih poduzeća bez obzira na stupanj rasta/razvoja poduzeća u koje investiraju. Istraživanje konzultantske tvrtke PricewaterhouseCoopers d.o.o. (u daljnjem tekstu: PwC Croatia) iz 2020. pokazalo je da skoro 90% startupova posluje pet ili manje godina i ima do deset zaposlenih, što ukazuje da je startup ekosustav u RH još uvijek u fazi ranog razvoja. Ukupno 62% anketiranih startupo-va primilo je investiciju za razvoj svog poslovanja, a njih 50% ostvaruje prihode. Kako bi se osigurali adekvatni izvori financiranja za rast poduzetničkih aktivnosti, Europski investicijski fond (u daljnjem tekstu: EIF) je zajedno s Hrvatskom ban-kom za obnovu i razvitak (u daljnjem tekstu: HBOR) pokrenuo nekoliko inicijativa za razvoj tržišta rizičnog kapitala, koje su rezultirale povećanjem broja fondova rizičnog kapitala u RH te njihovim povećanim ulaganjima u hrvatske startupove u posljednjih nekoliko godina. Fondovi rizičnog kapitala uložili su u RH u 2020. cca 126 milijuna EUR, što je predstavljalo povećanje od 54% u odnosu na 2019. Ohrabruje činjenica da je više od 50% sredstava uloženo u fazu razvoja i širenja poslovanja startupova. Očekivanja su da će osnivanje novih rizičnih fondova uz pojačanu aktivnost stranih fondova rizičnog kapitala u RH, doprinjeti daljnjem rastu tržišta rizičnih ulaganja u 2021. godini te se opravdano može očekivati 30 do 50 novih ulaganja u startupove. Uspješni primjeri hrvatskih startupova „jed-noroga“, kao što su Infobip i Rimac automobili, čija vrijednost premašuje milijar-du USD to i potvrđuju.

Ključne riječi: *Startupovi, Venture Capital (VC), Private Equity (PE), Rizični kapital, Europski investicijski fond (EIF); Hrvatska banka za obnovu i razvitak (HBOR)*

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INTEGRATED INFORMATION SYSTEMS AS SUPPORT TO CONTROLLING A FACTOR OF SUCCESSFUL BUSINESS OF THE COMPANY

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ABSTRACT

The goal of every profit-oriented company is to meet the needs of customers and thus make a profit. However, business processes are regulated by system regulators that respond to internal and external information. Quality information, that which is timely, accurate, realistic, significantly shortens the time required for the reaction and thus provides a competitive advantage. Integrated information systems use real-time data and thus enable realistic goal setting and control. In parallel with the development of integrated information systems, a new function in the company was developed - controlling. The role of controlling in a modern company is inseparable from management, because it is the controllers who provide the management with quality information for making the right business decisions. It is the process of controlling planned and realized costs that is one of the most important processes within the company that takes place through the function of controlling. Integrated information systems in companies lead to a rationalization of the time required to perform the controlling process because it significantly shortens the time required to enter and process the data necessary for the successful operation of the company. Such a successful integration was demonstrated on the example of the SAP ERP system, which through the FICO module enables the analysis of all data in real time and thus is an in-

dispensable tool for creating information for making adequate business decisions. The aim of this paper is to prove to what extent integrated information systems controlling functions contribute to the profitability of the company's operations.

Keywords: *integrated information systems, controlling, business performance*

1. INTEGRATED BUSINESS SYSTEM

In systems theory, a system is considered a set of objects (system elements or subsystems) united by connections between them, whereby the objects act as a whole.¹ Subsystems can be broken down into their components as needed, but elements cannot. Every system is a subsystem of a supersystem, which is usually characterized by its environment, with which it exchanges substances, energy or information.² That's how the company behaves as a system, and with its organizational units it forms components that are aimed at a common goal.

