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RESEARCH ARTICLE



UNVEILING INFLUENCE OF HOME MACROECONOMIC FACTORS ON INDIAN OUTBOUND M&A

SHEEBA KAPIL*, PUNEET KAUR DHINGRA**

Abstract *Indian enterprises have succeeded in climbing the ladder of outward M&A transactions and out-performing everyone's expectations post 1990s. This paper aims to recalibrate the empirical literature of India's outbound M&A by considering the impact of home country macroeconomics variables from 1990 to 2019. Bivariate regression and quantile regression approach is used to examine the impact of selected macroeconomic factors on outward M&A deal volume. The study found that the selected macroeconomic variables gross domestic product, population, exports, imports, interest rates, international reserves, human capital, trade openness, patents, exchange rate and per capita GDP influences the deal volume especially at high percentiles. The home country companies prefer to invest overseas specially when macroeconomic indicators change at high level. The empirical analysis of this paper provides policy makers a better understanding of determinants of outbound M&A transactions by Indian firms, to formulate push policies to encourage the same.*

Keywords: *Outbound M&A; India, OFDI, Determinants, Home Country*

JEL Classification: *F21, F23, G34, P45*

1. INTRODUCTION

The 20th century witnessed a strong activity of Mergers and Acquisitions (M&A) across the globe during several times (Scherer and Ross, 1990). Through cross-border M&A, multinational firms strengthened their international position on foreign markets: cross-border M&A progressively replaced Greenfield Investments in Foreign Direct Investment (FDI) over the 1990's. During this period, about 80% of FDI transaction value took the form of M&A. Therefore, facing this major change in FDI composition, it becomes legitimate to enquire cross-border M&A

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when examining the decision of international expansion with respect to macroeconomic factors that will influence the investment decision. Hence, this study delves to find the impact of Indian economy's macroeconomic factors on outbound M&A behavior of Indian companies.

The increase in overseas acquisitions by Indian firms can be seen as their response to a globalized competition since 1990s. With liberalization and changes in trade, industry, foreign investment and technology policy regime, previously protected Indian companies are exposed to global competition at once. Indian firms increasingly realized that their existing technological and other capabilities accumulated with predominant dependence on protected home markets and under the import substitution policy regime of the past are clearly inadequate to cope with this new competition unleashed by a more liberalized business environment. They are forced to improve their competitive strength immediately and enlarge their position in the world markets. Indian companies realized that adopting a long-term competencies-building strategy with large investment in R&D, advertising, etc. is relatively more risky and costly than pursuing the route of overseas acquisitions.

Mergers and acquisitions in India is largely driven by multinational enterprises is well recognized (Kumar 2000; Bhoi 2000), the less known fact is the growing intensity of Indian enterprises to acquire business enterprises overseas. Out of an estimated \$236.83 billion value of cross-border M&As involving India as a seller as well as purchaser during 1990-2018, nearly 44 percent amounting to \$105 billion has been accounted by cross-border acquisitions made by Indian enterprises. Indeed, in the late 1990s the value of cross-border acquisitions by Indian firms had continuously accelerated from \$57.6 million in 1990 to over \$1.105 billion in 2018 (Table I).

Table 1: Value of M&A deals in India

YEAR	Value of M&A deals in India (Purchaser) (UDS Million)	Total number of M&A deals in India (USD Million)	Purchases as a % of total number of deals
1990	57.6	62.6	92.01%
1995	25.3	249.4	11.29%
2000	589.0	1297.4	45.39%
2005	1939.0	2636.5	73.54%
2010	26642.0	32254.6	82.59%
2015	-612.5	710.9	-86.16%
2018	1105.1	34283.4	3.22%
1990-2018	105009.6	236825.2	44.34%

1.1 Determinants Of M&A

Over the years, many researchers have come up with theories or applications of the existing theories to explain the growth trajectories of these OFDIs, effect of various factors on expansion of emerging countries' multinationals (individually or in certain groups), their motives, challenges and spillovers (Dunning & Narula, 1994; Hymer, 1960; Aulakh, 2007; Bloningen, 2005; Kalotay, 2005; Kumar, 2007; Buckley et al., 2007; Makino et al., 2002; Douma et al., 2006; Lien et al., 2005). It was Dunning who had published earliest factual work that sought to explain outward foreign direct investment from America and its benefits to UK's economy, but Hymer's work in 1960 made a concrete attempt to elucidate the emergence of outward foreign direct investment. According to his research, major motive behind these Trans National firms were to gain opportunities out of oligopolistic control of the market and locational advantages. Dunning again in 1980 went to explain in length the determinants of outward foreign investment through his Eclectic theory, popularly known as O-L-I paradigm, which primary constitutes of 3 pillars, ownership advantages, location advantages and internalization advantages. (Rasiah et al., 2010)

After Dunning, subsequent researches have built up a base for capturing drivers of outward foreign direct investment flows from emerging economies. Determinants of outward foreign direct investment from emerging economies has been categorized in two sub divisions, macroeconomic determinants and firm level determinants.

Macroeconomic factors are liable for either encouraging or discouraging firms making foreign investments. MNCs are exposed to two sets of macroeconomic determinants, first are home country determinants, also known as push factors for investing overseas, and second set consists of host country determinants which work as pull factors for investing overseas. Every MNC is constantly interacting with its home and host country environment, and hence these factors are responsible for creating a conducive atmosphere for overseas investments to take place (Gammeltoft et al., 2010). These country specific factors are dynamic in nature, i.e. they continuously evolve with the country's level of development, as a consequence of its policies, natural endowments, market potential and action of economic agents. Firms utilize these country specific assets to develop and organize their own production process efficiently, so as to serve domestic and foreign markets profitably (Pantelidis and Kyrkilis, 2005).

1.2 Home Country Determinants

1.2.1 Market Size

Home country's development related variables serve as explanatory variables for any country's investment outflows. There exists a strong positive relationship between development level of home country and its OFDI (Chen, 2015). Economic development enables a firm to develop competence and specific strengths which can be fruitfully exploited by investing abroad. Empirical studies done on developed countries by Barry et. al. (2003), Bellak (2001), and Buckley and Castro (1998) as well as on a mix of developed and developing countries by Dunning and Narula (1994) and Tolentino (1993) confirm the existence of association between market size and outward investment flows.

Market size of a country is indicated by its GDP. Hence when a firm is operative in a home country marked by high GDP, it is successfully able to exploit economies of scale. Actual market demand could not be measured by GDP of a country, hence per capita GDP has been taken as a variable in many studies to measure the size of market demand or consumers' economic well-being of a home country (Buckley et al., 2006; Deng, 2004; Taylor, 2002; Zhang, 2003, Kayam, 2009).

1.2.2 Interest Rates

Capital abundance is a mandate for making investment overseas, especially when investment is made in capital intensive sectors. Amplitude of Capital is directly linked with the prevailing interest rates in the home economy, bearing an inverse relation. As per Krykilis and Pantelidis (2003), low interest rates in home country, results in capital abundance and thus reduces the opportunity cost of capital. Deducing from the above statement, companies with large capital base would hunt for profitable investment ventures abroad, this leads to increase in the investment flows abroad, proposing negative association between home interest rates and OFDI flows.

Pantelidis and Kyrkilis, (2005), stated that a firm always chooses to invest in those projects that offer higher expected return over its cost of capital. And when cost of capital of a firm decline, expanse of economically viable projects increases, allowing firms to make investments. Also, if the cost of borrowing is lower, leverage exposure of company may rise, thus leading the firm to pursue larger investment projects. Hence applying this phenomenon to foreign investments, as the cost of borrowing decreases in home country, the opportunity

cost of capital becomes lower subsequently and hence investing abroad becomes more attractive and viable.

1.2.3 Exchange Rate

Currency appreciation facilitates investment flows overseas, as the buying capacity of the currency increases in real terms. Aliber (1970) encompassed that companies whose countries' currency is strong, have better financial backing for supporting their foreign investments than companies whose countries' currency is relatively weaker. As a consequence of appreciation of home economy's currency, the capital requirements of investing abroad lowers, thus enabling easier capital acquisition than in case of depreciated home currency. Along with this, appreciation of home currency also curtails the relative attractiveness of exports as a mode of expanding overseas, thus companies turn towards choosing OFDI for exploring markets abroad. Bhasin et al. (2013) also support this inference and states that "Appreciation of the home country currency makes exports less competitive as they become relatively expensive for foreign buyers. So OFDI becomes cheaper mode for servicing foreign market."

1.2.4 Human Capital

Competent human capital possession gives a company powerful edge which makes them capable of acquiring various competitive advantage. All major business operation activities like management, marketing, organization and R&D functions mandates the presence of skilled and competent personnel. As per Tolentino (2008) skilled and educated labor is a mandatory requirement for majority of managerial functions, and opulence of this factor is an eminent determinant pushing home economy firms to make foreign investments. Proportion of higher education personnel in the population of a country gives an approximation of the human capital factor in that country (Pantelidis and Kyrkilis, 2005; Bhasin & Jain, 2013). Saad et al. (2014), in their research, analysed the home country determinants for OFDI flows from Malaysia, and states that investment flows overseas from developing countries is a consequence of lack of management know-how knowledge, thus driving Malaysian firms to invest abroad in order to overcome this prevalent limitation. Emerging economies suffer from shortage of skilled personnel, thus making human capital an incompetent push force for OFDI. This creates an immediate need for these economies to identify ways to boost the development of sound education infrastructure.

1.2.5 Openness of Economy

Smooth and voluminous flow of foreign direct investment is a direct consequence of the degree of openness of an economy towards unrestricted capital flows. There are few reasons leading to this, firstly, liberal capital regime with absent or minimal control promotes greater flow of funds across economies (Scaperlanda, 1992). Secondly, an economy with existing export orientation allows companies to gather knowledge about demand and supply conditions of proposed host destination, their legal system, prevalent business practices, know how required to sustain foreign operations, etc. All these constitutes the necessary background for switching of internationalization mode from exporting to setting up or acquiring business facilities overseas (Kogut 1983; Buckley et al., 2007, Goh, 2011). As per Buckley (2007), OFDI is also viewed as a supportive strategy to give some backing to domestic exporters and stimulating higher earnings for them. Thirdly, companies may resort to investing in host economies whose export give a tough competition to native firms of home economy. Here OFDI takes a pure form of retaliation to cope up with import competition (Pantelidis and Kyrkilis, 2003; Banga, 2007).

1.2.6 Technological Capability

Firms' ability to indulge in organization and production of technological input is in turn dependent upon the firms' home country environment, in terms of its legal and patent systems, presence of skills and inputs, government policies, market structure, scientific research, incentives for education. Hence this emerges as a critical advantage of firms to make foreign investments, as firms' technological capability helps them build ownership-specific advantages, upon which the firm can capitalize to invest abroad.

In case of developing countries, minting of new technologies may not always be possible, but framing policies for building technological capacity may fetch positive spillovers. Lall (2001) stated that technological advancement heavily relies on technological efforts made and firms' absorption capacity. Thus, to benefit from the diffusion of international technology stimulated by globalization, making indigenous innovation efforts became mandatory for emerging economies (Das, 2013; Fu et al., 2011). Therefore, countries making policies supportive of such technological efforts, will be more successful in creation of country-specific competitive advantages from international technology diffusion, thus facilitating outward investment flows. In contrast to the above arguments, Saad et.al. (2014)

postulated that developing economies facing disadvantage at the technological front, make outward investments in order to compensate for the same by merging with or acquiring foreign firms (Child and Rodrigues, 2005; Luo and Tung, 2007; Rugman and Li, 2007).

2. METHODOLOGY

This study considers several key factors that could influence an Indian firm's decision to invest abroad, out of all the previously studied home country macroeconomic factors, this paper aims to test the relevance of most pertinent determinants in today's scenario for Indian outbound M&A via quantile regression. This study is based on the secondary source of data consisting annual observations on Indian economy for the period of 1990-2019. The table below exhibits the various dependent and independent factors taken up in this paper

Table 2: Description of dependent and independent variables

Variables	Constructs	Description	Unit
Dependent variable: Outward cross-border mergers and acquisitions	M&A Deal Volume	Number of total outbound M&A deals in a Year by Indian firms	Units
Independent Variables	Market Size	by Gross domestic Product, GDP per capita and Population of a Host Country	USD Million (GDP & GDPPC) & Units (Population)
	.Liberalization of India's capital outflows	International Reserves with RBI	USD million
	Trade Openness	Free flow of trade i.e Total Exports and Total Imports	Total exports and Imports as Percentage of GDP (Total Exports Percentage and Total Imports Percentage) & $TO = (Total\ exports + Total\ imports)/GDP$
	Inflation	GDP deflator represents the inflation or the purchasing power in a country	Percentage of Nominal GDP over Real GDP
	Interest Rate	Interbank Interest rate, Lending interest rate and Central bank rate	Percent, not seasonally adjusted
Exchange rate	Real Effective Exchange rate measures the host country's currency against basket of foreign currencies	Index 2015=100 Not seasonally adjusted	

Variables	Constructs	Description	Unit
	Strategic assets	Total patent applications filed by residents of India	Unit
	Human Capital	Literacy rate in India	School enrolment, primary and secondary (gross), gender parity index (GPI)
	Political stability	Political stability and absence of violence or terrorism measures perceptions of the likelihood of political instability.	Performance score from -100 to 100. The highest score reflects the best situation.
	Geographic Distance	It is the physical distance between India and host country	Kilometres
Control Variable	Recession	Recession in Indian Economy post 2007	0 if year is 2007 or lessor and 2008 onwards its 1

2.1 Unit Root Test

It is found in the literature that most of the series in finance and economics are non-stationary in nature. In other words, most of the economic series are random walk. In this study, the data of economic time series are collected and ADF unit root test is applied to examine the nature of unit root behaviour in the studies.

Any econometric model applied on non-stationary time series would be considered as spurious model. Thus, if the selected time series are found to be non-stationary, they are needed to be transformed to become stationary series so that statistical models can be applied on those series. The result of the unit root is shown below in the table.

2.2 Bivariate Regression

To study the relationship between the outbound M&A deal volume by Indian firms in global market and the macroeconomic indicators of Indian economy, the bivariate time series regression analysis is applied on the included variables. The bivariate regression has the M&A deal volume as dependent variable and different macro-economic indicators as independent variables (*GDP Growth Rate, Change in GDP per capita, Population growth rate, Change in Interbank Interest Rate, Change in Lending interest rate, Change in Central bank interest rate, Change in Real effective Exchange Rate, International Reserves growth rate, Change in Trade openness, Change Exports as percentage of GDP, Change in Imports as percentage of GDP change, Change in Inflation, Change in Human Capital, Change in Patent Applications by residents, Change in Political stability and Recession as control variable*) in the study. The regression model can be expressed as:

$$\text{M\&A Deal Volume (Y}_i) = \alpha + \beta_1 * X_i + e \quad (1)$$

Where Y is the dependent variable (M&A Deal volume), α is the intercept and β is the slope coefficient, X_i indicates the different macroeconomic indicators. Following hypothesis is assumed to be tested with the help of regression analysis:

Hypothesis: *“There exists no significant impact of home macroeconomic indicators on the outbound M&A Deal volume of the Indian firm”*

2.3 Quantile Regression

In linear OLS regression, the deal volume as a dependent variable is predicted with the help of selected independent variables. Here, the conditional mean of deal volume is estimated using the changes in the average values of independent variables. However, the linear regression OLS model is not able to explain the behaviour of deal volume due to certain limitation such as the assumption of linear relationship between selected dependent and independent variables and the linear regression fails to explain the deal volume if the dependent variable has multiple modes in behaviour. Thus, the quantile regression is highly effective as it explains the deal volume at different percentiles due to the changes in different percentiles in independent variables.

In the study the behaviour of deal volume in M & A of the selected Indian companies is examined using quantile regression model. The macroeconomic indicators of Indian economy are assumed to be independent variables in the quantile regression.

3. RESULTS

3.1 Unit Root Test

The result of the unit root is shown below in the table.

Table 3: Results of Unit Root Test (Augmented Dickey Fuller Test)

Variables	ADF test		Status
Deal Vol	-3.265	-5.572*	Stationary at first difference
Log of GDP	-1.309	-5.092*	Stationary at first difference
GDP per capita	-1.841	-5.401*	Stationary at first difference
De-trended Population	-3.897*		Stationary at level
Interbank Interest Rate	-1.632	-5.482*	Stationary at first difference
Lending interest rate	-2.687	-5.329*	Stationary at first difference
Central bank interest rate	-1.632	-5.482*	Stationary at first difference
Real effective Exchange Rate	-4.785*		Stationary at level

Variables	ADF test		Status
Log of International Reserves	-1.163	-4.438*	Stationary at first difference
Trade openness	-0.473	-4.799*	Stationary at first difference
Exports as percentage of GDP	-0.596	-5.734*	Stationary at first difference
Imports as percentage of GDP	-0.544	-4.383*	Stationary at first difference
Inflation	-1.987	-3.227*	Stationary at first difference
Human Capital	-2.692	-5.358*	Stationary at first difference
Patent Applications by residents	0.776	-6.124*	Stationary at first difference
Political stability	-3.866*		Stationary at level

The results indicates that most of the series re found to be random walk at level. However, after first transformation, the series became stationary. The result reported that Real effective exchange rate and Political stability are found to be stationary at level, Rest of the series are found to be stationary at first difference. After analysing the series to be stationary, the advance econometrics model can be applicable on the stationary series.

3.2 Bivariate Regression

The result of bivariate regression analysis is shown below:

Table 4: Results of Bivariate Regression

Dependent Variable	Independent Variable	Regression Coefficient	Std. Error	t-Statistic	F stats	R Square
M&A Deal Volume	GDP Growth Rate	337.584	158.219	2.133**	4.55**	14.42%
	Change in GDP per capita	0.121	0.075	1.610	2.592	8.76%
	Population growth rate	4078.943	4196.991	0.971	0.944	3.38%
	Change in Interbank Interest Rate	-2.445	6.027	-0.405	0.164	0.6%
	Change in Lending interest rate	-5.359	5.020	-1.067	1.139	4%
	Change in Central bank interest rate	-2.445	6.027	-0.405	0.164	0.6%
	Change in Real effective Exchange Rate	1.647	1.166	1.412	1.994	6.8%
	International Reserves growth rate	99.898	89.282	1.118	1.251	4.4%
	Change in Trade openness Change	312.853	163.001	1.919**	3.683**	12%
	Change in Exports as percentage of GDP	7.988	3.508	2.277**	5.184**	16.11 %
	Change in Imports as percentage of GDP	4.349	2.854127	1.523	2.321	7.91%
	Change in Inflation	5.336	2.864	1.863**	3.471**	11.39%

Dependent Variable	Independent Variable	Regression Coefficient	Std. Error	t-Statistic	F stats	R Square
	Change in Human Capital	-145.769	313.154	-0.465	0.216	0.79%
	Change in Patent Applications by residents	0.004	0.011	0.367	0.135	0.49%
	Change in Political stability	37.614	61.295	0.613	0.376	2.44%
	Recession as control variable	-21.392	33.249	-0.643	0.413	1.51%

The results of regression analysis with M&A Deal volume of the Indian firm as a dependent variable and *macroeconomic indicators* as independent variable. The results indicate that p value of the t statistics in case of all the selected variables (*GDP Growth rate, Change in trade openness, Change in Exports as percentage of GDP, Change in Inflation*) is found to be less than five percent significance level. Thus, at ninety-five percent confidence level the null hypothesis that “*There exists no significant impact of macroeconomic indicators on the M&A Deal volume of the Indian firm*” can be rejected. The results reported that these *macroeconomic indicators* have significant positive impact on the *M&A Deal volume of the Indian firm*. The F statistics for all these variables are found to be significant indicating that the regression model is statistically fit.