Timely, accurate and reliable information is a competitive advantage in business. Although all authors do not agree on the qualitative characteristics that each piece of information should have, they agree that all available information is not both high-quality and useful, but can be unusable or even influence the making of a wrong decision.³ The information system (IS) of the company includes everything related to the collection, storage, processing and distribution of data and information.⁴ From the point of view of the connection of components within the system, there are different types of business information systems. Business systems are built in organizational units as partial, parallel and integral.⁵ An integrated business system is primarily an information system, actually an organized set of elements, components that in interaction perform the functions of collecting, processing, storing and disseminating (issuing for use) information.⁶

¹ Teorija sustava. *Hrvatska enciklopedija, mrežno izdanje*. Leksikografski zavod Miroslav Krleža, 2021., from <https://enciklopedija.hr/natuknica.aspx?id=60892>

² Teorija sustava. *Hrvatska enciklopedija, mrežno izdanje*. Leksikografski zavod Miroslav Krleža, 2021., from <https://enciklopedija.hr/natuknica.aspx?id=60892>

³ Oluić, A. (2008). Kvaliteta računovodstvenih informacijskih sustava u Republici Hrvatskoj. Zbornik Ekonomskog fakulteta u Zagrebu, 6 (1), p. 243.

⁴ Sekso, M. (2011). Uloga informacijskih sustava u upravljanju materijalima i zalihama. Zbornik radova Međimurskog veleučilišta u Čakovcu, 2 (1), p. 126.

⁵ Javorović, B. i Bilandžić, M. (2007). Poslovne informacije i business intelligence. Zagreb: Golden marketing-Tehnička knjiga, p. 20.

⁶ Panian, Ž. i Strugar, I. (2013). Informatizacija poslovanja. Zagreb: Ekonomski fakultet, p. 23.

2. BUSINESS SYSTEM MANAGEMENT

Management of the business system is performed at several levels: operational management, tactical management, strategic management.⁷ Operational management is the lowest level of management, which manages daily business activities that are in accordance with the decisions of higher levels. Tactical management represents the middle level of management that deals with medium-term problems such as the allocation of available resources in order to allocate available resources as efficiently as possible, while strategic management refers to the highest level of management.

How well an information system will be developed depends on the needs, size and financial strength of the organization. ERP systems (Enterprise Resource Planning) have a strong influence on the business activities of large multinational companies, but also on small and medium-sized enterprises.⁸ The two basic functions of the information system are the management and development of business processes. The business system management function is further divided into three special functions: documentation function, information function, management function.⁹ The documentation function provides a historical record of events and provides the basis for analysis, the information function provides real-time information, for example the stock status, and the management function provides a complete information base for management. The importance of the information system for the company: it reduces costs, increases efficiency, enables planning, control and evaluation, and reduces uncertainty.

SAP (System Applications Products) is a standard integrated software for planning and monitoring the company's operations with the following characteristics: it is based on a universal economic model which, with own modules and applications, provides a thorough insight into the data and processes within the company, the structure of the modules provides various independent applications where it is possible to select individual functions.¹⁰ All economic functionalities are fully integrated, which avoids duplication of data, high speed of work is provided by online data processing.¹¹

⁷ Garača, Ž. (2004). Poslovna informatika. Split: Sveučilište u Splitu, Ekonomski fakultet, p. 201.

⁸ Garača, Ž. (2011). Factors related to the intended use of ERP systems. *Management*, 16 (2), p. 23.

⁹ Garača, Ž. (2004). Poslovna informatika. Split: Sveučilište u Splitu, Ekonomski fakultet, p. 203.

¹⁰ Sekso, M. (2011). Uloga informacijskih sustava u upravljanju materijalima i zalihama. *Zbornik radova Međimurskog veleučilišta u Čakovcu*, 2 (1), p. 129.

¹¹ Sekso, M. (2011). Uloga informacijskih sustava u upravljanju materijalima i zalihama. *Zbornik radova Međimurskog veleučilišta u Čakovcu*, 2 (1), p. 129.

3. CONTROLLING – FACTOR OF SUCCESSFUL MANAGEMENT

Controlling is knowledge and art, a management philosophy based on the economic logic of rationality. A set of multidisciplinary knowledge that is needed to be based on countless data from companies and beyond, collected the optimal amount of information that managers need for making quality decisions.¹² Controlling processes the collected data and distributes it to the management in the form of information.¹³ The fundamental function of controlling is informational, and its role is derived from management's need for information, which is to provide business indicators that will timely signal unwanted deviations from the plan and also indicate their causes, so that managers can intervene in a timely manner with adequate business decisions.¹⁴ Through the instruments of coordination and integration, controlling influences the optimization of processes and expenditures, and thus the greater success of operations.¹⁵

Calculation and comparison of costs and effects is the most common controlling instrument in domestic business practice and is based on accounting and operational plan data. The application facilitates the calculation process, enables control of business economics, creates a basis for choosing between individual decision-making alternatives, and provides insight into the success of business. The key elements of the calculation of costs and effects are the classification of costs according to different criteria (types, locations, cost bearers) and the choice of the method of cost calculation (full, partial, planned, marginal, target or process costs). Comparison of costs and effects is possible from the aspect of actual, normal (most often average) and planned sizes and forms the basis of operational management and decision-making.¹⁶

4. INTEGRATED INFORMATION SYSTEM AS SUPPORT TO CONTROLLING

The indispensability of the information system in modern business, as well as the function of controlling in a modern company, is not in doubt, but there is a clear link between them. The company is a dynamic system, the growth

¹² Švigir, A. (2009). Kontroleri - dobri dusi menadzera, from <https://www.poduzetnistvo.org/news/kontroleri-dobri-dusi-menadzera>

¹³ Popović Petrušić, H. (2017). Kontroling kao instrument uspješnog upravljanja zalihama. FIP - Financije i pravo, 5 (1), p. 107.

¹⁴ Rupčić, N. i Datković, A. (2013). Kontroling – pretpostavka djelotvornoga rada menadžmenta. Praktični menadžment, 4 (1), p. 44.

¹⁵ Popović Petrušić, H. (2017). Kontroling kao instrument uspješnog upravljanja zalihama. FIP - Financije i pravo, 5 (1), p. 120.

¹⁶ Osmanagić Bedenik, N. (2017). Instrumenti integriranog i kriznog kontrolinga. U: Meter, M. (ur.) Kontroling u praksi Instrumenti kontrolinga. Zagreb: Poslovna učinkovitost d.o.o., p. 32.

and development of which increases its complexity. Developed organizations have a more developed structure and division of labor, so that its whole as the bearer of general functions is broken down into parts with different special functions. Each part is connected and dependent on other parts, and together they form a certain whole. For this reason, differentiation and specialization are linked for the unification and for the subordination of parts, while additional differentiation and specialization require the need for additional integration and coordination.¹⁷

It follows from the above that the development of the controlling function took place in parallel with the development of information business systems. Accurate and timely information is the basis for analysis and therefore the basis for decision-making. In the context of management, a special place in the business system is occupied by controlling, which "produces" information, which is necessary for decision-making.¹⁸ An example of an integrated information system is the SAP ERP information system. SAP ERP system within which is the SAP FICO model used for processes in financial accounting and controlling. FI stands for Financial Accounting and CO stands for Controlling. SAP CO has an important role for decision makers and for creating internal reports.¹⁹

5. RESEARCH METHODOLOGY

Companies always depend on their stakeholders. The figures of business results expected by the management of the company, as well as the analysts themselves, must be oriented towards the future. Management needs numbers, and it is controlling that organizes the planning process by checking whether the information is useful. A company will never be rewarded with excellence if it does not have a well-integrated controlling process.²⁰ The dynamics of changes in the external environment of the company are increasingly pronounced, which results in the need for a whole series of tools and instruments implemented by operational controlling, in order to ensure long-term business success and achieve long-term competitiveness on the market. Numerous authors and researchers study information systems as a support for business decision-making, but there is no knowledge about research on the

¹⁷ Osmanagić Bedenik, N. (2004). *Kontroling-Abeceda poslovnog uspjeha*, Školska knjiga, Zagreb, p. 90.

¹⁸ Bolfek, B. (2010). Model kontrolinga kao podrška menadžmentu pri donošenju odluka. *Ekonomski vjesnik*, XXIII (1), p. 111 .

¹⁹ Preuzeto sa <https://www.saponlinetutorials.com/what-is-sap-fico-about-sap-fico-module/>

²⁰ Vinšalek Stipić, V. i Nakić, S. (2020). Kontroling – čimbenik stvaranja dodane vrijednosti poduzeća. *Oeconomicus* 13, 30(05), p. 4., from <https://www.bib.irb.hr/1090538>

connection between information systems and company performance.²¹ From the above, there was a need to conduct research on the impact of integrated information systems on the controlling function on the success of the company's operations.