3.3 Quantile Regression

The quantile regression is applied with the five level of percentiles namely 20th percentile, 40th percentile, 50th percentile, 60th percentile and 80th percentile. The deal volume in M&A is expected to be different at the different changes occurs in economic indicators. The deal volume is expected to change with higher changes in economic indicators of the India. The results of the quantile regression for each economic indicator are shown below:

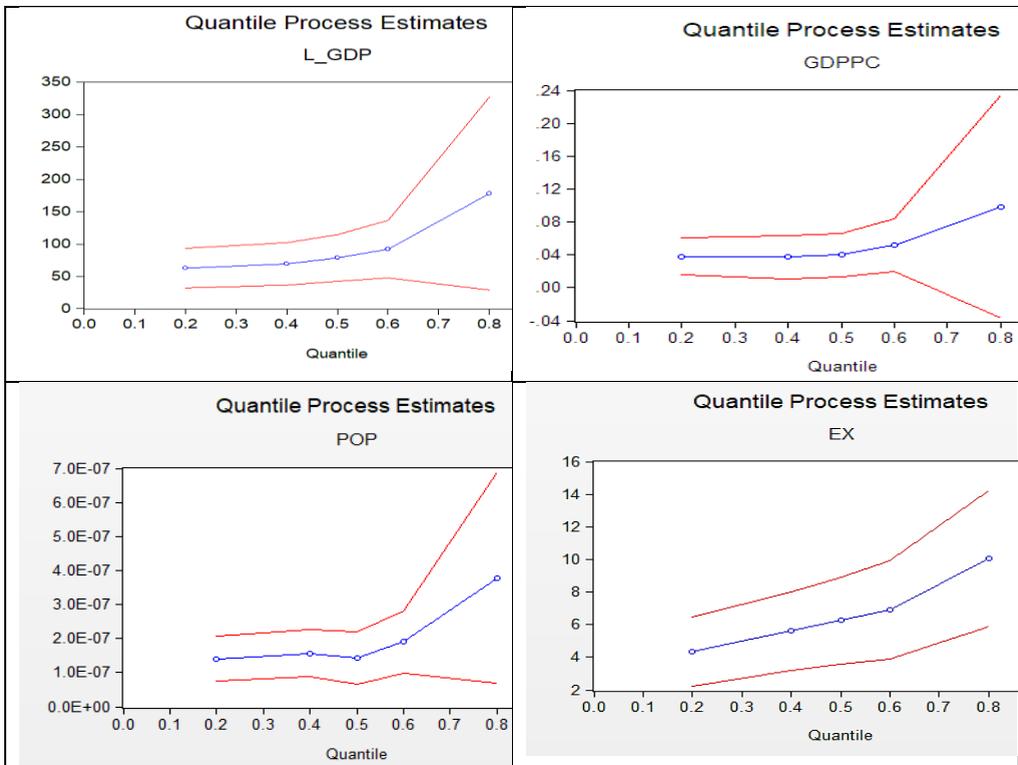
Table 5: Results of Quantile Regression

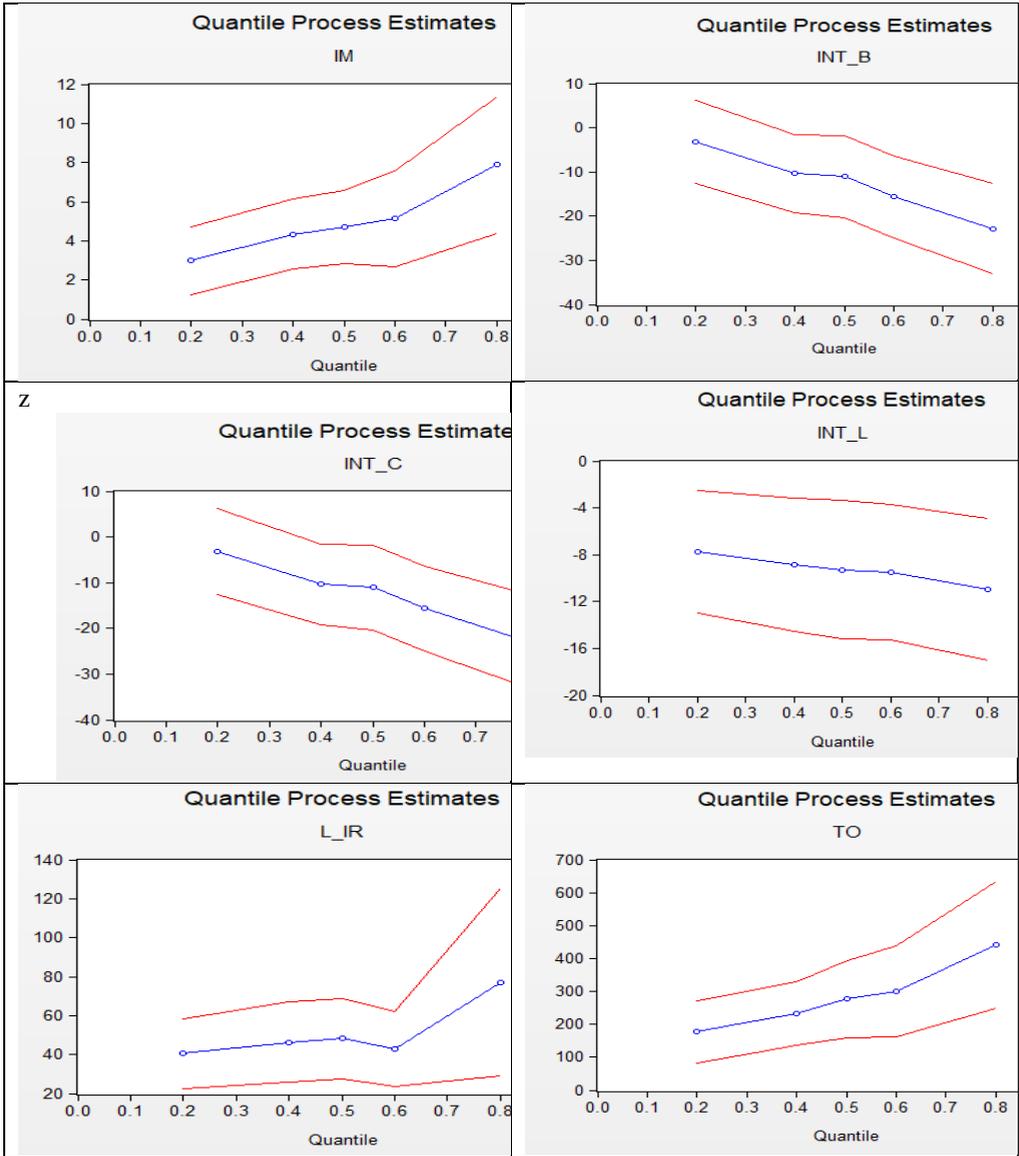
Quantile Process Estimates				
	Quantile	Coefficient	Std. Error	t-Statistic
L_GDP	0.200	62.637	15.652	4.001**
	0.400	69.223	16.767	4.128**
	0.500	78.448	18.436	4.255**
	0.600	91.918	22.722	4.045**
	0.800	177.90	76.075	2.338**
GDPPC	0.200	0.038	0.011	3.332**
	0.400	0.037	0.013	2.773**
	0.500	0.039	0.013	2.921**

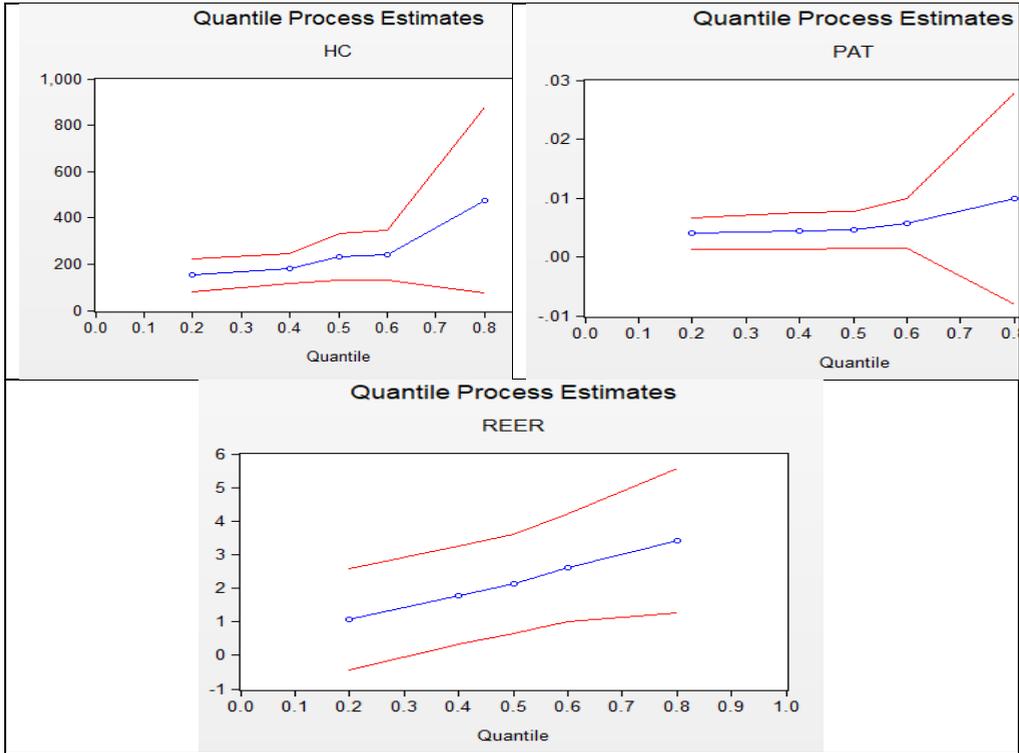
Quantile Process Estimates				
	0.600	0.051	0.016	3.149**
	0.800	0.098	0.069	1.426
POP	0.200	1.40E-07	3.36E-08	4.180**
	0.400	1.57E-07	3.55E-08	4.432**
	0.500	1.43E-07	3.87E-08	3.692**
	0.600	1.90E-07	4.71E-08	4.028**
	0.800	3.78E-07	1.58E-07	2.392**
EX	0.200	4.353	1.091	3.989**
	0.400	5.610	1.228	4.567**
	0.500	6.243	1.354	4.608**
	0.600	6.922	1.548	4.470**
IM	0.800	10.067	2.130	4.725**
	0.200	2.984	0.886	3.368**
	0.400	4.340	0.908	4.776**
	0.500	4.690	0.950	4.937**
	0.600	5.125	1.256	4.078**
INT_B	0.800	7.877	1.792	4.395**
	0.200	-3.272	4.805	-0.681
	0.400	-10.333	4.519	-2.286**
	0.500	-11.047	4.723	-2.338**
	0.600	-15.619	4.725	-3.304**
INT_C	0.800	-22.833	5.226	-4.369**
	0.200	-3.272	4.805	-0.681
	0.400	-10.333	4.519	-2.286**
	0.500	-11.047	4.723	-2.338**
	0.600	-15.619	4.725	-3.304**
INT_L	0.800	-22.833	5.226	-4.369**
	0.200	-7.764	2.666	-2.912
	0.400	-8.828	2.902	-3.041**
	0.500	-9.284	3.008	-3.086**
	0.600	-9.492	2.957	-3.209**
L_IR	0.800	-10.971	3.073	-3.570**
	0.200	40.369	9.153	4.410**
	0.400	46.274	10.482	4.414**
	0.500	48.144	10.488	4.590**
	0.600	42.807	9.712	4.407**
TO	0.800	77.130	24.583	3.137**
	0.200	177.078	48.024	3.687**
	0.400	233.285	49.165	4.744**
	0.500	276.740	60.042	4.609**
	0.600	299.682	70.362	4.259**
HC	0.800	441.241	98.259	4.490**
	0.200	152.972	36.482	4.193**
	0.400	181.723	32.360	5.615**
	0.500	231.327	52.136	4.436**

Quantile Process Estimates				
	0.600	238.547	55.015	4.336**
	0.800	476.775	204.551	2.330**
PAT	0.200	0.003	0.001	2.937**
	0.400	0.004	0.001	2.830**
	0.500	0.004	0.001	2.829**
	0.600	0.005	0.002	2.694**
	0.800	0.009	0.009	1.086
		0.200	1.065	0.768
REER	0.400	1.793	0.752	2.382**
	0.500	2.130	0.755	2.820**
	0.600	2.606	0.822	3.169**
	0.800	3.422	1.099	3.111**
		0.200	1.065	0.768

Table 6: Quantile regression graphs







The deal volume is found to be significantly influenced by the gross domestic product, population, total exports, total imports, international reserves, trade openness and human capital of Indian economy at all the selected percentiles (reported in table). While gross domestic product per capita, and patents are significant at 20th, 40th, 50th and 60th percentile, and exchange rate is significant at 40th, 50th, 60th and 80th percentile. The results indicates that deal volume increases with the increase in all these variables of Indian economy. It means that the deal volume of M&A is highly responsive at higher level of changes in these variables. The figures in table 6 of all variables is upwards sloping indicating the increase in deal volume at higher level of these factors in India.

The deal volume is found to be significantly influenced by the interest rates (interbank interest rate, lending interest rate and central bank rate) of Indian economy at 40th, 50th, 60th, and 80th percentiles (reported in table). The results indicates that deal volume increases with the decrease in interest rate of the country and vice versa. It means that the deal volume of M&A is highly

responsive at higher level of changes in interest rate. The figures in table 6 of interest rate is downwards sloping indicating the increase in deal volume at lower level of interest rate in India.

4. CONCLUSION

This paper attempted to gauge the impact of home macroeconomic variables on outbound M&A deals by Indian companies. The implications of the findings of this study will not just be useful for government policies aimed at promoting OFDI from India but also for emerging multinational corporations to formulate strategies to spread their business overseas.

As per the results of quantile regression, there is positive a significant influence of market size on the outbound M&A deal volume of Indian companies as GDP, population and GDP per capita all tend to signal an increase in deal volume with increase in these variables at higher percentiles. This is in sync with this notion that economic development enables a firm to develop competence and specific strengths which can be fruitfully exploited by investing abroad (Bhasin et al., 2013; Chen, 2015; Buckley et al., 2006; Deng, 2004; Taylor, 2002; Zhang, 2003).

Trade openness and liberalization also being a positively significant determinant of overseas acquisitions by Indian firms, reconfirms the research results of Bhasin et. al. (2013), Das (2013), Haiyan (2017). Trade openness have been approximated by proportion of total trade (export and import) to GDP of India, total exports, total imports and accumulated international reserves by RBI. India Government thus needs to take initiative in framing liberal trade policies, resulting in rising proportion of trade activities and thus increased outward cross border acquisitions. Also, Indian firms having prior experience of exporting to a host country, generally develops the necessary background of knowledge regarding the destinations legal system, prevalent business practices and other essential know-hows of sustaining a successful business model, thus this export experience acts as a motivator for making such foreign investment.

The significant and positive impact of real effective exchange rates on volume of outbound M&A from India substantiates the earlier studies by Pantelidis and Kyrkilis (2003 & 2005) and goes well with the theoretical background (Aliber,1970) which argues that countries whose currencies are stronger, pushes firms to invest overseas, lowering the capital requirement of investing abroad thus making outbound acquisitions easier on financial front. Indian government policies and decisions must aim at strengthening rupee at the global level, promoting

exports and increasing the accumulation of international reserves will ultimately lead to betterment of India's balance of payments, thus contributing towards appreciation of rupee. Also, Indians firms should look forward to successful investment in countries whose currency is weaker, thus lowering the operating and investing cost resulting in higher profit figures.

Indian interest rates are significant and have an inverse impact on outward cross-border M&A deals by Indian firms. This is a boon for an economy which is seeking capital abundance for investing abroad. Prevalent low interest rates in home country, results in capital abundance and thus reduces the opportunity cost of capital. Deducing from the above statement, companies with large capital base would hunt for profitable investment ventures abroad, this leads to increase in investment overseas (Haiyan, 2017; Clegg, 1987; Prugel, 1981; Lall, 1980; Grubaugh, 1987; Pantelidis and Kyrkilis, 2005).

Hence the findings of the paper establish key takeaways for our Indian companies as well as policy makers for 'going-out' and realizing high quality development, thus benefiting the economy and our society at large.

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AN ECONOMETRIC STUDY OF HERDING BEHAVIOUR OF DOMESTIC INSTITUTIONAL INVESTORS IN INDIAN CAPITAL MARKET: AN AUTO REGRESSIVE DISTRIBUTED LAG APPROACH

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Abstract: *The Indian equity market is one of emerging markets' best-performing and most promising markets. The funds that play a significant role in the Indian capital market are divided into two categories: domestic institutional flows and foreign institutional flows. There have been several studies on the flows of funds from foreign institutional investors, but only a few studies on domestic institutional investors have been conducted. Using monthly data from 2007 to 2021, this research study focuses on the impact of domestic institutional investment flow on the performance of stock market indexes. The study takes into account two sorts of variables: net flows of domestic institutional investors and the Sensex index. The data was obtained from the Reserve Bank of India's official website. The Granger Causality Test and the Auto Regressive Distributed Lag (ARDL) model reveal that domestic institutional investors have no beneficial impact on the Sensex since their investments have a short run impact on the index's movement during the entire study period.*

Keywords: *DII, Stock Market, ARDL, AIC, ADF.*

1. INTRODUCTION

An economy's ability to promote and sustain growth is heavily reliant on the functioning of the capital market. It serves as a crucial and efficient mechanism for channeling and mobilizing capital to enterprises, both private and public, in order

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to promote economic growth. It is critical in mobilizing savings for investment in productive assets with a view to improving a country's long-term growth prospects, and it serves as a major catalyst in the transformation of the economy into a more efficient, innovative, and competitive market place in the global arena, among other things. It is a reliable source of investment in the economy that is cost-effective. A new era in Indian financial reform began with the founding of the Securities and Exchange Board of India (SEBI). The Securities and Exchange Board of India Act 1992 specifies how to safeguard investors and regulate the securities market. Various laws have been passed from time to time in order to support and maintain a healthy growth of the Indian securities market. The Securities and Exchange Board of India support the orderly and healthy expansion of the Indian capital market. When an economy's capital market is well-developed, it reflects the economic conditions and progress of the economy.

The Indian equity market is one of the most successful and promising markets in the world's emerging economies, with a record of strong performance. The funds that play a significant role in the Indian Capital Market are divided into two categories: domestic institutional flows and foreign institutional flows. Domestic institutional flows are the primary source of funds for the Indian Capital Market. Since the Financial Liberalization Act of 1991, the Indian stock market has experienced a significant increase in the number of foreign institutional investors. The inflows of Foreign Institutional Investors into the Indian capital market were critical to the market's health. Normally, when foreign institutional investors (FIIs) are the net purchasers, the market experiences a rise; but, when they become the net selling, the market experiences a precipitous decline (Bikhchandani and Sharma 2001). Domestic players, on the other hand, were maturing slowly but steadily over time. On the other hand, they were making significant investments in the market, giving it a more stable environment in which to invest. Our study is unique in that it focuses solely on the investment patterns of DIIs, in contrast to all other previous studies, which were primarily concerned with FIIs' investment patterns.