5.1. AIM AND HYPOTHESES OF THE RESEARCH

In the modern business environment, the goal of every system is to achieve profitability, and the main goal of the research is to prove to what extent integrated information systems of the controlling function contribute to the profitability of the company's. While the secondary goals of the research are: to prove whether there is a positive attitude of the controller about the importance of integrated information systems for performing the controlling function, and whether the business information systems of Croatian companies are fully adapted to achieve the goals and tasks of the controlling function. Accordingly, the research hypotheses were set:

H1 – integrated information systems of the controlling function significantly contribute to the profitability of the company's

H2 – executors controlling functions have a positive attitude about the importance of an integrated information system for performing the controlling function

H3 – the business information systems of Croatian companies are fully adapted for the execution of controlling goals and tasks

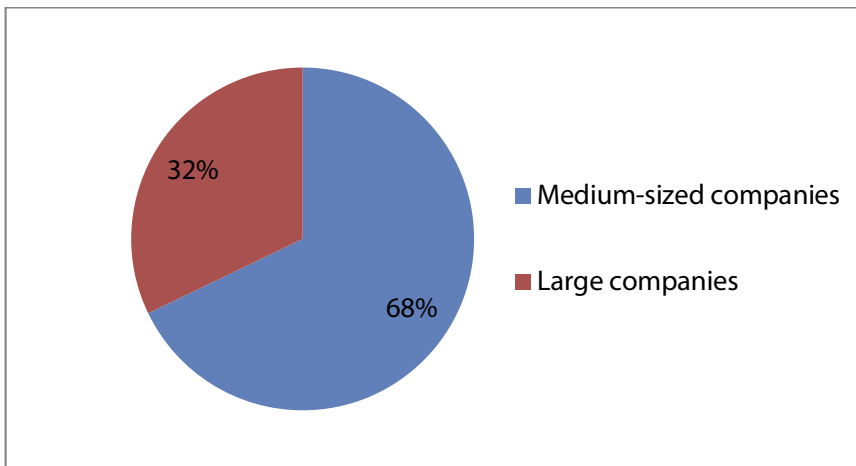
Based on the set hypotheses, the independent variable is the information (integrated) system of the controlling function (IS), which was obtained from the questionnaire using the Likert scale of intensity as follows: 1 – I absolutely disagree; 2 – I do not agree; 3 – I neither agree nor disagree; 4 – I agree; 5 – I absolutely agree. The survey questionnaires were filled out by the executors of the controlling function, randomly selecting large and medium-sized companies, via e-mail or by telephone in the period from June 1 to June 15, 2021. A total of 56 valid survey questionnaires were collected for this empirical research. The dependent variable, the company's profitability, which was obtained from the company's financial statements as of 12/31/2020., it was measured by the indicators Return on sales – ROS, Basic earning power – TSZ and Return on equity – ROE. The analysis of the obtained research results was made using linear correlation and a regression model in the statistical program SPSS Statistics 17.0, and the obtained results are below.

²¹ Pilepić, Lj., i Šimunić, M. (2009). Applying information technology to business decision-making in the hotel enterprises. *Ekonomski misao i praksa*, (2), p. 411-428., from https://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=74938