Generally speaking, domestic institutional investors refer to Indian institutional investors who make investments in the Indian financial market. DIIs are mainly mutual fund firms, insurance companies, and banks in India. Prior to 2007, there was no consolidated data for domestic institutional investors; however, since 2007, the Securities and Exchange Board of India has taken the initiative and made the consolidated data for domestic institutional investors. A very essential and crucial role in providing support to the Indian stock market is played by DIIs, particularly when Foreign Institutional Investors (FIIs) become net sellers (Bose,

2012). The purpose of this study is to determine the impact of domestic institutional investors on the Indian stock market. It seeks to determine whether or not the flows, whether positive or negative, have any effect on the performance of the Indian stock exchange. It refers to the role of domestic institutional investment plays in increasing or reducing the performance of the Indian stock market. This type of investment decision is influenced by a variety of domestic economic and political developments as well as international trends.

It is necessary to establish powerful DIIs in order to counteract the disruptive nature of FII trading. These DIIs would act as a buffer against the negative impact of FII trading. When foreign institutional investors (FIIs) withdraw capital from the market, domestic institutional investors (DIIs) tend to support the market, as was the case in 2018, when FIIs sold more than Rs. 340 billion while DIIs remained net buyers of more than Rs. 1090 billion. Since the Narendra Modi-led National Democratic Alliance (NDA) government came to office in 2014, Indian equity markets have outpaced emerging markets by 26 percent in dollar terms over the last four years.. Over the last four years, DIIs have also invested significantly more than FIIs, primarily in Indian equities, where they have made significant infusions of capital. Despite the fact that domestic institutional investors are pouring large sums of money into domestic equities, they are unable to absorb the influx of foreign capital in the near to medium term. Despite the fact that mutual funds are rising in influence, they are still a long way from matching the power of foreign institutional flows. Because they support the market and act as a buffer when the market falls, they have been able to acquire equities at reduced prices at every downturn in the market, which has given them comfort. DIIs have the potential to outperform FIIs in terms of overall impact, but this will only be feasible over a period of time as the scale of their investment grows. For domestic institutional investors (DIIs), the vast majority of domestic savings is channeled via mutual fund investments. It was already obvious in the last few years that there was a shift toward financial savings. When opposed to actual assets such as gold and real estate, Indians are increasingly putting their money into financial investments.

2. REVIEW OF THE LITERATURE

The Indian capital market is dominated by institutional investors, who play a key role. In the first review section, we analyse the significant contribution of foreign institutional investors (FIIs) to the Indian capital market, as well as their investing patterns and the volatility of indices as a result of FIIs. According to De

Mello (1999) and Narayanan and Bhat (2011), foreign capital inflows are a significant driver of economic growth in developing countries. According to Arora and Baluja (2013), in comparison to foreign direct investments (FDIs), foreign institutional investments (FIIs) are short-term in nature and can be withdrawn at any time. According to Jain, M., et al. (2012), “the Sensex has gone upwards when there are positive inflows of FIIs and has moved downwards when there are negative inflows of FIIs.” Pal (2005) discovered that foreign institutional investors' (FIIs) trading activities in the Indian stock market have expanded dramatically, and that the stock market's high turnover is primarily due to FIIs trading. Foreign capital flows and the Indian stock market have a strong positive link, according to Sultana and Pardhasaradhi (2012), who discovered a high degree of statistically significant correlation between them. Jain et al. (2012) discovered a highly favourable link between foreign institutional investors' investments and the Sensex. Anubha (2013) discovered that foreign institutional investors' (FIIs) investments have a statistically significant positive impact on the stock market and on major stock indices. Agarwal (1997) and Nair and Trivedi (2003) discovered that foreign institutional investors' (FIIs) investment and equities returns had a significant positive association. Behera (2017) discovered that foreign institutional investors' (FIIs) investments have a favourable influence on both liquidity and returns. Furthermore, foreign institutional investors (FIIs) investments create volatility in the Indian stock market. Krishna (2009) indicated in his research that foreign institutional investors' (FIIs) involvement has a significant impact on both liquidity and volatility. According to Batra (2003) and Karmakar (2006), the investment by foreign institutional investors (FIIs) contributed to the increase in volatility of the stock market. According to Mohan (2006), FIIs entry into the market has a destabilizing effect on the values of numerous equities. According to Bohn and Tesar (1996) and Berko and Clark (1997), foreign institutional investors (FIIs) purchase when the market rises and sell when the market falls, and that this conduct causes stock prices to deviate from their underlying values. It was demonstrated by Gupta (2011) that foreign institutional investors' investment flows are unpredictable, and that the heightened volatility associated with FIIs investments leads to dramatic price changes in the Indian stock market. Because of the large volume of investments, Gordon and Gupta (2003) found that foreign institutional investors (FIIs) perform the role of market makers and book their gains, meaning that they buy financial assets when the prices are decreasing and sell them when the prices are climbing. According to Kumar et al. (2002), foreign institutional investors (FIIs) and Indian mutual funds are the most significant forces

in the capital market. According to Loomba (2012), heightened volatility associated with FIIs investments results in extreme price changes, and FIIs were the net sellers in all of the major market crashes during the period under consideration. Joo and Mir (1914) discovered that the volatility of the Indian stock market has grown over the period of study by the Foreign Institutional Investors (FIIs). The amount of volatility peaked during the financial crisis and then gradually declined to moderate levels over the following months.

According to Mazumdar (2004), foreign institutional investors (FII) have increased liquidity in the Indian stock market (including both BSE and NSE securities). Finally, according to the findings of the study, a positive correlation was discovered between foreign institutional investors, market capitalization, and the BSE and NSE indices, demonstrating that foreign institutional investors were a significant driver of the liquidity and volatility of the Indian capital market. Mukherjee (2011) conducted an investigation on the stochastic causal relationship between foreign institutional investment (FII) and stock market return. The purpose of this study was to gain a better understanding of the dynamic relationship between Indian stock market results based on the BSE Sensex and foreign institutional investment (FII) flows. The study, which aimed to determine the direction of causality by the use of the granger causality test, discovered that both stock market returns and FII granger flows were caused by one another. In other words, it had been discovered that both benefited from bidirectional causality.

Bose and Coondoo (2004) investigated the influence of several policy changes affecting foreign institutional investment on the performance of the Indian stock market. When the Multivariate Garch Model was employed for this purpose, it was discovered that there has been a rise in foreign institutional investment in the Indian economy since the liberalization of trade and commerce. According to Mishra and Pradhan (2010), the influence of net equity investment by foreign institutional investors on the performance of the Indian stock market return was investigated. Using Regression Analysis, it was discovered that foreign institutional fund flows are responsible for a 19.74 percent change in the Sensex return. Clark and Berko (1997) evaluated the causation behavior of the variables using daily data on foreign institutional flows and the closing price of the Nifty index, as provided by the National Stock Exchange of India. To conduct this investigation, the time span from January 2003 to February 2011 was taken into consideration. According to the findings, foreign funds flowing into the stock market have a short-term effect on returns, while the returns themselves have an impact on them in the long run.

Sharma & Mittal (2019) investigated the Causal Relationship between Foreign Portfolio Investment and Indian Stock market NSE index Nifty Return. Different variables associated with portfolio investment such as FPIP, FPIS, FPIN, Ratio FPIP, Ratio FPIS, Ratio FPIN have been taken in their study. NSE Nifty has been taken as the benchmark for the Indian stock market. Monthly data from April 2010 to March 2019 have been taken as the sample. In their study they check the causality for the time series data Granger Causality test has been applied. The result of the study showed that there is no causality between FPIS and NSE Return and the same result is reported for Ratio FPIN and NSE Returns during the study period. Result also revealed the evidence for bi-directional causality between Ratio of FPIP and Returns, Unidirectional Causality found to exist when causality test is applied on the Ratio of FPIS, FPIP, FPIN, and NSE Returns for the period under study. Sias (2004) in their study did not find any evidence of herding Institutional investors' demand for a security this quarter is positively correlated with their demand for the security last quarter. Results of the study are most consistent with the hypothesis that institutions herd as a result of inferring information from each other's trades. Lin and Swanson (2008) investigated the herding behaviors and investment performance of foreign investors in the U.S. market. Little evidence is found of foreigners' herding behavior within one time period. Foreigners' buy-side behavior of buying U.S. equities as a group is positively related to past high returns in the U.S. market and this buy-side behavior leads to superior investment performance.

After that, we discuss about the role of domestic institutional investors in the Indian capital market in the second half of the study. Ajay (2008) conducted a study on the preferences of foreign institutional investors (FIIs) and domestic institutional investors (DIIs) in the Indian stock market. Foreign institutional investors (FIIs) are not the sole participants in the Indian capital market. DIIs played a significant part in the development of India's capital market. He also looks into the shareholding patterns of foreign institutional investors (FIIs) and domestic institutional investors (DIIs) in a developing market economy like India. Kumar (2005) investigated the impact of foreign institutional investors and Indian mutual fund investors on the Indian stock market. Both of these entities have a substantial impact on the functioning of the Indian stock market. Natchimuthu et al (2018) discovered that the FII responds positively to an impulse from Nifty returns, whereas the DII responds negatively to an impulse from the Nifty returns. According to Bose (2012), the influence of stock market returns can be dominated by the effect of foreign institutional investors (FIIs) investments as compared to

mutual fund investments. The author discovered that there is no causal association between domestic mutual fund flows and the return on the stock market.

In accordance with the findings of the evaluation of the literature, a significant number of studies have been done in relation to the role and influence of foreign institutional investment on the Indian stock market. It has been found in various studies that foreign institutional investment is the most important factor to consider. Few studies have taken into account other types of institutional investment, such as domestic institutional investment, and the impact they have on the stock market. As a result, the primary focus of this research article is on the causal relationship between domestic institutional investment and the movement of the Sensex index.

3. RESEARCH GAP

The relationship between foreign institutional investment and Indian equity markets has been extensively researched, but comparatively few research has been conducted to analyse the impact of domestic institutional investors on the Indian stock markets, despite the fact that domestic institutional investors are the second largest investors in the Indian equity markets.

Objective of the Study

- To study the overall concept of Domestic Institutional Investors in Indian Stock Market.
- To know the causal relationship between Domestic Institutional Investment and Indian capital market.
- To analyse the impact of Domestic Institutional Investment on Indian capital Market.

Hypothesis of the Study

There is significant impact of Domestic Institutional Investment on Indian capital market.

Significance of the Study

There is a strong likelihood of the Indian Stock Market development, and the DII plays a vital part in both the upward and downward movement of the market. The purpose of this study is to determine whether or not domestic institutional investors (DIIs) are significant role in the Indian stock market. In order to better understand the investment pattern of domestic institutional

investment (DII) towards India. This study may be of assistance to researchers, corporations, investors, portfolio managers, research institutions, and other entities that are involved either directly or indirectly with the operations of the capital market activities.

Scope of the Study

The study is focused on India, and the reason for this is that the Indian economy is one of the fastest expanding in the world, and as a result, the Indian stock market has received the greatest amount of institutional investment from both foreign and local investors. The Bombay Stock Exchange is one of India's oldest stock exchanges, having been established in 1895. A significant amount of money is being invested by institutional investors from within the country in these markets. The stock market of India is represented by BSE (Sensex) in this research study. In order to determine the impact of domestic institutional investors on the performance of the Sensex, this index has been selected for investigation. Domestic Institutional Investors, in addition to Foreign Institutional Investors, are the largest investors in the industry, and it is critical to grasp the general tactics of the domestic players operating in the market. Domestic Institutional Investors are discussed extensively in this study, including which companies they invest in, whether their investments are dependent on the direction of the Sensex, and whether or not their investments have an impact on the performance of the Indian Stock Market. The study also includes a discussion of the impact of foreign institutional investors on the performance of the Indian Stock Market.

4. RESEARCH METHODOLOGY

Sources of Data

The research is primarily based on secondary data collected between 2007 and 2021. The capital flows pertaining to domestic institutional investors (DIIs) monthly investment in India have been compiled from the Reserve Bank of India's (RBI) database. BSE market data (Sensex data) can be obtained via the BSE's official website, which is www.bse.com.

Data Analysis

Correlation analysis can be used to determine the relationship between DIIs' investments in the Sensex performance. When using the Auto Regressive Distributed Lag (ARDL) model to study the short run and long run equilibrium, it is possible to determine the precise impact of DIIs investment on capital market

return. A model in which the dependent variable is a component of its own past lagged values as well as current and previous values of other explanatory variables is known as an ARDL model. The Granger Causality Test has also been utilised to strengthen the conclusions reached in this study.

Domestic Institutional Investment in India

The term "domestic institutional investors" refers to institutional investors based in India who make investments in the country's capital market. DIIs have been pouring in a considerable amount of money into the Indian market, which is a positive development because they are doing a balancing act that is counter to the outflows of FII money from the country. The DII money has really been able to keep the market afloat, which has supplied the market with much-needed stability. Figure 1 demonstrates that DIIs have withdrawn the largest amount of money, Rs. -48319 Crores, and made the largest investment, Rs. 55591 Crores, respectively. It is estimated that DIIs received Rs.1564 crore on an average monthly basis throughout the time. The investment of DIIs and the performance of the Sensex have a negative correlation coefficient. The outcome was unexpected, and it was certainly startling. It is possible to determine the precise influence of DIIs on the movement of the stock market with the use of advanced econometric tools and techniques.

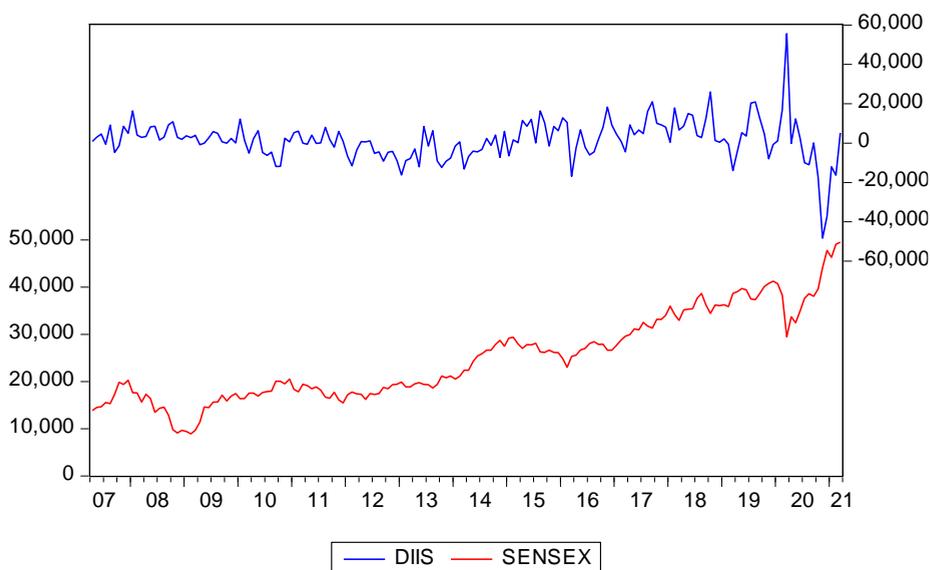


Figure 1: Investment Behaviour of DIIs and Sensex performance
Unit Root Test

The unit root test is primarily used to determine the data's stationarity properties. The majority of economic data has a unit root (non stationary), which causes erroneous regression. To circumvent this issue, the study uses the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test statistics to check for stationarity in time series data. Domestic Institutional Investors (DIIs) investment is integrated at level , while market index is integrated at level one, as shown in Table 1.

Table 1: ADF Unit Root Tests Results

Series	Order of Integration
DIIs	I(0)
Sensex	I(1)

Source: Author's Calculation

The Econometric Model

$$Sensex = \alpha + \beta_1 DIIs + \epsilon \quad (1)$$

Sensex = Indian Stock Market Index

DIIs= Domestic Institutional investment

ϵ =Error Term

Impact of DIIs on Indian Capital Market

The Autoregressive Distributed Lag (ARDL) model is a technique for estimating the impact of domestic institutional investment short- and long-run coefficients of the Sensex (BSE) in Indian capital market simultaneously. In this model, the number of explanatory factors affects the dependent variable in both the present and previous periods. That is, the cumulative effect of all explanatory variables on the dependent variable. The model's dependent variable is the Sensex, whereas the model's independent variable is Domestic Institution Investment. The independent variable should be I (0), whereas the dependent variable should be I (1), or a mixed order of integration. The R-square value is 98 percent, as shown in Table 2. This means that DIIs (independent variables) account for 98 percent of the volatility in the Sensex index (dependent variable).

Table 2: ARDL Model for Sensex Index and DIIs

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SENSEX(-1)	1.018207	0.008615	118.1847	0.0000
DIIS	-0.125312	0.008752	-14.31787	0.0000
DIIS(-1)	0.054022	0.009658	5.593222	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DIIS(-2)	0.012787	0.008834	1.447473	0.1497
C	-150.1899	227.5246	-0.660104	0.5101
R-squared	0.988626	Mean dependent var		25017.11
Adjusted R-squared	0.988344	S.D. dependent var		9239.149
S.E. of regression	997.5006	Akaike info criterion		16.67804

Accordingly a linear equation model is developed in the following way:

$$Sensex = \alpha + \beta_1 Sensex_{t-1} + \beta_2 DII + \beta_3 DIIs_{t-1} + \beta_4 DIIs_{t-2} + \epsilon \quad (2)$$

Where $t - 1$ is variables' lagged value by one period, $t - 2$ is variables' lagged value By two period and ϵ is an error term. Thelag length is determined automatically by Akaike Information Criterion(AIC).

Optimum lag length criteria

The Akaike Information Criterion (AIC) is used to determine the model's optimal lag length, or how many lags are utilised in the model. The lower the AIC score, the better the model, according to this test. As shown in Figure 2, the top 20 models are those with the lowest AIC values.

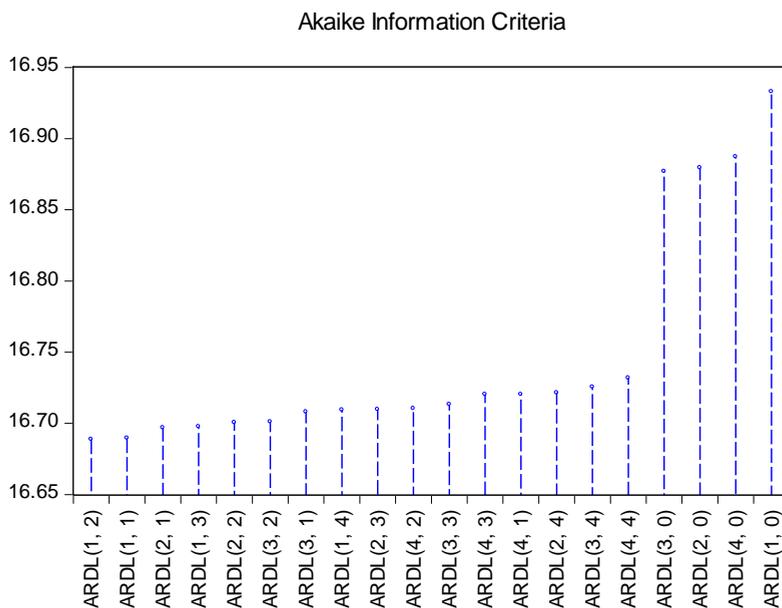


Figure 2: Optimum Lag Length Criteria

Source: Author's Calculation

The best lag length is ARDL, as indicated by the lowest AIC value (1, 2). The dependent variable received lag value 1 and the independent variable received lag value 2, with a 16.67 AIC value.