5.2. RESEARCH RESULTS

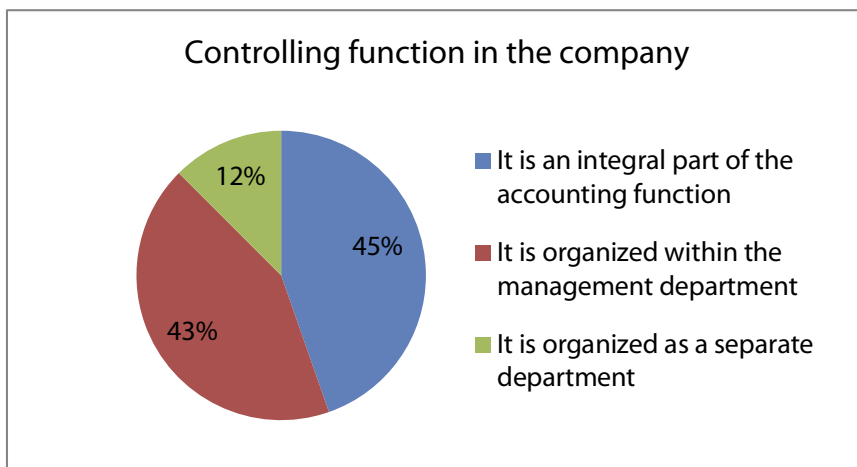
The total research sample is 56 respondents who perform the function of controlling in Croatian companies. The research covered 38 medium-sized companies and 18 large companies, while the relative ratio is shown in graph 1, while graph 2 shows how the controlling function was established in the companies from the observed sample.

Chart 1. Sample of companies by size



Source: Author's research

Graph 2. Establishment of the controlling function in the observed companies



Source: Author's research

In order to fulfill the assumptions of further research, descriptive statistics of all IS, ROS, TSZ, ROE variables were first made, which is shown in table 1. In the display of descriptive statistics, the basic statistical values for each variable are shown: arithmetic mean, median, mode, standard deviation, variance, percentiles, minimum and maximum value.

Table 1. Descriptive statistics of variables IS, ROS, TSZ, ROE

		Statistics			
		IS	ROS	TSZ	ROE
N	Valid	56	56	56	56
	Missing	0	0	0	0
Mean		3,6250	5,4811	1,7971	11,5202
Median		3,7500	4,5000	3,6050	6,3850
Mode		3,75	8,05 ^a	1,55 ^a	1,49
Std. Deviation		,60302	13,50378	13,46612	17,74047
Variance		,364	182,352	181,336	314,724
Minimum		2,25	-31,38	-85,20	-20,94
Maximum		4,75	52,41	27,21	83,64
Percentiles	25	3,0625	,6450	1,5350	1,4975
	50	3,7500	4,5000	3,6050	6,3850
	75	4,0000	9,9475	4,9500	16,4550

Source: Author's research

From the multiple regression model shown in table 2, the multiple correlation coefficient (0.127) is visible, which is a weak positive correlation between the information (integrated) system of the controlling function (IS) and the profitability of the company measured by indicators ROS, TSZ and ROE. That is, the integration of the information systems of the controlling function is not directly correlated with the company's profitability. It is evident from the coefficient of determination that 8.1% of variations in the dependent variable result in variations of the dependent variable. With the given significance level of 0.05 and with the number of degrees of freedom (3.52), the basic hypothesis is partially confirmed, while Durbin-Watson has a value of 2, which indicates the absence of autocorrelation of relational errors.

Table 2. Multiple regression analysis of the connection between the integrated information systems of the controlling function and the company's profitability

Model Summary ^a										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,285 ^a	,081	,028	,59440	,081	1,536	3	52	,216	2,114

a. Predictors: (Constant), ROE, ROS, TSZ
 b. Dependent Variable: IS

Source: Author's research

Multiple regression analysis using the ANOVA table shows an F ratio greater than 0.05 and the number of degrees of freedom ($F_{3, 52} = 1.536, p > 0.001$) indicates that the analyzed variables predict statistical significance, that is, the variations in the regression model are not the result of chance. So from a p-value that is greater than 0.05, it is concluded that the independent variable does not statistically significantly predict the dependent variable, in fact the regression model statistically significantly predicts the variations of the dependent variable.

Table 3. Multiple regression ANOVA analysis

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,628	3	,543	1,536	,216 ^a
	Residual	18,372	52	,353		
	Total	20,000	55			

a. Predictors: (Constant), ROE, ROS, TSZ
 b. Dependent Variable: IS

Source: Author's research

In order to complete the interpretation of the multiple regression model, the obtained data were analyzed in Table 4, which forms the third part of the regression model. Given that the dependent and independent variables were measured in different units of measurement, standardized coefficients were interpreted, thus ensuring the comparability of the variables of the multiple regression model. From the predictive power of significance $p > 0.001$, which partially confirms the hypothesis H1, there is a positive weak statistical connection of the integrated information system with the company's profitability.

Table 4. Multiple regression analysis - coefficients

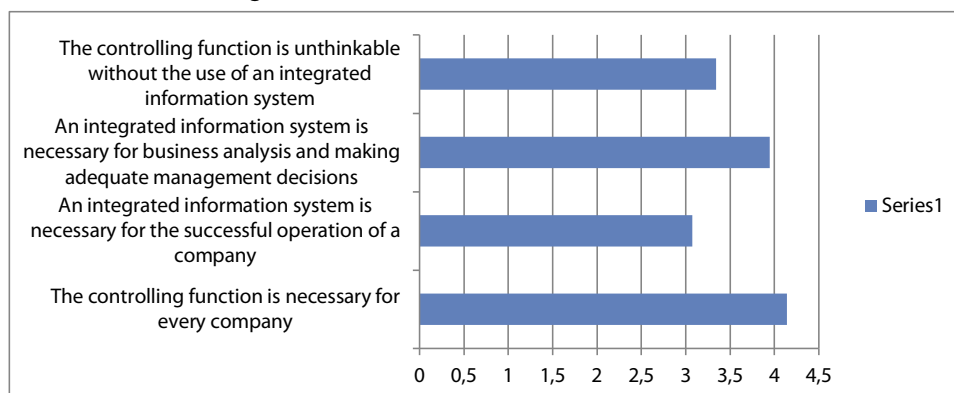
Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,618	,100		36,161	,000
	ROS	-,003	,008	-,077	-,421	,676
	TSZ	,015	,008	,333	1,780	,081
	ROE	-3,762E-5	,005	-,001	-,008	,994

a. Dependent Variable: IS

Source: Author's research

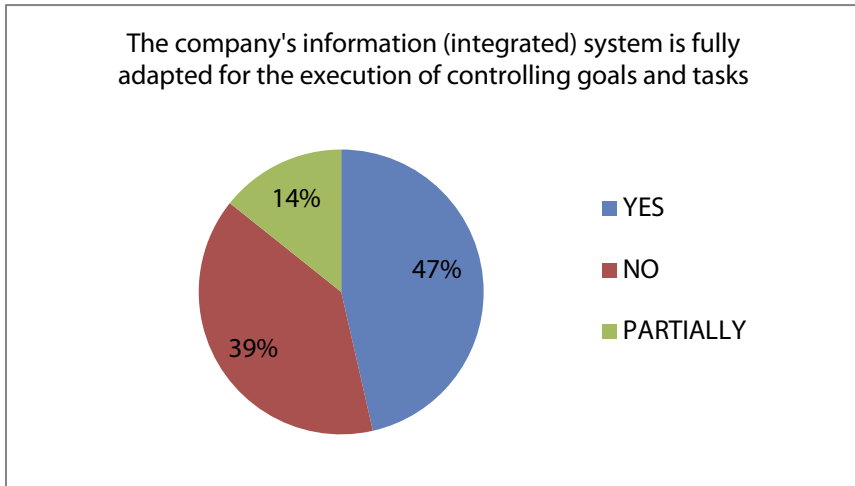
Through the analysis of the survey, Graph 3 shows the data obtained for individual questions about the attitude and importance of the integrated information system for performing the controlling function. It can be seen that the respondents believe that the controlling function is necessary for every company (4.1429), as well as the necessity of an integrated information system for analyzing the company's operations (3.9464). However, the respondents partially agree with the statement that integrated controlling systems are necessary for the success of the company's operations (3.0714), thus confirming the second hypothesis, those performing the controlling function have a positive attitude about the importance of an integrated information system for performing the controlling function.

Graph 3. Importance of integrated information systems for performing the controlling function



Source: Author's research

Graph 4. Adaptation of information systems to the function of controlling



Source: Author's research

The analysis of the survey revealed that the company's integrated information systems are not fully adapted to the execution of controlling goals and tasks, which is graphically shown in graph 4. Based on the results obtained, it can be concluded that hypothesis H3 is partially confirmed.

The development of information systems, especially their role in performing the controlling function, is unquestionable. Precisely because of the aforementioned and obtained research results, there is a visible need to monitor the development of integrated information systems of the controlling function and conduct further research on a more representative sample on the impact of integrated information systems on the success of the company's operations.