Table 3: Breusch-Godfrey Serial Correlation LM Test for DIIs and its Stock Market in India

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.690975	Prob. F(2,159)	0.5026
Obs*R-squared	1.430359	Prob. Chi-Square(2)	0.4891

Source: Author's Calculation

Table 3 shows the results of the Breusch-Godfrey(1978) LM Assess, which is used to test or check serial correlation. The P value is greater than 0.05, indicating that there is no auto correlation and thus no concern with Serial Correlation.

Co-integration using the ARDL Bound Test Approach

The next stage is to analyse the co-integration or long run relationship among the variables of the model after selecting the order of integration of all variables and lag length selection. If the estimated F-statistics are higher than the upper-bound critical value at the 5% level, then indicates that the variables in the model have a co-integrating connection. The null hypothesis of the ARDL Bounds Test assumes that the variables have no long-term association. The F-statistic value is less than the critical value of the upper boundaries at the 5% level of significance, it indicates that the null hypothesis is accepted, which meets the ARDL Test's required condition (no co-integration or long-run link between the variables).

Table 4: ARDL Bound Test

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	20.89882	1

Critical Value Bounds

Significance	I(0) Bound	I(1) Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: Author's Calculation

The resolutions of the bound test are described in Table 4. The computed F-statistic is 20.89 which is more than the upper bound at 5 percent level. It indicate that there is a long term relationship between variables of this model. Therefore our study conclude that there exist there is a long run relationship or co-integration between domestic institutional investment and the stock market performance in India.

Table 5: ARDL Cointegrating and Long run form of DIIs and Sensex

ARDL Cointegrating And Long Run Form
Dependent Variable: SENSEX

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DIIS)	-0.125312	0.008752	-14.317875	0.0000
D(DIIS(-1))	-0.012787	0.008834	-1.447473	0.1497
CointEq(-1)	0.018207	0.008615	2.113336	0.0361
Cointeq = SENSEX - (3.2132*DIIS + 8248.9225)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIIS	3.213168	1.597687	2.011137	0.0460
C	8248.922517	8938.339484	0.922870	0.3575

Source: Author's Calculation

ARDL model estimate the impact of domestic institutional investment on stock market performance and analyses the short run and the long run effect of domestic institutional investment on capital market performance in India. The results illustrated in Table 5 indicates that there is a long run positive relationship between DIIs and Sensex but the Error Correction Term (ECT) is significant but

not negatively signed (refer Table 5). The ECT coefficient shows how quickly variables return to equilibrium and it should have a statistically significant coefficient with a negative sign. In this case disequilibrium exist.

Causality Tests using Granger

Granger causality is a strategy that requires the stationarity condition to be met first. This econometric technique aids in determining if the values of one time series can be used to forecast the values of another stationary time series. It essentially establishes the causality relationship between the various time series. The first step in running the Granger Causality is to ensure that the variables of interest are stationary, followed by determining the ideal lag duration. Different criteria, such as Akaike Information Criteria or Schwarz Information Criteria, can be used to pick the best lags. The Akaike Information Criterion was used to select the number of delays for the causality test in this investigation. The following hypothesis underpins Granger causality:

Null hypothesis (H0): X variable does not granger cause variable Y.

Alternate Hypothesis (H1): X variable does granger cause variable Y.

If the P value is less than 0.05 percent, the level of significance is considered low. As a result, the null hypothesis is rejected. If the p value is greater than the significance level, the null hypothesis is accepted and the alternate hypothesis is rejected. We look into the causal linkages between net DIIs flows and the Sensex index's performance. We use causality analysis to see if DIIs flows drive Sensex performance or if Sensex performance drives DIIs performance.

Table 6: Pairwise Granger Causality Test between DIIs and Market Index

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
SENSEX does not Granger Cause DIIS	166	1.76044	0.1753
DIIS does not Granger Cause SENSEX		0.33925	0.7128

Source: Author's Calculation

To investigate the causal relationship between DIIs and market movements, the Granger-causality test is used. For the entire sample period, Table-6 shows pairwise Granger causality test results with delays as two is an adequate lag order selects in terms of the Akaike Information Criteria (AIC). Because Sensex has been accepted, null hypotheses of DIIs do not granger. The second null hypothesis was

accepted, indicating that there is no causation between the Sensex and DIIs investment. During the study period, the results demonstrated that there was no causation between the factors.

The Study's Practical Implications

The study's main conclusion is that capital market regulators should maintain a careful eye on the activities of domestic institutional investors herding behaviour, as their trading patterns influence stock market performance in long run. As a result, a thorough investigation of the causal relationship between domestic institutional investment and stock market performance is required, as it will aid policymakers in the formulation of stock market performance and investment limit laws. As the Indian capital market's watchdog, the SEBI should play a key role in instilling trust in domestic private investors, encouraging them to actively participate in the stock market. This will help to mitigate the impact of foreign institutional investors' herding behaviour on the Indian stock market. This study will help regulatory authorities to improvise on policy making on investment in stock market for domestic insurance companies, financial institution, venture capital fund and mutual fund. The surge in domestic institutional equity inflows, will help to insulate the Indian equity market from the high velocity traders of foreign investors.

Future Research Prospects

The study focused solely on the causal relationship between domestic institutional investment and stock market performance, disregarding other macroeconomic factors that influence stock market performance. For the purposes of this analysis, only a single BSE index was used. In the future, other NSE indices may be included in the research. This could result in a more reliable result as well as a better understanding of the causality between these variables.

5. CONCLUSION

It was established that DIIs influenced the stock market, but not in a significant way, because other players, primarily foreign institutional players or investors, also play a significant role in the performance of the Indian capital market. DIIs play a critical role in channelling individual Indian investors' funds and then investing in the Indian stock market. Domestic institutional investors have no positive impact on the performance of the Sensex, during the study period. The empirical findings imply that domestic institutional investors and stock market performance in India have a negative association. The purchasing and selling of DIIs has little impact on the Sensex's movement or returns. In the future years, we expect DIIs to become a counterbalance to FIIs, as investment flows from consumers, pension funds, mutual funds, and SIPs are expected to expand as savings and tax planning increases. While it will take a few years DIIs to become the market's driving force, they will undoubtedly have a strong grip on Indian capital market.

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ERP AND FINANCIAL PERFORMANCE – CASE STUDY ON ROMANIAN COMPANIES

IULIA UNGUREANU*

Abstract *This study is conducted based on analysis of 397 companies from Romania. The study evaluates the impact of ERP solutions on the financial performance of companies, viewed from the perspective of the business model, in the sense of decreasing expenditures or increasing revenues and turnover. Using the Least Squares method (OLS) and the Difference in Difference model, the study results show that there is a strong correlation between the implementation of ERP solutions and the increase in turnover; respectively the decrease in revenues. The results obtained do not reveal an influence of the ERP implementation on the expenditures.*

Keywords: *ERP, financial performance, organizational performance, accounting and finances, efficiency, business model.*

JEL Classification: *M29*

1. INTRODUCTION

The Enterprise Resources Planning (ERP) systems are computer systems that integrate databases from a company. These systems are modular and allow further developments by adding new modules or functionalities (Ungureanu, 2020). The simplest ERP systems have in their structure databases representing accounting operations and databases with customers and suppliers, and the most complex ERPs integrate production flows or Business Intelligence modules. An ERP is a tool for implementing the company's strategic vision (Teittinen et al., 2013). Among the benefits of ERP implementations for top management, transparency and control are the most important. An advanced information technology of business flows directly impacts net sales (Edith Galy, Mary Jane Saucedo, 2014).

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The flow and the business model must be very carefully integrated in the ERP implementation, so that it has the expected effects. Inefficient workflow configuration can cause a loss of performance (Davenport, 2000) The implementation of ERP systems is not a simple process and due to an incorrect analysis of the business process and due to the lack of expertise in the testing process, major problems may arise in the implementation of these systems. In the absence of an efficient and correct implementation, the process itself can fail and can generate irrecoverable cost for the company.

With the help of ERP systems, all the business flows and the business model in a company can be designed, so that the company's activity turn out to be transparent, easy to transpose and analyze in various reports, based on which the management factors can take the best decisions in the shortest time. Most ERP systems integrate flows with customers, suppliers, and employees (Davenport, 1998). The central database of an ERP routes the data and it transposes into reports for managers and decision makers in the company.

In this article we aim to analyze how the implementation of an ERP system influences not only the revenues and the turnover, but also the impact that it may have on the expenditures of Romanian companies, given that this country is ranked, according to the index of the digital economy and society (DESI-2021), on the last place in the 28 EU Member States. Also, in Romania the level of acquisition of digital skills is among the lowest in Europe. ERP implementations and implicitly obtaining results that are reflected in the performance of companies require that both those who design the implementation and those who test, implement and effectively use in the Go-Live phases the ERP system to have advanced digital skills. The results of the study show that the implementation of such systems influences the revenues and turnover of companies, but does not influence in any way the expenditures of Romanian companies.

The remainder of our paper is structured as follows: Section 2 summarizes the literature review. Section 3 describes the data and methodology employed. Section 4 reports the empirical findings, while Section 5 presents the concluding remarks.

2. LITERATURE REVIEW

The implementation of an ERP system influences the performance of companies, approached from several points of view. Optimized long-term operational performance has been observed for companies that have adopted an ERP system (Nicolaou A.I, 2011). Also, companies benefit from the

implementation of ERP which results in simplifying processes, improving data accuracy and obtaining quality data / reports (Mabert V.A., 2001). Because performance is a generic term, it is possible to refer to it by denoting the company's "gain" from an economic, financial, social, management, technical perspective etc.

From a business model perspective, the utility and the benefit brought by the implementation of an ERP system is proven when a company achieve cost savings or increased revenues and turnover. Although the acquisition and implementation cost of these ERP systems are quite high and may increase over time with further developments (Shadi A., 2019), studies show that the benefits of owning and using such systems are likely to justify the high cost and they can increase the performance of the companies that implement them.

Studies show an improvement in productivity and the ratio between the cost of goods sold and revenues (Poston and Grabski, 2001). Moreover, (Legare, 2002) shows that the implementation of ERP determines a decrease in personnel expense (direct and indirect), but also a decrease in procurement and administrative expense as well as an increase in productivity.

If these effects may not be seen immediately after the implementation of such a system, after a more careful or improved configuration of the implemented system, the benefits will start to come. Thus, three years after the implementation of an ERP system, there is an improvement in performance resulting from a decrease in the cost of goods sold and an increase in productivity (Poston and Grabski, 2001). Due to the efficient configuration of flows with the help of ERP systems, companies can obtain important competitive advantage that materialize through the increase of revenues but also through the reductions of personnel cost (Allen, 2008). Cost and time savings in core business are direct benefits of an ERP implementation (Davenport, 2000).

As much as companies that adopt ERP systems adapt to change, they will improve the benefits of implementation until they achieve the desired performance. According to the studies, the performance obtained after the implementation of an ERP system will be even more visible, in general, starting with the second year from the implementation (Ross and Vitale, 2000; Betts, 2001; Al-Mashari et al., 2003; and Cosgrove Ware, 2003). Moreover, the performance obtained by the companies that realize various subsequent developments and upgrades, is superior to that of the companies that do not invest in improvements (Nicolaou and Bhattacharya., 2008).

The effects of implementing an ERP system propagate in both revenues and expenditures. An ERP implementation can significantly reduce costs, but it can

also have an effect on revenues. According to Rikhardsson and Kræmmergaard (2006), the effects on expenditures are easier to quantify, but in terms of revenues growth as an effect of implementation, such a result is more difficult to isolate from other variables that influence their growth. The implementation of an ERP system itself does not increase revenues. The improvement of services, products or processes with the help of ERP, along with the increase of capacity without an increase in cost, influences the increase of revenues.

3. DATA AND METHODOLOGY USED

3.1. Methodology

The impact of ERP implementation on company performance was estimated using the following regression equation and the least squares method (OLS):

$$Performance_{i,t} = \beta_0 + \beta_1 \times ERP_i + \Phi \times Control\ variables_{i,t} + \varepsilon_{i,t} \quad (1)$$

The dependent variable is represented by the company's performance indicators in year t expressed by a series of alternative indicators such as: Turnover, Expenditures, Revenues. The variable of interest is ERP which reflects the fact that the company has implemented an ERP system in the analyzed period taking a value 1 for companies that have implemented an ERP system and 0 for companies that have not implemented an ERP.

In the analysis, we used as Control Variables the following variables: Equity, Field of activity, BVB Listing and Number of Employees.

The coefficient β_1 reflects the impact of adopting an ERP system. A positive value of β_1 indicates that the adoption has led to an increase in performance, and a negative coefficient indicates a decrease in the performance of companies that have adopted an ERP system.

In the second part of the analysis, we considered impact quantification of the implementation of an ERP system on the performance of companies taking into account the time when they adopted the ERP system. To perform this analysis, we used the following Difference in Difference model:

$$Performance_{i,t} = \beta_0 + \beta_1 \times ERP_i + \beta_2 \times ERP_i \times Time + \Phi \times Control\ variables_{i,t} + \varepsilon_{i,t} \quad (2)$$

The variable Time takes the value 1 for the companies that implemented an ERP system in the post-implementation years and 0 for the companies that did not implement an ERP system and for the period before implementation for the companies that implemented an ERP system.

Thus, the coefficient β_1 quantifies the overall impact of the adoption of an ERP system by some companies, compared to the companies that have not adopted, and the coefficient β_2 quantifies the impact of the adoption of an ERP system, compared to the pre-adoption period.

Methods for comparing changes in groups over time (e.g. difference-in-difference) have been discussed in the literature (Singer, 2003) (Nichols, 2007) and (Skrondal, 2004).

Given previous studies, we anticipate that there is a positive influence of ERP implementation on turnover and revenues of Romanian companies, in terms of increasing these indicators, following the adoption of an ERP, and a negative influence on the Expenditures of companies that have adopted an ERP in the sense of decrease in Expenditures. Therefore, we have established the following hypotheses:

Hypothesis 1: The implementation of ERP systems causes an increase in the company's turnover.

Hypothesis 2: The implementation of ERP systems causes an increase in the company's revenues.

Hypothesis 3: The implementation of ERP systems causes a decrease in the company's expenditures.

3.2. Data used

The study of ERP systems influence on the business model of Romanian companies was conducted using a database containing information on 397 companies in Romania, of which 267 companies (67.25%) implemented an ERP system and 130 companies (32.75%) that did not implement such a system, for the period 1999-2020. Information on the implementation of ERP systems by companies was collected using a questionnaire distributed online (LinkedIn, e-mail, other social media networks). Thus, we collected data on ERP systems owned by companies, regarding the respondents' perception on the benefits or adverse effects of implementing ERP systems in companies, information on the type of modules implemented within the ERP system and the time of ERP implementation. The questionnaire was applied to a number of 500 companies, of which 446 companies completed the questionnaire. The final database contains a number of 397 companies, which provided all the information regarding the implementation of ERP systems and for which we found the financial data in the ORBIS database.

Out of the total of 267 companies that implemented an ERP type system, most of them, respectively 87.64%, implemented the Accounting module, followed

by 83.15% that implemented the Human Resource module, 79.03% which implemented CRM, 59.93% implemented the Procurement module, 50.19% implemented the Financial module, 26.97% implemented the Production module, 24.72% implemented the Project Planning module, 23.60% implemented Records office module, and 19.85% have implemented the Business Intelligence module. On average, each company implemented in the first ERP run, a number between 4 and 5 modules (Average: 4,550562). The minimum number of modules implemented by a company at the first ERP run is 1 and the maximum number of modules implemented is 9.

In Romania, the legislative regulations related to fiscal declarations, impose the necessity of having an ERP system that will automatically process the accounting data in the format requested by the authorities. Also, the declaration of salary income through the d112 declaration requires the use of software / modules to process the salary data and to automatically include it in the fiscal declaration. Declaration 394 regarding the deliveries / services and purchases made requires the use of CRM software to keep track of them. For this reason, companies that do not decide to outsource activities such as accounting or human resources decide to acquire and implement ERP systems that facilitate data management and processing.

In the studied sample, out of the total of 267 companies that implemented an ERP system, 64.79% of the companies, respectively 173 companies, implemented at least the Accounting, Human Resources and CRM modules. This could lead to the conclusion that these companies have implemented ERP for administrative purposes, and have less considered a possible increase in performance. But 50 of these companies have also implemented a Business Intelligence module, a module that is often used by companies that have made successful ERP implementations and want to optimize the business model with the help of analysis performed by the BI module. Out of the total of 267 companies that implemented ERP, 14.18% had a second implementation, respectively 38 companies. On average, these companies adopted 2 modules in the second implementation. Most companies have implemented the Business Intelligence module in the second implementation. It is interesting to note that in the second implementation, the companies added more modules and did not resume the initial one. This indicates that companies have improved the system implemented by adding new modules. The second implementation of ERP was adopted by companies with a performance well above the average of those who adopted ERP. Therefore, we can interpret that the most performing companies have subsequently implemented ERP modules due to the

recognition of the effects and the positive impact that the ERP implementation produces on the performance and the business model.

Most of the companies that completed the questionnaire are from the private sector, respectively 93.45%. Of these, 242 companies have implemented an ERP system and 129 companies have not implemented such a system. Only one public sector company did not implement ERP. The higher implementation rate for the public sector can be explained by the high cost of implementation, and by the fact that these companies had access to financing through projects with funds from the state budget or European funds, projects more difficult to access for private companies due to the eligibility criteria imposed.

225 companies (56.68% of the total number of analyzed companies) have less than 50 employees, followed by those in the range of 151-500 employees, respectively 15.37%. Therefore, most companies that responded to the questionnaire are companies with up to 500 employees. As expected, most companies that have not implemented an ERP system are in the range with the lowest number of employees, respectively a number of employees less than 50. All companies with more than 150 employees implemented ERP. Probably the high cost of an ERP implementation can be the cause of the implementation in a higher proportion by companies with over 150 employees. Large companies have easier access to financing through the implementation of projects financed by European funds.

141 companies, belong to different domains, that of services, production and trade, followed by 130 companies belonging of services. Most companies that have implemented an ERP belong to different domains of services, production and trade, respectively 91 companies, followed by 81 companies belonging to the production domain and 66 companies belonging to the services. Analyzing the data by activity sectors, the higher percentage of companies that have implemented ERP is related to companies in the Production and Trade sectors (over 80%). This can also be explained by the fact that recently the online commerce has developed a lot and the possession of an ERP system (CRM) is necessary for the evidence and organization of information. Also, most companies operating in the field of production are large companies that can bear the cost of an ERP implementation. (Ungureanu, 2021).

Table 1: Descriptive statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Turnover	6,089	279.5202	1414.691	-.085655	33350

Variable	Obs	Mean	Std. Dev.	Min	Max
Employee	6,089	492.6451	2013.714	0	44917
Equity	6,089	251.4033	2022.069	-4558	52850
Revenues	6,089	303.1958	1501.1	-.062989	35330
Expenses	6,089	289.2557	1481.84	-10.35286	39800
Productivity	6,089	.905217	4.548931	-.000043	130.1

To study the influence of ERP implementation on the business model explained by the variables Turnover, Expenditures and Revenues, we considered the database containing information for 397 companies, for the period 1999-2020. Due to the fact that there were no annual observations for all companies, an Unbalanced Panel database containing 6089 observations resulted. Descriptive statistics of the variables are presented in Table 1.