6. CONCLUSION

Controlling enables management to manage business results in order to achieve business goals, which are measured by the company's profitability. The research conducted on a sample of 56 respondents, although the hypotheses were partially confirmed, proved that the purpose and goal of the establishment and operation of the controlling function in companies is extremely important, and the necessity of an integrated information system for the analysis of the company's operations. The results of the research were obtained on the importance of integrated information systems for performing the controlling function. Hypothesis H1 was partially confirmed, in fact it was proven that there is a positive weak statistical relationship between the integrated information system and the company's profitability. Based on the obtained research re-

sults, it can be concluded that there is an awareness of the importance of the controlling function, as well as the necessity of integrated controlling information systems to achieve the profitability of company's. However, it is necessary to fully adapt the company's integrated information systems to fulfill the goals and tasks of controlling in order to achieve long-term profitability.

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INTEGRIRANI INFORMACIJSKI SUSTAVI FUNKCIJE KONTROLINGA KAO ČIMBENIK USPJEŠNOG POSLOVANJA

SAŽETAK RADA

Cilj svakog profitno orijentiranog poduzeća je zadovoljiti potrebe kupaca te na taj način ostvariti profit. Međutim, poslovni procesi su regulirani od strane regulatora sustava koji reaguju na unutarnje i vanjske informacije. Kvalitetna informacija, ona koja je pravodobna, točna, realna, bitno skraćuje vrijeme potrebno za reakciju i samim time pruža konkurentsku prednost. Integrirani informacijski sustavi koriste podatke u realnom vremenu i na taj način omogućuju realno postavljanje ciljeva i kontrolu istih. Usporedno s razvojem integriranih informacijskih sustava razvijala se nova funkcija u poduzeću – kontroling. Uloga kontrolinga u suvremenom poduzeću je neodvojiva od menadžmenta, jer upravo kontroleri pružaju upravi kvalitetne informacije za ispravno donošenje poslovnih odluka. Upravo je proces kontroliranja planiranih i ostvarenih troškova jedan od najvažnijih procesa unutar poduzeća koji se odvija kroz funkciju kontrolinga. Integrirani informacijski sustavi u poduzećima dovode do racionaliziranja vremena potrebnog za obavljanje procesa kontrolinga jer bitno skraćuje vrijeme potrebno za unos i obradu podataka koji su neophodni za uspješno poslovanje poduzeća. Takvu uspješnu integraciju prikazalo se na primjeru SAP ERP sustava koji kroz modul FICO omogućuje analizu svih podataka u realnom vremenu i na taj način je nezaobilazan alat za kreiranje informacija za donošenje adekvatnih poslovnih odluka. Cilj ovog rada je dokazati u kolikoj mjeri integrirani informacijski sustavi funkcije kontrolinga pridonose profitabilnosti poslovanja poduzeća.

***Ključne riječi:** integrirani informacijski sustavi, kontroling, uspješnost poslovanja poduzeća*

PROJECT: ECONOMICS OF SUSTAINABILITY (EOS) 2019-1-PL01-KA203-065050

Erasmus+ Key activities 2 - Cooperation for innovation and exchange of good practices, activity Strategic partnerships.

EOS partner consortium consists of partners from Poland (Uniwersytet Ekonomiczny w Katowicach as project leader), Croatia (RRiF Visoka škola za financijski menadžment), Lithuania (Vilniaus Kolegija), Slovenia (Univerza v Mariboru), Italy (Universita Degli Study di Firenze) and The Republic of North Macedonia (Integrated Business Faculty PU)



The project Economics of Sustainability (EOS) was designed to address core sustainability issues which have been playing an increasingly important part in today's business activity, individuals' lives and have immense potential in contributing to the future development of the world.

Its focus was on identifying areas where sustainability issues are critical, followed by suggesting solutions to be practically implemented.

The first stage of the project involved partners' contribution to the development of the joint curriculum for the subject "Economics of Sustainability". Research was carried out by partners to name the most important sustainability challenges from the perspective of their regions and countries, including environmental and employment relations, marketing and sustainable production and consumption, tourism, and hospitality industry, sustainability of businesses, sustainable finance and management, cultural and social sustainability, etc.

The intellectual output of this stage was syllabus of a new subject "Economics of Sustainability" to be introduced into the curricula of tertiary education institutions participating in the project. The syllabus dealing with general issues of sustainable development also incorporated local, country specific and cross-cultural issues. Such global and local approach will stimulate young generations' openness to different cultures, tolerance, and responsiveness to different needs, thus strengthening social potential.

The next stage of the project was involving a course book written by researchers following their findings in the first phase of the project. It targeted primarily students of the partnering institutions as a support material for the new

subject introduced into their curricula. It is a PDF downloadable open-access resource to be used by students and teachers of other institutions worldwide.

Thus, the intellectual outputs catered educational needs of the contemporary societies to tackle core environmental and social problems. The Partners of the project believe that in the process of educating students of economics current issues need to be approached both globally as well as locally, and to meet this objective cooperation between tertiary education institutions is indispensable.

The essence of sustainable development although clear, is hardly ever realised by individuals. Activities towards CSR or sustainability definitely improve the company image while they are not likely to be one of the criteria taken into account by individual consumers. This lack of individuals' awareness may result in their ignorance of such beneficial actions and simultaneously in no positive feedback or support given to them. The technology diffusion is the root of behavioural changes which, on the one hand, lead to new expectations of product and service providers, and on the other hand, empower consumers to such an extent so as they get involved in co-creating or even creating market offerings themselves. However, people often lack creativity and therefore it should be stimulated and encouraged.

Modern technology proliferation plays the most important role in driving transition to sustainable development by, for example, the emergence of new business models, such as sharing/access economy that reflect social needs resulting from changing demographics and other megatrends. The new developing system is based on re-using, re-cycling, and sharing, all activities leading to reduction of environmental impacts and thus contributing to values of CSR and sustainability. The project strengthened and supported such positive behavioural trends.

At the final stage, the project's results were disseminated by creating an open-access platform where ideas for utilising game-dynamics were entered to be used proactively by business leaders as well as consumers willing to combine fun with socially and environmentally desirable activities. The innovative idea of the platform consists in gathering both novel and tested solutions in one place thus enabling quick and easy access to a variety of ideas with potential to enhance sustainable choices. By utilizing game-dynamics, which have been proved effective in encouraging consumers to behave in a desired way, businesses can gain important benefits from marketing success, relationship building to CSR- related merits. The platform is useful for consumers with sustainability- conscious mindset to help them find eco- friendly solutions, associate them with relevant business and support socially important initiatives.

INSTRUCTIONS FOR AUTHORS

All the papers dealing with the topics of accounting and management are welcome. All the submitted papers are considered for publication and have been blindly peer-reviewed by two independent reviewers.

The papers are categorized in the scientific, professional and other papers:

- **Original scientific paper** contains previously unpublished original results of scientific research;
- **Preliminary paper** presents the primary findings of research in progress, which requires urgent publication, but without the level of deep and thorough study required for the original scientific paper;
- **Scientific review article** contains a detailed and comprehensive critical review of a certain problem area, but with no significant originality of the obtained results;
- **Professional paper** contains the information and experience relevant for a certain profession, but without scientific characteristics.
- **Case study** contains a description and detailed information about the particular subject or small group.

The Editorial Board determines the category of the paper, based on the reviewers' proposals.

The Journal of Accounting and Management is published in two issues a year.

All the papers should be submitted by mail or email to the address of the Editorial Office. The authors are obliged to follow these instructions:

1. The manuscripts should be written in English.
2. The manuscript should be submitted in a MS Word format.
3. A cover page should be supplied, containing the title of the paper, name(s) and address(es) of the author(s), including the telephone number, e-mail address and the name and postal address of the author(s) home institution.
4. The full paper should not exceed 10 single-spaced pages of text (font: Times New Roman, size 12) including graphs, tables, endnotes and references.
5. The paper should begin with an abstract of not more than 900 characters and maximum 5 key words
6. The Editors reserve the right to make editorial changes in order to adjust the style of the paper to the Journal.
7. The manuscripts are not returned.
8. No payment is made to the authors for publication of the paper.

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