Table 2: Differences between companies that have implemented and those that have not implemented ERP systems

	No ERP	ERP	Difference	Mean
Turnover	7.963567	371.4519	-363.4883***	279.5202
Revenues	9.828012	402.5113	-392.6833***	303.1958
Expenditures	9.866793	383.8389	-373.9721***	289.2557

Note: ***, ** and * indicate statistical significance at 1%, 5% and 10% respectively

Univariate statistical analysis using the T test on the sample data reveals that companies that have implemented an ERP system record higher values for all variables related to the business model (Table 2).

4. RESULTS

Table 3 shows the results of the regression analysis on the impact of ERP adoption on the business model for 397 companies in Romania using the OLS method. Models 1, 2 and 3 show the estimates for each performance indicator: Turnover, Expenditures and Revenues.

Table 3: Results regarding the influence of ERP on the business model

	Model 1 Turnover	Model 2 Expenditures	Model 3 Revenues
ERP	5.5669*** (1.6301)	-1.3939 (3.5291)	-6.3728*** (1.7630)
Equity	-0.0107** (0.0042)	-0.0106 (0.0188)	0.0158*** (0.0043)

	Model 1 Turnover	Model 2 Expenditures	Model 3 Revenues
Domain	3.4014*** (1.2787)	1.1661 (1.5327)	-4.4948*** (1.4668)
BVB Listed	-10.4270 (16.6320)	-221.4874** (86.1394)	1.7766 (17.9338)
Employee no.	-9.0361*** (2.4372)	-1.7760 (6.9501)	12.2724*** (2.7914)
Cons	1.3529 (2.6355)	-0.0625 (6.2325)	-2.4195 (2.7927)
N	6089	6089	6089
R ² -adj	0.9933	0.9810	0.9935

Note: ***, ** and * to indicate statistical significance at 1%, 5% and 10% respectively. Standard errors are reported in parentheses.

The results of the regression analysis, show that the implementation of the ERP system had a statistically significant impact on the Turnover and Revenues.

The results of the regression analysis reveal that the impact of the implementation of ERP systems on the turnover was a positive and statistically significant one. In the case of the first model (Turnover Model 1), the determination coefficient R² shows that the variation of the dependent variable (turnover) is explained in proportion of 99.33% by the variation of the independent variables ERP, Equity, Domain of activity and Number of employees. Therefore, Hypothesis 1 is confirmed, the implementation of ERP determines an increase in turnover. In the case of Model 2 (Model 2 Expenditures), the impact of the implementation of ERP systems on Expenditures is not statistically significant, so we cannot consider that the variable of interest (ERP) has any influence on expenditures. Hypothesis 2 is not confirmed. In the case of the third model (Revenues Model 3), the results of the regression analysis reveal that the impact of the implementation of ERP systems on Revenues was negative and statistically significant. The coefficient of determination R² shows that the variation of the dependent variable (Revenues) is explained in proportion of 99.35% by the variation of the independent variables.

An increase in turnover determined by the implementation of ERP can be the result of a closer monitoring of customer orders and a more efficient organization of the sales process, or the improvement of processes. At the same time, the decrease in revenues with the implementation of ERP may be the result of a decrease in other types of revenues that are not part of turnover, such as other operating income in which there is also the resumption of income from amortization of investments realized through projects with non-reimbursable funds.

During the period for which the data related to the study were collected, Romanian companies benefited from such funds obtained from projects with non-reimbursable financing, funds that allowed them to grow sustainably. The negative correlation of ERP implementation with revenues may be the result of significant investments made prior to ERP implementation, investments that allowed the increase of turnover and determined the decision to implement such a system.

In the second part of the analysis, on the influence of the ERP systems implementation ERP on the business model, we used the difference-in-difference methodology, to determine whether the impact of ERP was amplified or diminished by the moment of implementation. The results obtained correspond to the reference model. The significant effects of the ERP systems implementation on the Turnover and Revenues of Romanian companies were also confirmed in the estimates made using the difference-in-difference method. The results presented in Table 4 show that the impact of the ERP x TIME variable is statistically significant for models 1 and 3. Thus, Model 1 shows that there is a direct link, in the sense that ERP implementation positively influences the dependent variable - Turnover, and model 3 reveals that the impact is negative for the variable Revenues.

Table 4: Results regarding the ERP influence on the business model taking into account the moment of implementation

	Model 1 Turnover	Model 2 Expenditures	Model 3 Revenues
ERP	15,061 -21,900	20,170 -58,102	-25,958 -23,204
ERP x TIME	11.6800*** -44,194	-98,344 -74,993	-10.8645** -45,055
Equity	-0.0106** (0.0042)	-0.0106 (0.0188)	0.0158*** (0.0043)
Domain	3.2756** -12,875	12,669 -15,619	-4.3772*** -14,732
BVB Listed	-113,793 -166,302	-220.6701** -857,209	26,770 -179,192
Employee no.	-9.0962*** -24,306	-17,120 -69,101	12.3260*** -27,884
Cons	16,597 -26,215	-0.3228 -60,856	-27,037 -27,821
N	6089	6089	6089
R ² -adj	0.9933	0.9810	0.9935

Note: ***, ** and * to indicate statistical significance at 1%, 5% and 10% respectively. Standard errors are reported in parentheses.

5. CONCLUSIONS

Although according to the index of the digital economy and society (DESI-2021), an index that measures digital skills, Romania ranks last in the 28 EU member states, and the level of acquisition of digital skills is among the lowest in Europe, and thus we could assume that the implementation of ERP systems would not have impacts on the performance of the companies, the conclusions of our study show that in Romania, the implementation of ERP systems have a positive influence on the turnover. Therefore, the implementation of these systems in Romania shows its efficiency by increasing sales. This increase can be explained by the rigorous organization of information related to contracts and customers with the help of ERP systems so that an increase in sales is possible. Sales departments in companies have access, through these ERP systems, to data situations that allow easy tracking of contract terms and anticipation of customer buying behavior. A good use and understanding of this information can be the cause of increased sales in companies.

Regarding the influence of ERP system implementation on Expenditures, the low degree of digital skills in Romania may affect the expected results of these implementations, if we take into account a decrease in salary expenditures following automations generated by ERP implementations. The other expected and proven effects in companies in other countries may not occur in companies from Romania that implement ERP systems, due to low digital skills of users.

Although Romanian companies have implemented more and more ERP systems, especially since 2015, still from the DESI perspective, our country has not made progress in the last 5 years in terms of integrating technology into business. Romania ranks at the bottom of the rankings in terms of integrating basic digital technology into companies.

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THE SUSTAINABILITY OF SALES: FINANCIAL DECISIONS ON HUMAN RESOURCE

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Abstract: *In general, finances are constantly exposed to many risks, shocks or pressure factors, demographic changes, political turmoil including economic and financial crises depending on the stages of an economic cycle. Based on this context, we propose to analyze the impact of the decision to finance human capital regarding the sustainability of sales. Our analysis is based on the financial data of the top European companies, covering the range of years between 2017 and 2020 ending with the pandemic crisis caused by Covid-19. The main findings in the comparison of 2019 vs 2020 suggest that the composition of human capital financing decisions generated by the top management of the companies on the sustainability of sales may have success and this translates into a greater profit per employee income compared to the company's annual profit indicator. Based on our findings, we identify some successful recipes that could be useful for decision makers in the context of other economic turbulences.*

Keywords: *Financing decision, human resource, sales sustainability, pandemic crisis, Covid-19.*

1. INTRODUCTION

The subject of analyzing the impact of the financing decision on companies is of great interest to company managers around the world, in the context of the inevitable phases of a company's economic life cycle. A major problem is that during and after each crisis, debt seems to be rising for most companies. Another related issue is that every time economies move upward, governments generally pursue irrational fiscal policies, thus affecting the resilience of companies' budgets and resources to new economic shocks. With limited tax options in a new crisis context, a kind of vicious business cycle can be set up, which, the longer it runs, the greater the

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distance between its phases. In addition, they may be reflected in a larger and unsustainable corporate debt. By avoiding this vicious cycle of business, companies should pursue strong, ongoing budget and resource consolidation strategies.

The main purpose of this paper is to analyze the impact of the financing decision of the directors of the companies on the sustainability of sales, implemented by companies in the Member States of the European Union and their effects, in order to identify the main factors that determine them. In this regard, we have outlined the successful and unsuccessful approaches to corporate governance interventions during the pandemic crisis of 2020 and 2021. Finally, the paper includes some potential lessons or best practices in implementing funding decisions.

The paper is organized as follows: Section 1. presents discussions and empirical research on funding decisions in the existing literature, Section 2. presents research methodology on the basis of funding decision and analysis of human capital sustainability, Section 3. provides a discussion of application practices of the financing decision on the sustainability of the sales of the companies from the European Member States and about their evolution during the evolution of the current pandemic crisis, and in the last section we present the conclusions.

2. LITERATURE REVIEW

The financing system of the investment process consists of the financing unit and the investment activity regarding the financing methods. The formation of investment financing sources for this activity is one of the common and important issues of investment activities. *Financing* is the process of planning, applying, using and controlling the funds used in any type of business (Gupta C.B. 2012).

In the case of *financial management* we find two directions of definition assigned by the author (Bran P. 1997), which explains that its general objective is to ensure the efficiency of the establishment and use of capital, thus achieving financial support to maximize the market value of the company and, implicitly, increase the wealth of shareholders. Author (Stancu I. 1994) defined more simplified, namely, focusing financial management only on the efficient management of the process of correct and profitable allocation of resources while the author (Conso P. 1981) states that financial management is the existence of a power structure.

Key financial management decisions are based on three key aspects of a company's business cycle: *the investment decision, the financing decision, and the dividend decision.*

In companies, regardless of the form in which they are organized, the investment decision is one of the most important decisions to increase its value. Investment decisions are focused on the company's capital investment. When we indicate a specific decision related to financial managers, we are talking about decisions regarding a capital project. Managers need to evaluate a number of factors in making investment decisions. The financial manager must estimate how much the company's future cash flows will change if it invests in a project, and the manager must also analyze the unpredictability associated with these future cash flows.

Also, while the long-term investment decision is known as the capital budget, the short-term investment decision is called human capital management. According to the authors (van Marrewijk, M. și Timmers, J. 2003) human capital management involves an alignment between the individual and the organization.

Funding decisions are decisions about the use of funds in any organization in the most efficient way. Financial decisions are those relating to liabilities and the share of equity in the balance sheet, such as the decision to issue bonds. Every organization has to make daily decisions for the proper functioning of the organization. From buying assets to selling products, from hiring workers to firing employees, all decisions are very important and crucial. The funding decision is yet another crucial decision made by the financial manager regarding the funding mix of an organization. It is concerned with lending and allocating the necessary funds for investment decisions.

The purpose of financial decisions is to define the financial structure adopted by the enterprise according to the criteria of profitability, growth and risk (Vasile Ilie și Teodorescu Mihaela, 2005). An optimal decision to finance the operating cycle refers, for the most part, to the harmonization of the profitability-risk relationship, to achieving the balance between the need for current assets and the mobilizable sources for their financing. Every enterprise, whether it is in the development phase of its activity or in the maintenance phase of its production capacity, is obliged to attract resources to finance the activity carried out (Dragotă Victor, și alții 2005). The main choice in the financing decision focuses on the choice between own resources and borrowed resources (Onofrei Mihaela, Management financiar 2006). In order to ensure the continuity of production and the rhythmicity of sales, it is necessary to constantly renew stocks and receivables (Onofrei Mihaela, Finanțele întreprinderii 2004).

Financing decisions are based on the governing bodies of the companies. Most companies and non-profit organizations have an organization chart presented in this way, the *Board of Directors* is the highest body, and the

chairman of the board is generally the highest ranking person, followed by the CEO, but often the chairman. The board also serves as CEO, followed by the *Chief Operating Officer (COO)*, who is often appointed as the chairman of a firm. The COO directs the company's operations, which include marketing, manufacturing, sales and other operational departments. The Chief Financial Officer (CFO) is generally the Senior Vice President and the Chief Financial Officer, is responsible for accounting, finance, credit policies, asset acquisition decisions and investor relations, involving communications with shareholders. and the press (Brigham Eugene F. și Houston Joel F. (2019)).

The company's decision to make capital investments may consist of a series of distinct decisions, each called a project. Sometimes, these projects require the company to increase its investments in working capital, inventory, cash or receivables. The working capital represents the part of the permanent capital destined and used for the financing of the current operating activity. Specifically, this is the difference between permanent capital and fixed assets, or in other words, the surplus of permanent capital over fixed assets. Capital investment refers to the company's investment in assets, and these investments can be either short-term or long-term.

The financial decision is important to make wise decisions about when, where and how a company should acquire funds. Because a company tends to make the most profit when the market estimate of an organization's share expands and this is not only a sign of development for the company, but also increases the wealth of investors. Consequently, it refers to the composition of the various securities in the capital structure of the company.

Unfortunately, there is no debt-to-equity ratio that can be used as a guide to achieving an optimal capital structure in the real world. What defines a healthy mix of debt and equity varies depending on the industries involved, the line of business and the stage of development of a firm and may also vary over time due to external changes in interest rates and the regulatory environment. However, as investors are better off putting their money into companies with strong balance sheets, it makes sense that the optimal balance should generally reflect lower debt levels and higher equity levels.

3. RESEARCH METHODOLOGY

The objective of the research is to analyze the impact of the decision to finance human capital on the sustainability of sales in the light of the financial

reports of selected European Union companies. The analyzed sample is represented by European companies active in 2022 in various sectors such as: food, pharmaceuticals, energy, oil and gas, pharmaceuticals, IT & Software, clothing, cosmetics, beverages, financial services, technology, pharmaceuticals, FMCG, aeronautics, tobacco. The methods of analysis used in this study are: the logical method used to interpret legal norms to discover the underlying principles and to identify the content and form of the legal phenomenon attributed to the pandemic crisis; the comparative method used to conduct a comparative study of companies in different asset sectors based on financial data and the number of employees; the method of analysis and research used to identify the financial data and their interpretation, as well as for the analysis of the empirical study of the research thesis; the quantitative method represents the analysis of the financial data established in the analysis sample within the study by the applicability of the human capital indicator in relation to the company's profit.

The Impact of the Decision to Finance Human Resource on the Sustainability of Sales

The outbreak of the COVID-19 pandemic in Europe had economic effects on large companies, in addition to the effects on people, which provided for restrictions on the movement of people and an unprecedented economic slowdown.

In the European Union, more than 1,350 measures to combat the crisis have been adopted in 2020, including almost 400 state aid decisions that have thrown a lifeline at European businesses. In the first days and weeks of the pandemic in Europe, health systems have been strengthened nationally, regionally and locally, and hospitals across the European Union have also treated patients from other countries. Mobile medical teams were sent to the field to meet the most urgent needs. More than 600,000 European citizens stranded abroad have been brought home and public and private investment has been mobilized to develop safe and effective vaccines worldwide. The Commission's Medical Equipment Coordination Center has helped Member States work together to cover deficits. To counteract the effects of the crisis, the European Union and the Member States have mobilized EUR 4.2 trillion, which is more than 30% of the Union's gross domestic product.

In 2020, the Dutch oil company *Royal Dutch Shell* had a turnover of over 352 billion US dollars, the largest of all European companies. German carmaker *Volkswagen* had the second highest revenue this year at over \$ 282.76 billion, followed by BP at \$ 282.62 billion and Swiss trading and mining company *Glencore* at \$ 215 billion.

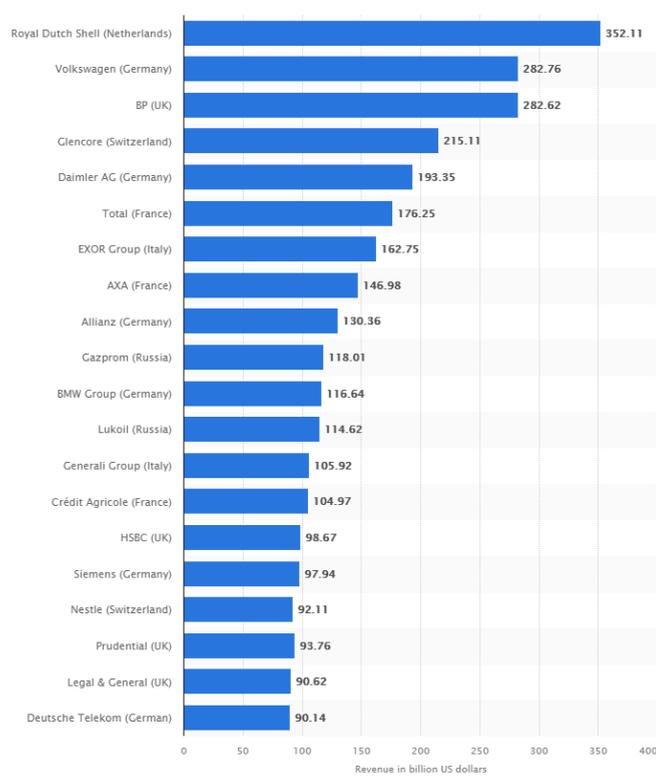


Figure 1. The largest European revenue-based companies in 2020

Source: <https://www.statista.com/statistics/973337/largest-european-based-revenue>

Although it was the second largest in terms of revenue, *Volkswagen* employed more people worldwide than any other European company, with over 671,000 working for the German car giant. Volkswagen was followed by the British food service company *Compass Group* in terms of 596,000 employees, followed by *Deutsche Post DHL*, which had about 504,000 employees.

When the scope is extended to look at companies around the world, *Walmart* had both the highest revenue of any company (US \$ 523 billion) and the largest number of employees, with over 2.2 million people. Chinese oil company *Sinopec* had the second highest revenue in 2019, over US \$ 407 billion.

Below are the top 15 companies in Europe by revenue, according to centralized information at <https://www.value.today/>. The table below shows more statistics, including market value as at 1 January 2020, total assets, global place of employment and type of activity.

Table 1. Top European companies by market value on 1 January 2020 and 1 January 2021

NO.	TOP 15 COMPANIES	INDUSTRY	CENTER	WORLD PLACE 2020	Market Value (1 Jan 2020) (Billions of dollars)	TOTAL ASSETS
1	NESTLE AG	Food	Switzerland	16	311.592	112.73
2	ROCHE HOLDING AG	Pharmaceutics	Switzerland	23	279.684	73.06
3	Royal Dutch Shell	Energy, Oil and Gas	Netherlands	30	237.102	426.12
4	NOVARTIS AG	Pharmaceutics	Switzerland	38	215.018	148.38
5	SAP SE	Itc & Software	Germany	49	169.596	58.47
6	LVMH	Clothing	France	29	237.807	103.64
7	L'OREAL	Beauty	France	50	165.742	43.61
8	ANHEUSER-BUSCH INBEV	Beverages	Belgium	51	163.224	254.38
9	HSBC HOLDINGS	Financial services	UK	53	160.68	3321.24
10	ASML HOLDING	Technology	Netherlands	84	127.542	27.27
11	AstraZeneca PLC	Pharmaceutics	UK	72	135.3	74.98
12	Unilever Group	FMCG	Netherlands	59	151.747	67.66
13	AIRBUS	Air	Netherlands	92	117.26	110.10
14	BRITISH AMERICAN TOBACCO	Tobacco	UK	116	100.584	198.64
15	InterContinental Hotels Group	Hospitality	UK	1494	1237	5.04

Source: own processing

It can be seen that in the top 15 companies, two are in the pharmaceutical business, followed by one with the business of clothing, energy, gas and oil, cosmetics, financial services, food, FMCG, Tobacco, air transport and beverages. *NESTLE AG* in Switzerland (food industry) took first place in Europe, followed by *ROCHE HOLDING AG* in Switzerland (pharmaceutical industry) and *LVMH* in France (clothing industry).

It can be seen that of the 15 firms, apart from those in the pharmaceutical and medical equipment field, the others had a declining market value, while employment in the world fell considerably from January 1, 2020 compared to January 1, 2019.

Below, we present the analysis of the sample of selected companies presented in the table above, which is subject to the global analysis of the profit recorded by companies per employee in the years 2020 and 2019.

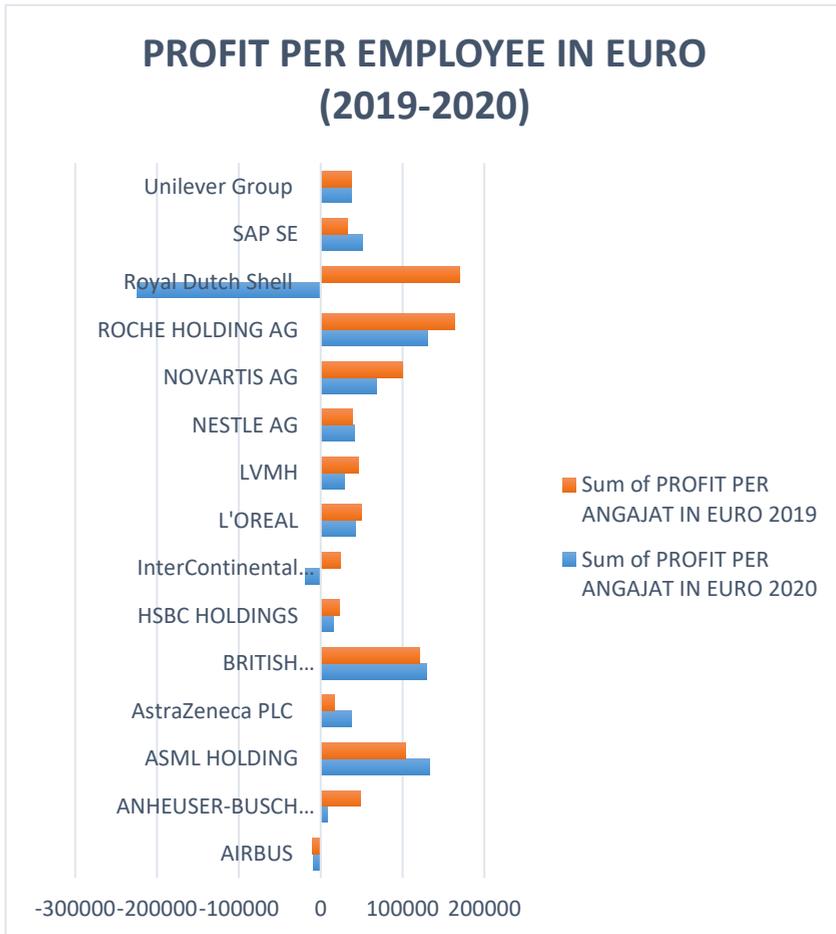


Figure 2. Profit per employee in euro (2019-2020)

Source: own processing

Next, some important European companies from different fields will be analyzed in order to be able to observe how the revenues evolved in the pandemic

year and to conclude whether the sales affected the activity of the companies or not. We will also analyze the impact of companies' profit on investment in human capital.

Nestlé is a multinational company in the food industry and one of the most important Swiss concerns, which in 2020 had 291,000 employees. Globally, it has dropped 4 places in the ranking of major companies. The year 2020 and the coronavirus pandemic affected this company's revenues, decreasing sales. In March 2020, at the end of the quarter there were sales of 19 billion Euros, while in 2019 in the same period there were sales of 20 billion Euros. Thus, sales at the end of the first quarter of 2020 decreased by 6.2% compared to the previous year.

Nestle's organic growth reached 3.5% in 2019, with real domestic growth rising to 2.9% for the full year, the highest level in six years. Growth was supported mainly by innovation and portfolio management. Prices contributed 0.6% and returned to a positive trend in the fourth quarter of 2019.

The effects of COVID-19 on Nestle's organic growth varied by product category and sales channel:

- *Product categories*: Demand for home consumption, trusted brands and products with nutritional benefits. PetCare Purine, Dairy, Coffee at Home and Nestlé Health Science reported strong growth. Confectionery and water sales fell, reflecting their high exposure to canals outside the home and consumption on the go.
- *Sales channels*: Retail sales recorded a single-digit organic increase, reflecting the demand for home consumption. Sales through external channels decreased significantly. E-commerce sales increased by 48.4% to 12.8% of total sales. Coffee, Purina PetCare and Nutrition & Health Science were the main contributors to the growth, with a strong boost in all other categories.

In 2020, the costs related to the pandemic crisis caused by COVID-19 were 389 million Euros, including expenses for bonuses paid to front-line workers, employee safety protocols, donations and other allowances for staff and customers. Approximately 241 million Euros of these costs affected the operating profit of trading, partially offset by savings such as travel expenses. In addition, the Group incurred costs of EUR 157 million related to staff and facilities that remained inactive due to containment measures. Overhead costs related to COVID-19 decreased in the second half of the year as traffic restrictions decreased.

Regarding the revenues of Nestle AG, for the period 2017-2020, it can be seen that in 2020 there were revenues of approximately 7 billion Euros lower than in 2019. The period 2017 - 2019 shows that this company is on an upward trend, but 2020 has led to a decline in revenue due to declining demand.

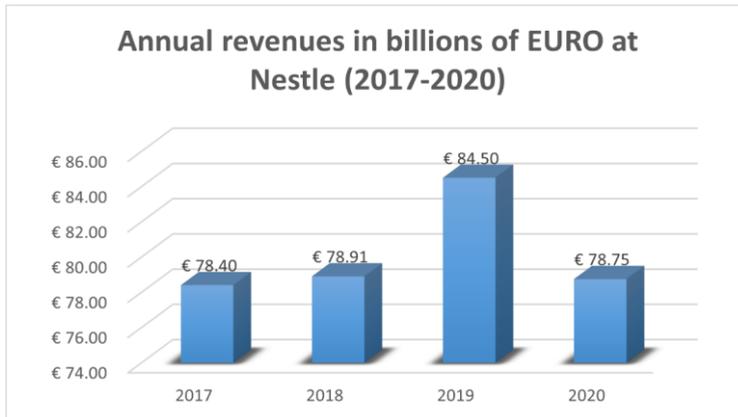


Figure 4. Annual revenues in billions of EURO at Nestle (2017-2020)

Source: own processing

The net and operating profit for the period 2017 - 2020 show that the operating profit in 2020 was lower than in 2017, the net profit registering the same downward trend, but not at the same index as in the case of gross profit. Thus, the company's profitability compared to the indices of previous years decreased in 2020, due to sales that were mainly affected by the pandemic crisis.

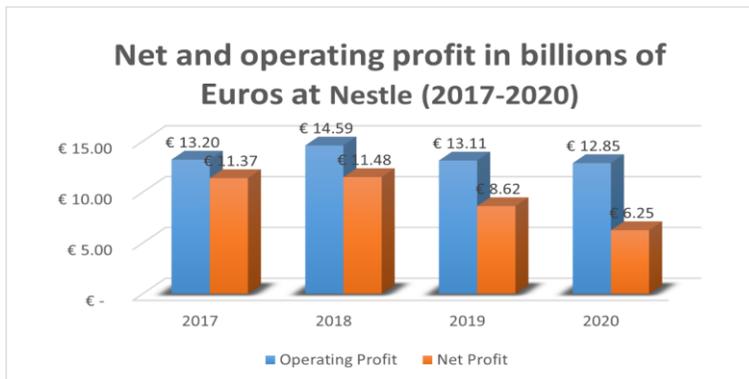


Figure 5. Net and operating profit in billions of Euros at Nestle (2017-2020)

Source: own processing

Nestle in 2019 had 291,000 employees worldwide, an average employee managing to produce an annual profit of 39,390 Euros per employee. In 2020, the company had 273,000 employees, 18,000 fewer than the previous year. However, one employee managed to produce an average annual profit of 41,662 Euros, 5% more than in 2019. Thus, we can see that Nestle managed to record higher revenues in 2019 than in 2020, but one employee on average, it managed to record a higher profit in 2020 than in 2019.

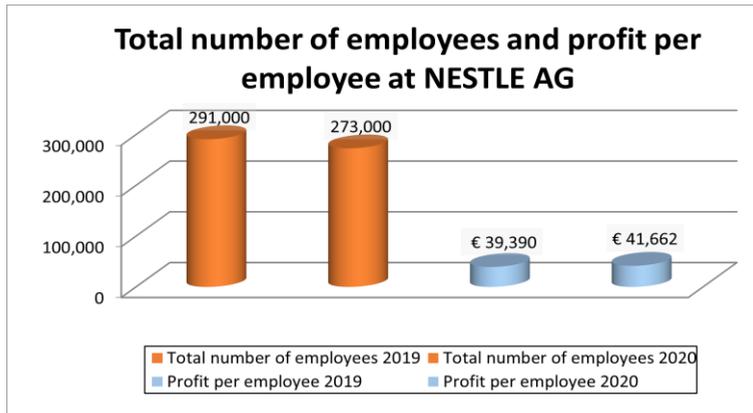


Figure 6. Total Number of Employees and Nestle Employee Profit (2019-2020)

Source: own processing

ROCHE HOLDING AG is a global pharmaceutical company based in Basel, Switzerland. In 2020, the market value increased, being one of the sectors that developed due to the Coronavirus pandemic. Sales have increased, being a sought-after sector, as has medical equipment. In terms of market value, this company increased in 2020 compared to previous years, and in terms of revenues, there is a slight decrease in 2020 compared to 2019. In 2019 there were significant increases compared to 2017 and 2018, reaching 55.93 billion Euros.

According to the annual financial report for 2019, *ROCHE HOLDING AG* recorded additional sales of 4.9 billion euros, with the drugs launched in 2012, stimulating the growth and rejuvenation of the product portfolio. By 2020, Roche has reported solid results in 2020, with the business showing resilience in a pandemic environment.

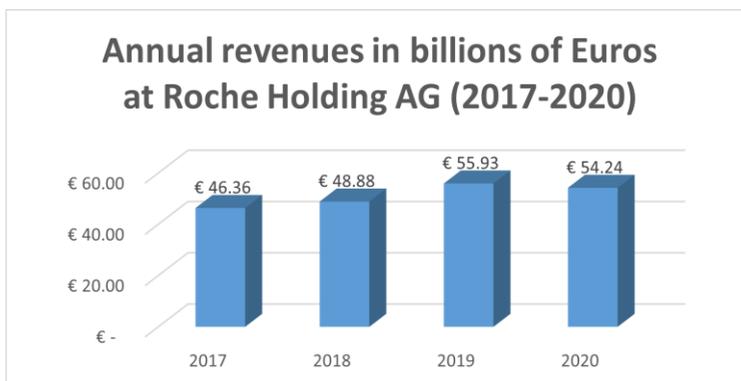


Figure 7. Annual revenues in billions of Euros at Roche Holding AG (2017-2020)

Source: own processing

Operating and net profit show that sales in this area were consistent in 2020, with increases in both chapters, which indicates that the company's gross profitability has also increased. Operating profit was on an upward trend from 2017 to 2020 from 11.31 billion Euros to 17.24 billion Euros, while net profit increased from 7.51 in 2017 to 13.29 in 2020.

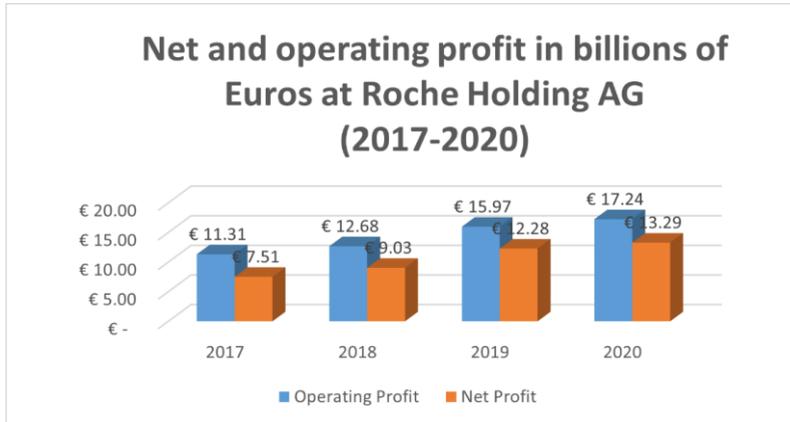


Figure 8. Net and operating profit in billions of Euros at Roche Holding AG (2017-2020)
Source: own processing

Also, the company Roche Holding AG in 2019 had 97735 employees worldwide, an average employee managing to produce an annual profit of 163226 Euro per employee. In 2020, the company registered a number of 101465 employees, increasing the team by 3730 employees compared to the previous year, an average employee managing to produce an annual profit of 130978 Euro per employee, 20% less than in 2019.

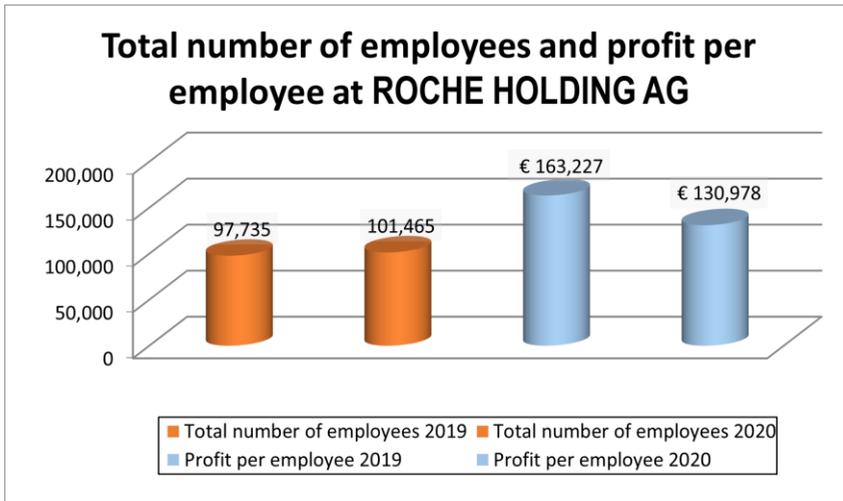


Figure 9. Total number of employees and Profit per employee at Roche Holding AG (2019-2020)

Source: own processing

Thus, we can see that Roche Holding AG managed to record higher revenues in 2019 than in 2020 and employed more people in 2020 than in 2019, but one employee in 2020 managed to produce an average lower profit than in 2019.

ROYAL DUTCH SHELL is commonly known as Shell, being a multinational Anglo-Dutch oil and gas company based in The Hague, the Netherlands and incorporated in the United Kingdom as a joint stock company.

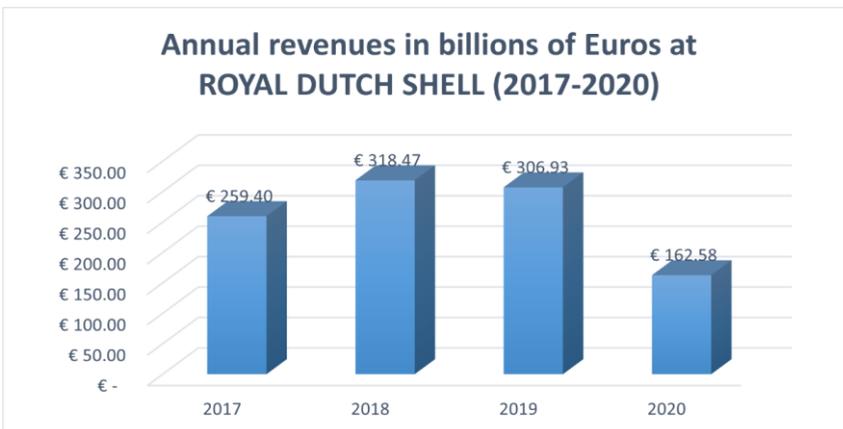


Figure 10. Annual revenues in billions of Euros at ROYAL DUTCH SHELL (2017-2020)
Source: own processing

Net profit started to decrease starting with 2019, registering 14.10 billion Euros, an amount approximately half of the one registered in 2018. In 2020, this company registered very high losses, of -19.51 billion Euros.

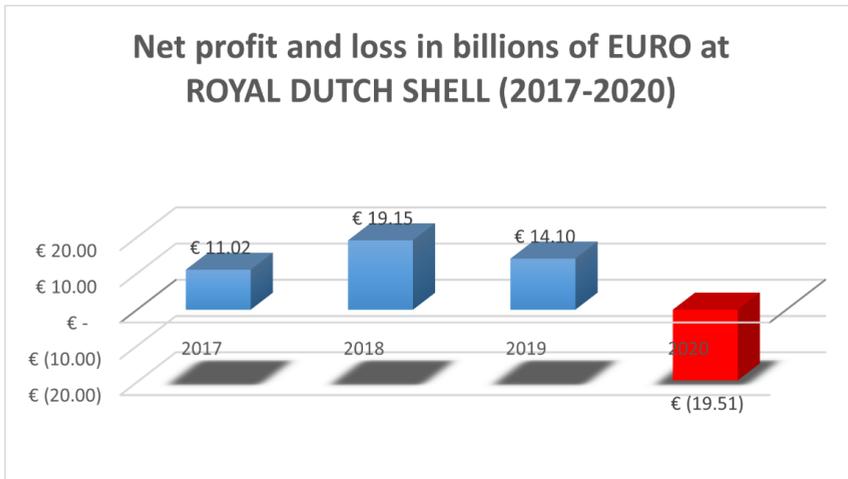


Figure 11. Net profit and loss in billions of EURO at ROYAL DUTCH SHELL (2017-2020)

Source: own processing

Also, the company ROYAL DUTCH SHELL in 2019 had 83,000 employees worldwide, an average employee managing to produce an annual profit of 214,431 Euros per employee. In 2020, the company registered a number of 87,000 employees, increasing the team by 4,000 employees compared to the previous year. An employee "contributed" an average of 276884 Euros to the total annual loss. Thus, we can see that ROYAL DUTCH SHELL managed to record higher revenues in 2019 than in 2020, but had more employees in 2020 compared to 2019, but lost money due to declining sales.

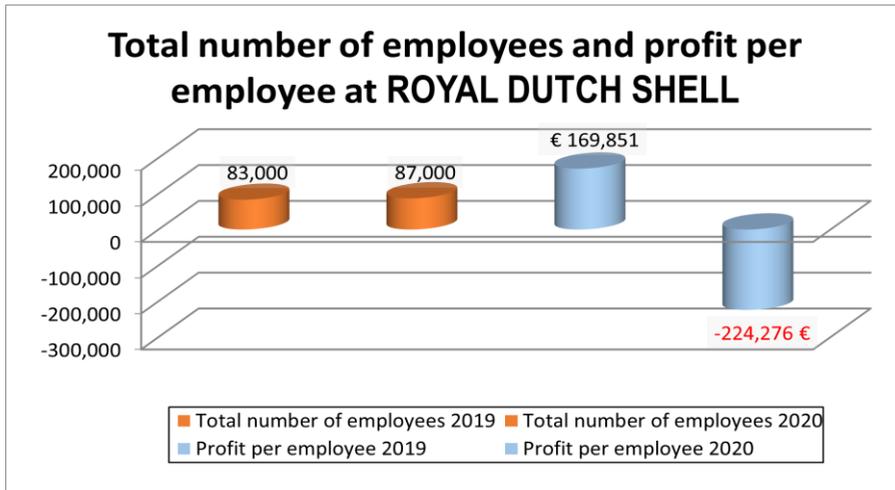


Figure 12. Total number of employees and Profit per employee at ROYAL DUTCH SHELL (2019-2020)

Source: own processing

In 2020, the company operated in an unprecedented context created by the pandemic crisis, the resulting macroeconomic conditions and the imbalance between supply and demand in the oil and gas market. In 2020, the company reduced its investments in research and development expenditures, which were 1008 million Euros, compared to 1081 million Euros in 2019 and 1202 million Euros in 2018.

In early 2020, a key point for the group's board of directors was the preservation of cash, which included reducing costs and capital expenditures, disrupting the share repurchase program and reducing the dividend. In the latter part of the year, the directors approved the cash allocation framework, which was announced as part of the results for the third quarter of 2020. For each quarter, the Board assessed the continuation of the share repurchase program and the ongoing action payable to shareholders. Also, in order to maintain its focus on achieving its strategic ambitions, in 2020 the Council established a cash allocation framework designed to reduce debt, increase the distribution of shares and facilitate disciplined growth as Shell reshapes its business for the future of energy. Shell has also announced the reshaping of its portfolio of assets and products to meet the cleaner energy needs of its customers in the coming decades.

The oil industry has been one of the industries most affected by the pandemic, with the lowest price per barrel in recent years. This is due to the fact that the production / extraction price was higher than the selling price.

SAP SE is a German-based software developer for other companies and organizations with a turnover of 27.55 billion Euros in 2019. In 2020, its market value fell to 141.441 billion Euros compared to 2019 when it registered a market value of 154.178 billion Euros. Revenues were increasing between 2017 and 2019, with 2020 recording a decrease.

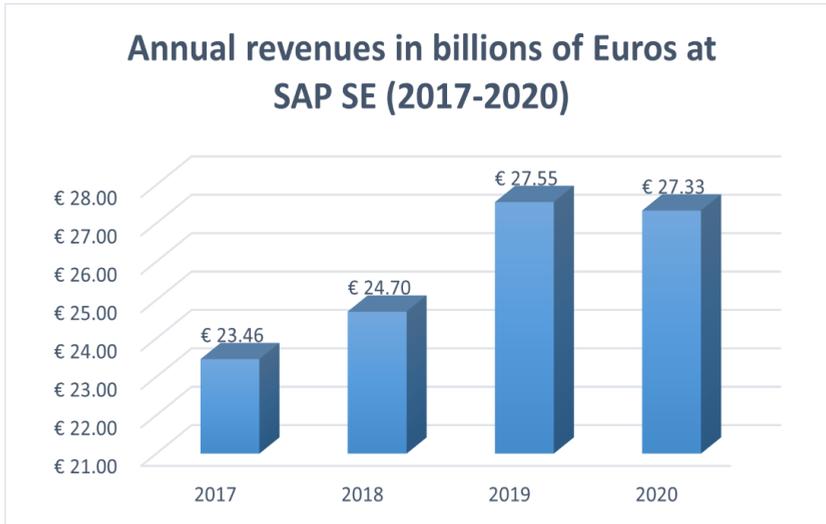


Figure 13. Annual revenues in billions of Euros at SAP SE (2017-2020)

Source: own processing

In terms of revenue, it can be seen that this company increased from 23.46 billion Euros in 2017 to 27.55 billion Euros in 2019. Cloud revenues continued to be the main engine of the company's growth, up 18%. Operating cash flow doubled compared to 2019 to 7.2 billion Euros, while free cash flow increased to 6.0 billion Euros. At the level of SAP SE in 2019, a decrease in net profit could be observed, which shows that in 2020 sales were higher, several areas being forced to adapt your services and activity, using IT companies. In 2020, SAP SE moved with almost all online customer interactions, including sales, go-lives and support. Throughout 2020, the company's software has helped companies grow and distribute vaccines, make their supply chains stronger, adjust their business processes, and stay close to their employees and customer needs. helped to make a substantial profit.

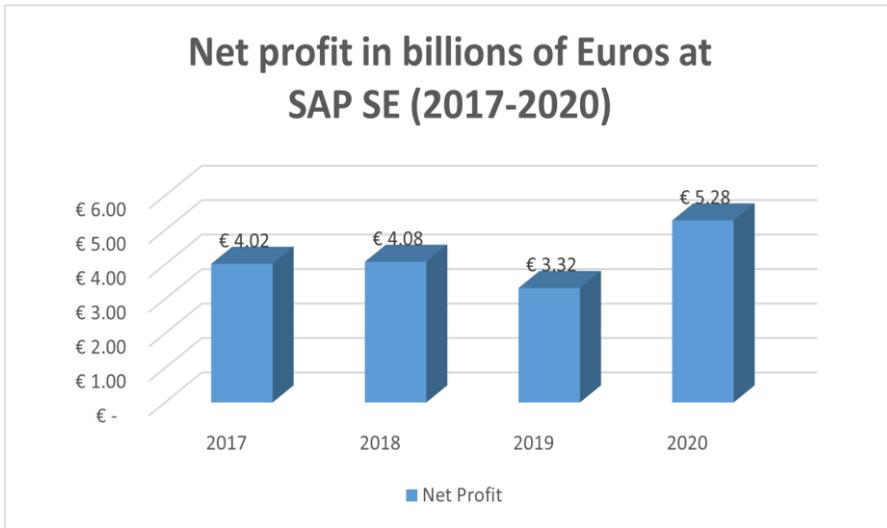


Figure 14. Net profit in billions of Euros at SAP SE (2017-2020)

Source: own processing

Also, the company SAP SE in 2019 had 100,330 employees worldwide, an average *employee* managed to produce an annual profit of 33,091 euros per employee. In 2020, the company registered a number of 102,430 employees and increased the team by 2100 people compared to the previous year, and an average employee managed to produce an annual profit of 51,547 Euros.

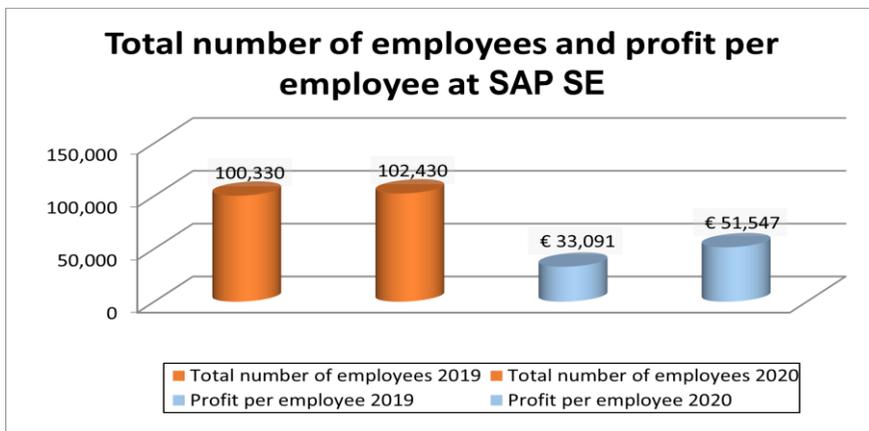


Figure 15. Total number of employees and profit per employee at SAP SE (2019-2020),
Source: own processing

Thus, we can see that SAP SE managed to record lower revenues compared to 2020 in 2019, and employed more people in 2020 compared to 2019, and *an* average employee in 2020 managed to record a 23% higher profit than in 2019.

Airbus is a European multinational aerospace corporation. Airbus designs, manufactures and sells civilian and military aerospace products worldwide and *manufactures* aircraft in Europe and various non-European countries. The company has three divisions: Commercial Aircraft (Airbus S.A.S.), Defense and Space and Helicopters, the third largest in its industry in terms of revenue and deliveries of turbine helicopters. Since 2019, Airbus is the largest aircraft manufacturer in the world.

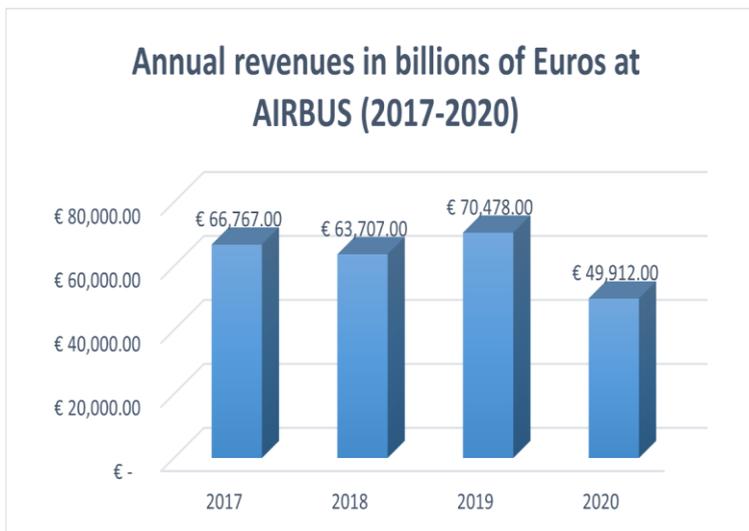


Figure 16. Annual revenues in billions of Euros at AIRBUS (2017-2020),
Source: own processing

In April 2020, Airbus announced that it had reduced aircraft production by a third due to the COVID-19 pandemic crisis. Airbus' revenues for 2019 were 70.478 billion Euros and a loss of 1.362 billion Euros. The company's revenues for 2020 amounted to 49.912 billion Euros and recorded a loss of 1.133 billion Euros.

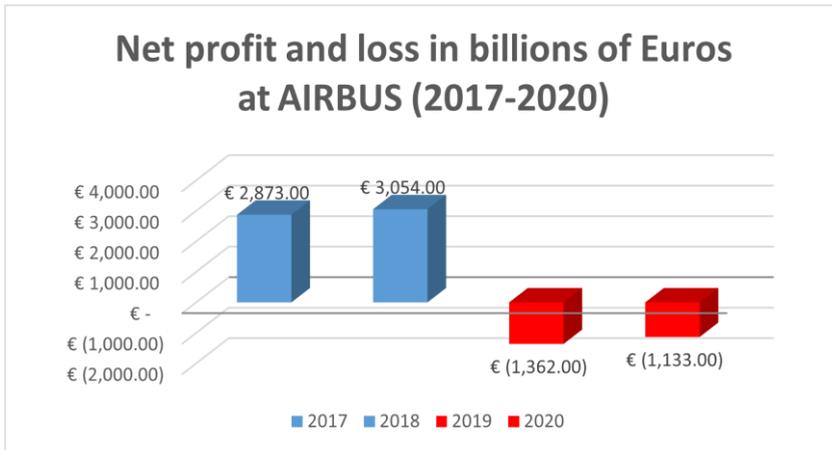


Figure 17. Net profit and loss in billions of Euros at AIRBUS (2017-2020),
Source: own processing

Also, the Airbus company in 2019 had 134,400 employees worldwide, an average *employee* "contributed" to an annual loss of -10096 euros. In 2020, the company registered a number of 131,300 employees and reduced the team by 3600 employees compared to the previous year. An average employee "contributed" to an annual loss of 8629 euros. Thus, we can observe that Airbus registered in 2019 and in 2020 substantial losses compared to 2018.

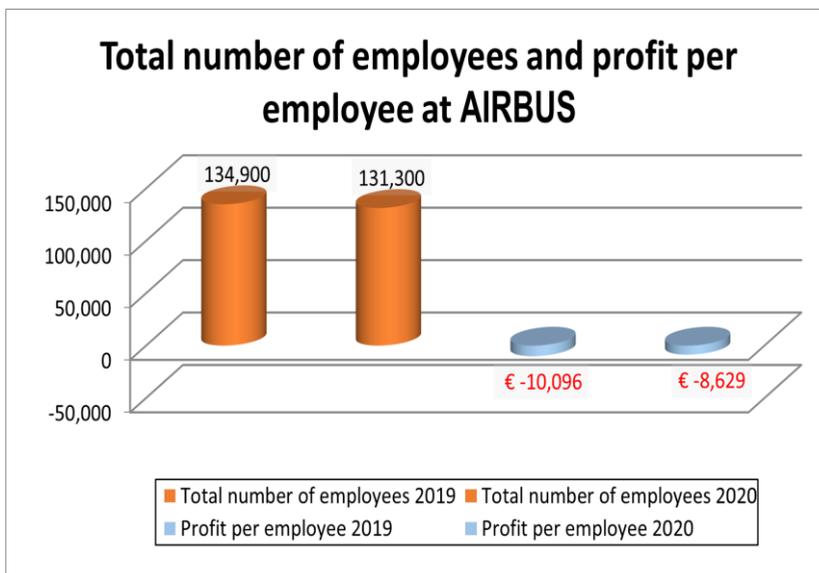


Figure 18. Total number of employees and profit per employee at AIRBUS (2019 - 2020)
Source: own processing /

In April 2020, Airbus announced that it had reduced aircraft production by a third due to the COVID-19 pandemic crisis. According to Guillaume Faury, the company was "bleeding cash at an unprecedented rate." The recession *jeopardized* his survival and the need for deep job cuts in all Airbus departments, with 3,000 French employees involved in redundancy schemes that were assisted by the French government. In 2020, the COVID-19 pandemic led to a significant disruption to the company's business operations and supply chain. The company has taken a number of steps to implement health and safety procedures imposed by governments, while taking into account stock levels and production deadlines. On April 8, 2020, the company announced its decision to adjust commercial aircraft production rates to 40 per month for A320 production, 2 per month for A330 and initially 6 per month for A350, after which production of only 5 aircraft per month in response to the new market environment caused by the pandemic crisis. This was a reduction of the average pre-COVID-19 production rates from March 2020 by about one third.

With these new tariffs, the company intends to maintain its ability to meet customer demand, while protecting its ability to continue to adapt as the global market evolves. The company's business, results of operations and financial condition were significantly affected by the pandemic, the pandemic crisis and the economic crisis.

InterContinental Hotels Group is a London-based hotel corporation listed on the London Stock Exchange. It is the largest hotel chain in the world and operates 4,300 hotels worldwide. The company's revenues increased between 2017 and 2019, but in 2020, due to the pandemic crisis caused by Covid-19, it registered a decrease in revenues, half compared to 2019.



Figure 19. Annual revenues in billions of Euros at InterContinental Hotels Group (2017-2020)

Source: own processing

InterContinental Hotels Group in 2020 recorded a loss of -234 million euros.



Figure 20. Net profit and loss in billions of Euros at InterContinental Hotels Group (2017-2020)

Source: own processing

Also, the InterContinental Hotels Group company in 2019 had 14,436 employees worldwide. In 2019, an average employee managed to produce an annual profit of 23,735 Euros per employee. In 2020, the company registered a number of 12832 employees and reduced the team by 1604 employees compared to the previous year, and an average employee "contributed" to an annual loss of 18235 Euros per employee. Thus, we can see that InterContinental Hotels Group managed to record higher revenues in 2019 than in 2020, and reduced the number of employees in 2020 compared to 2019 to limit losses.

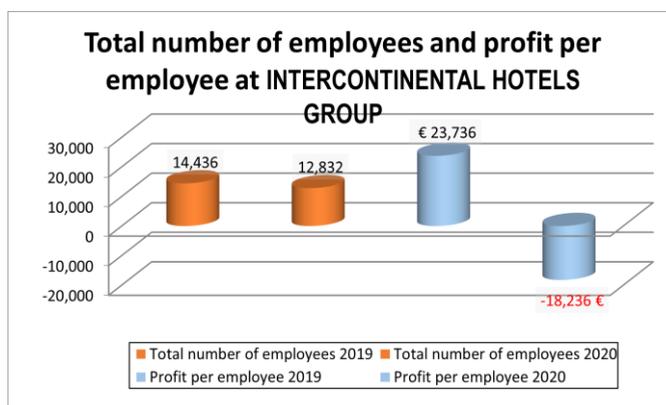


Figure 21. Total number of employees and profit per employee at INTERCONTINENTAL HOTELS GROUP (2017-2020)

Source: own processing

The tourism industry was the industry most affected by the pandemic, with losses estimated at tens of billions of euros. Given that the European Union is the most visited tourist destination in the world, the tourism industry is made up of more than 2.3 million businesses, employs more than 12 million people and accounts for about 4% of the European Union's GDP, according to the Eurostat source for 2019.

In the financial report of the company InterContinental Hotels Group for the year 2020 (Keith Barr 2021) stated that the impact of travel restrictions and physical distance measures around the world has been in demand at the lowest levels we have ever seen. This led to a 52% decrease in revenue and a 75% decrease in the company's operating profit. The company's development activity started long before 2020, continuing in that period with 285 new hotel openings and 360 hotel registrations within the group contributing to the global chain, of which a quarter were from conversions. The company's commitment is to be responsible for 2030, *the journey to tomorrow*, setting ambitious commitments, including environmental targets, support for communities and the promotion of diversity, inclusion and equality.

The areas affected in 2020, during the pandemic coronavirus, were mainly Hospitality, air transport, hotel industry and tourism, but on the other hand there were areas that prospered, such as the pharmaceutical industry, medical equipment, IT, etc. -they have the capacity, they have kept to their fleets and they have tried to put measures to reduce the expenses of number and the security of the liquidity. Companies in the European Union (EU27) have increased their investment in research and development (R&D) for the tenth consecutive year in industrial research and development, so the pandemic has not affected this sector much. In 2019, they invested 5.6% more in research and development, up from 4.7% in 2018. This growth is driven by the automotive, ICT and health sectors. A successful example is the German company BioNTech, which leads the innovative development of a first COVID-19 vaccine among the used ones. Since its inception, it has received more than € 108 million in EU research and development support. BioNTech ranks 654th in the world rankings and has been in this dashboard since 2013. It has multiplied its investment in research and development six times and its net sales ten times in this 7-year activity.

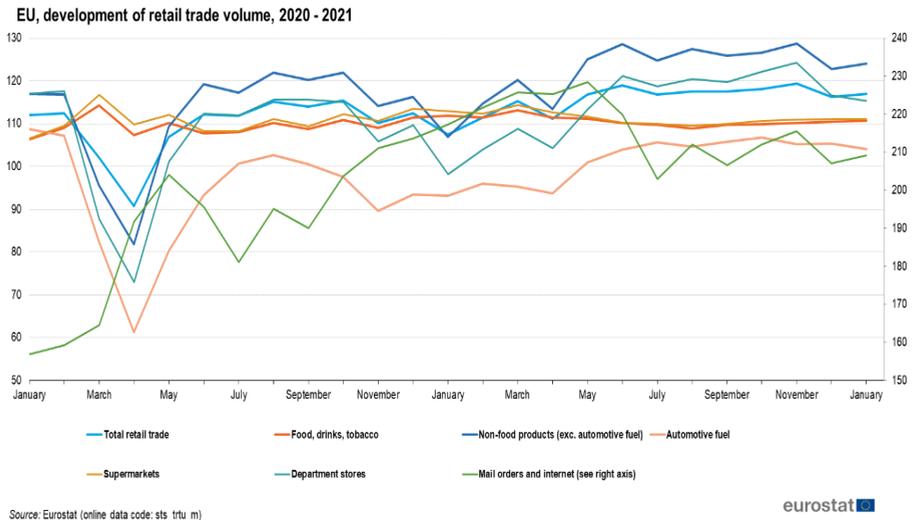


Figure 22. Retail trade volume development, 2020-2021, Source: Eurostat

Companies were affected in 2020, especially during the lockdown period, when sales were more online, with mobility restrictions. Some companies have had to seek agreements with creditors, restructure or seek protection in the event of bankruptcy or insolvency, which may have additional consequences for the company and its order book, as well as other consequences of proceedings. Trade was affected during April-May, when most European Union states were in a state of emergency. In April, sales in supermarkets and department stores were the hardest hit.

4. CONCLUSION

2020 has been a difficult year for most companies. Companies that had services / products that would allow them to move their business to the online environment, increased sales in this way and limited losses. This aspect of adapting the marketing of services and products highlights the decisions of companies to optimize sales. The success of some of the companies was also based on the quality of distribution of human capital management which helped the companies to make more efficient the profit per employee. It is also noteworthy that companies have been subjected to cost-effective decisions, by firing employees from the company, reorienting the business to e-Commerce and raising prices.

2020 has also been a difficult year for private economic institutions organized in various forms. Thus, decisions to finance or optimize the activity were tested, in accordance with the pandemic situation. It was found that health care companies had a prosperous year, recording high revenues, above those of 2019, while other areas were affected and recorded significant decreases. In this sense, investments could be made, given the delicate situation and stagnation of the activity, but within the limits of the companies' budgets and the forecasts they made.

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DELAYS OF CONSTRUCTION PROJECTS – THE TRADITIONAL WAY OR THE HYBRID WAY?

RINAT GRINBERG*, VALENTIN NIȚĂ**

Abstract: *Construction projects are a main economic catalysator and motivation for most developing countries. However, many infrastructure projects experience extensive schedule delays in their process. Unexpected increases in budget and schedule delays have become an integral part of construction projects in Israel and worldwide. At any given moment, millions of projects worldwide have one thing in common - the wish to succeed. A successful construction project meets its time, budget, and quality goals. Numerous comprehensive studies have found that about a quarter to a third of the projects fails, while the remainder range from failure to success (Powell-Smith and Stephenson 1989). This paper, a working paper for a doctoral thesis, examines studies done in this area and suggests a new hybrid methodology of compliance with the schedules at construction project sites. Despite introducing changes in the characteristics of the project during the planning and execution stages in a VUCA world, complex and uncertain environments during construction projects can lead to schedule delays.*

Keywords: *business management, project management, construction industry, changing reality, organizations change.*

JEL Classification: *L23, L74, O22*

1. INTRODUCTION

Construction projects worldwide suffer from budget increases and scheduling delays, becoming an increasingly worse phenomenon (Slevin & Pinto, 1986) due to frequent changes, significant decision-making dynamics, and rapidly changing global transformations. With the Covid-19 pandemic, problems arose in the worldwide supply chain that led to a rise in prices and delays in the delivery of

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raw materials, which impacted project management processes and caused scheduling delays.

The result is that everyone involved in the project encounters unnecessary conflicts, inconsistent work methods and norms, and inefficient use of valuable time and resources. Construction projects are characterized by several significant milestones: characterizing needs, initial planning, detailed planning, tender writing, contractor selection, agreement preparation, initial building, and delivery.

There are several types of construction delays which can be categorized as compensable, which is due to the Owner; non-excusable, which is due to the Contractor; and excusable delays, which are expected to unforeseen events or situations that are not the fault of either side (Kraiem & Diekmann, 1987). Each type of delay has its implications, including who is required to cover the consequences of the delay and how to proceed. Regarding excusable delays, it is essential to anticipate some delays due to situations and events that neither side can be aware of during the scheduling. An adjusted schedule method is useful in determining how various delays can impact the completion date and how the schedule can be adjusted because of multiple situations.

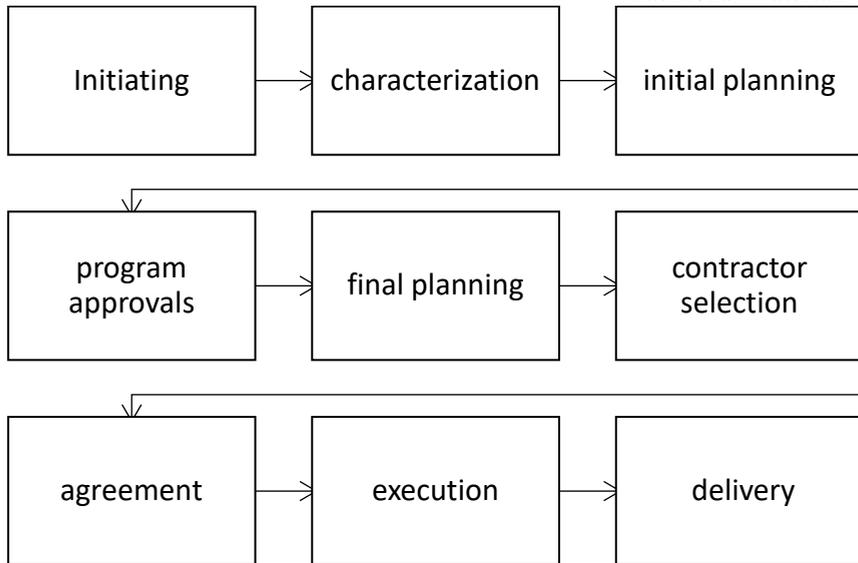
Wei (2010) found that the most effective ways to reduce construction delays and stay within the scheduled time frames are to enforce strict oversight and management, ensure strategic planning, and keep communication channels clear and open.

This paper examines compliance with a construction project schedule despite the introduction of changes in the characteristics of the project during the planning and execution stages of the Waterfall Model. The Waterfall Model is a classical project management model used in the system development life cycle to create a linear and serial approach (Royce, 1970).

The stages of work are serial and resemble how a waterfall must flow from a high to a low pool, hence the name Waterfall Model.

This Model strongly emphasizes the characteristics of all the requirements as a preliminary phase in project planning, a process carried out by the project developer who represents the business requirements on the part of the management. The main problem in the process is the inability to make design deviations without incurring high costs instead of the Agile methodology, which manages a project by breaking it up into several phases. It involves constant collaboration with the project's partners and continuous improvement at each stage. (Manifesto for Agile Software Development, 2001).

Table 1. Most the construction projects are managed according to the traditional Waterfall Model



Source: Author's waterfall model, construction project's process, 2021

Many individuals aspire to be entrepreneurs, enjoying the freedom, independence, and wealth that such a career suggests. And more giant corporations want to become more "entrepreneurial," their shorthand for the innovative and adaptive qualities they see in their smaller and often more successful competitors (A Perspective on Entrepreneurship, Farjad Mehdi, April 2006).

If the project's entrepreneur changes the plans or the SOW (Scope of Work), the project manager must go back to the programs and design all projects from the first step. That action changes the project's original T.L (Timeline).

In the 1990s, with the development of online platforms, the disadvantages of the process began outweighing its advantages. The internet allowed constant updates, and processes such as software updates, user reviews, and troubleshooting requirements were received immediately. These generated frequent changes in the product and priorities starting from the execution process. However, since the Waterfall Process relied on complete characterization from the beginning, any change requests became costly and cumbersome.

Effective project management is essential in industry-oriented projects such as construction.

A look into the literature can provide professionals who work in construction to prepare, schedule, and anticipate delays more precisely by using

the data and experiences of others. Siddiqui & Faheem (2021) have designed a method of collecting and pre-processing data to statistically analyze the different parameters that can be used to recommend more appropriate schedule delay mitigation measures.

Isiket al. (2008) developed the PMBOK® Management Guide to improve project results. The Institute for Project Management guide includes processes, techniques, instruments, and skills (PMI, 2008). By applying these management techniques, project managers and project teams can improve their chances of success in various projects (Zwikael, 2009). Over the years, additional methods have been developed, such as Agile methodologies. That method is mainly based on the Manifesto for Agile Software Development (Beck et al., 2001). It underpins the belief that initial plans are not effective and that an evolutionary, iterative process is more efficient (Dybå & Dingsøy, 2008). These theories operated in the hardware and software rather than traditional building projects.

Agile Project Management differs from traditional projects and product management, such as the waterfall model, by emphasizing continuous design, flexible scope, living with uncertainty, constant customer interaction, and modifications in the project structure (Serrador & Pinto, 2015).

2. LITERATURE REVIEW

Many studies have been conducted regarding the factors that cause construction delays and increased budgets worldwide.

This review summarizes the leading causes of deviation in construction project schedules and budgeting in research and literature.

Assaf et al. [1995] conducted a field survey for identifying causes of time overrun in Saudi Arabia, which revealed 73 reasons broadly ascribed to owners, consultants, and contractors as labor shortage, delay in interim payment, change orders by owners during construction, delays in checking and approving the design documents, awarding contracts to the lowest bidder, incompetent human resources, among others causes.

Odeh et al. [2002] researched the causes of delays in Jordan by a survey consisting of 28 delay causes categorized into eight groups client, Contractor, Consultant, material, labor & equipment, contract, contractual relationships, and external factors. A ranking of causes based on RII was done, and results revealed the top reason by consultants and contractors as lousy contractor experience and low labor productivity, respectively.

Ahmed, S. M et al. [2002] conducted a study in Florida, the USA, for finding the causes of delays using survey data from general contractors. By the ranking, the data across six categories found that building permits approval, change order, changes in drawings, incomplete documents, and delayed Inspections as the top five causes of delay.

Sadi A. & Al-Hejji [2006] found 73 causes of delay, which were identified by a field survey with three participating parties. The common causes of delay which all parties reported were [1] changing the order by the owners during construction to avoid delay, [2] delay in progress payment, [3] ineffective planning and scheduling, [4] shortage of labor, [5] difficulties in financing on the part of the Contractor. Towhid Pourrostan & Amiruddin Ismail (2012) surveyed to identify the causes with a questionnaire that cited 28 causes and six effects for delays. It highlighted the ten major factors which reduce the delays by clients, consultants, and contractors.

Similar results were found in another study in Mumbai, which indicated that a significant cause of construction delays resulted in owners' changes in design (Awari et al., 2016). However, additional factors included payments, price changes in raw materials and supplies, and shortages in labor and materials. The overall issues mainly involve financial difficulties, whether on the side of the Owner or Contractor. A secondary issue is changes in design and errors in the construction process. Delay of payments was also the predominant factor in construction delays in a Turkish study (Kazaz & Tuncbilekli), whereas environmental delays were the least influential. As Turkey is a developing country, the issues surrounding finances and cash flow seem to carry the most challenges. The overall issues mostly involve financial difficulties, whether on the side of the Owner or Contractor. A secondary problem is changes in design and errors in the construction process, especially in areas where the economy is less developed.

Acharya et al. [2006] reported frequent interruptions from the public, changed site conditions, failure to provide the required construction site, unrealistic project time estimation, and design errors as critical causes of delay in Korean construction projects among a survey of 208 respondents and 19 delay causes. Alaghbari et al. [2007], using Mean score and ranking, reported top five reasons for delay by contractors were financial problems, shortage of materials on-site, poor site management, construction mistakes, defective work, and delay in delivery of materials to site and coordination problems with others.

The top five reasons for delays by clients were financial problems, slowness in making decisions, contract modifications, lack of coordination with the Contractor, and lack of construction knowledge.

Owolabi et al. (2014) Investigated the causes and effects of delay on delivery time. A random sample of 93 was given a questionnaire structured in Linkert scale format. The results showed that clients have the highest value at 51.1%, contractors have 35.5%, then the consultants have 13.3% of causes of delay in a construction project. The 15 factors are identified and ranked according to the mean index score. The factors include lack of funds, adequate information from consultants, slow decision-making, and insolvency of contractors.

Late issue of drawings, delay in progress payment by Owner, change orders, the slow decision by owners, and contractors' financial problems were the leading causes commonly reported by Rachid et al. [2019], Ahmad et al. [2019], and Prasad et al. [2019] who studied projects in Algeria, Jordan, and India respectively. Hossain et al. [2019] studied Kazakh construction projects and reported that contractors' related causes like poor planning, rework due to errors in construction, shortage of labor/equipment/materials, and delayed supply of materials were important delay causes. Bounthipphasert et al. [2020] studied road construction projects in Laos. They concluded that contractor cash flow, delayed payment by Owner, difficulties in financing project by Contractor, financial issues related to Owner, and defective equipment and vehicles for the work as the top five causes of delay.

Most construction industry organizations cannot finish the projects within the agreed time frame (Caven, 2012). It represents the factors that delay the project in civil engineering and building projects. Project management staff in the construction industry takes more time than the state before starting the project. It is one of the significant issues in the corporate sector. Harris et al. (2013) stated that completing the project within the timeframe is efficient in the construction industry.

3. DISCUSSION

In the construction industry, execution delays mean exceeding the length of performance from the date specified in the contract or beyond the agreed-upon date for delivery of the project. The uncertainty leads to financial implications (Lo et al.).

Outstanding claims relating to time are a Contractor requirement for an extension during the project or an extension for a particular activity beyond the agreed-upon duration and define the delay in executing the project and its cost. These claims are widespread. In Nigeria, for example, the construction industry's

performance in terms of meeting schedules was poor, and seven in ten projects had suffered delays in execution. A similar proportion of projects ending in exclusion was also found in Saudi Arabia, with only 30% of construction projects completed on time, and the average exception duration is 10-30 % (Soon & Sambasivan, 2007).

Execution delays are also common in construction projects in Hong Kong and result in lawsuits and budget irregularities (Lo et al., 2006). Soon & Sambasivan (2007) found a correlation between the causes of time anomalies and the causes of budget irregularities which quickly lead to disputes, lawsuits, arbitrations, and courts. Kaming et al. (1997) dealt with the relationship between budget deviations and time anomalies and, even more importantly – found a strong connection between their factors. However, budget deviations were found to be more common than time anomalies. In conclusion, while most projects suffer from the two "diseases" together, there are no projects that suffer only from time-lapses without budgetary implications. Research categorizes delays into four primary ways:

- Critical or Noncritical delays
- Excusable or Non-excusable delays
- Compensable or Non-compensable delays
- Concurrent or Non-concurrent

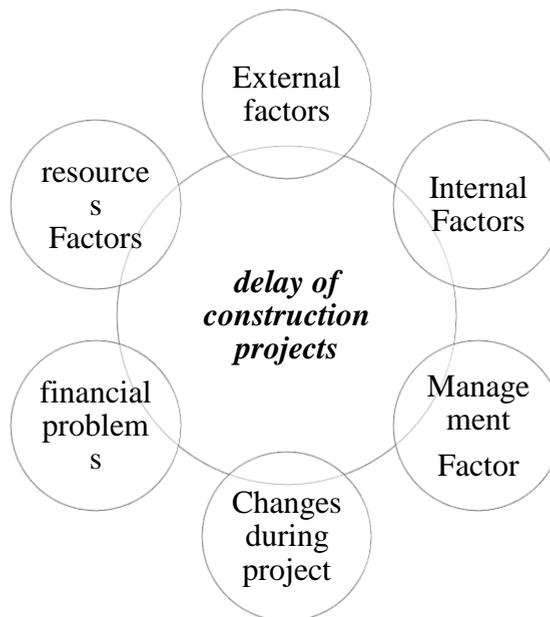


Figure .1 Causes for construction delays
Source Ahmed et al. (2003)

3.1 The main reasons for the delay in constructions projects in most of the literature

External factors: external factors that influence the delays are - Government laws, global supply chain, permits, weather and unforeseen events, and accidents. The literature indicates external factors that may affect the performance and schedules of construction projects in terms of time.

A comprehensive agreement among all scholars and researchers that the external factors are unfamiliarity & changes with local laws, construction permits, social & cultural factors, and weather conditions (A. Assaf & Al-Hejji, 2005; Doloi et al., 2011; Jarkas et al., 2014; Sambasivan & Soon, 2006; Frimpong et al., 2002). In more articles, the external factors have been ranked first in the overall top causes of time overrun (Alnuaimi & Almohsin, 2013). When they studied projects from 2007-to 2008, weather conditions were the first factor contributing to delays. Another external factor that has to do with laws and permits, Elawi et al. (2015) found "land acquisition" is the first ranked cause that contributes to delaying the project's completion date in Mecca-Saudi Arabia.

Internal Factors: technical and design, change in characteristics, company strategy, cost overrun.

Management Factors: leadership, communication & safety, organizational changing structure. Construction projects can sometimes proceed for more than two years, and changes may occur within the organization. The changes can be in the organizational structure, the administrative decisions, the initial budget given to the project, and the organization's strategy. Sometimes a project can be canceled entirely due to these changes.

Changes during the project: design issues, new consults

Even if the construction contractor could absorb minor changes while construction, principal, and multiple modifications will affect the progress of the project because the Contractor must spend time on alterations and changing course rather than the original plan of the project, the probability of the changes in design during engineering phase is high, and that could be because there are many interfaces involved at this stage. Different vendor inputs are needed as well as client input and intervention. Therefore, changes may come from the design company, the vendors themselves, or even the owners.

Financial problems: cash flow, company finance problem, prices increase, financial claims, lawsuits. Although the design is usually the cause of variations in the project and is often undesired, owners are obligated to implement them to complete the project promptly and with adequate quality. Moreover, typically these

changes are agreed upon by all parties, especially between the Owner and the main construction contractor. As noted above, one of the effects of variation is legal claims. Alnuaimi et al. (2010) found that financial claims were the second most prevalent factor of interpretation after the effect of the time delay of the project. Also, Desai et al. (2015) mention that financial claims mainly originate from variations as time delays lead to legal claims. Moreover, legal claims are one of the main factors of project delays and budgeting issues (Alnuaimi & Almohsin, 2013; Memon et al., 2011).

Resources Factors: Material, equipment, and human resources. Project resources are the people, capital, and material goods required for a project's successful execution. During a construction project, resources must be identified and allocated by frequent changes. The resources include the internal and external teams and managers.

Every activity in the project's activity list needs to have resources assigned to it. Before posting resources to the project, availability must be checked. Resource availability includes information about what resources can be used on the project, when they're available, and the conditions of their availability.

4. CONCLUSION

In the construction industry, a delay in execution means exceeding the performance length from the specified date in the contract or beyond the agreed-upon date for project delivery. The uncertainty leads to financial implications (Lo et al., 2006). Outstanding claims relating to time are the Contractor's requirement for an extension during the project or an extension for a particular activity beyond the agreed duration and define the delay in executing the project and its cost. Delays in the project schedules directly affect the project's budget, and the issue can become political in public projects.

In a dynamic world that changes daily, flexible methodologies are needed to manage traditional construction projects. Construction projects are usually executed in the Waterfall Model, but procedures must be incorporated from the Agile method.

This article outlines the problems that cause delays and the need to make construction projects flexible, fast, and suitable for frequent changes.

According to various researchers, the following recommendations can be made to minimize the delays:

- Prepare effective planning and scheduling
- Proper site management and supervision

- Using up-to-date technology
- Procurement of material
- Coordination between the parties involved in the project
- Use of adequate construction methods
- Estimate the initial cost for the projects
- Owners should make decisions quickly
- Progress payment should be made on time
- Manage the financial resources

Delaying schedules in construction projects is global and relevant worldwide, from India, Malaysia, Europe, the United States, to Israel. According to the literature, the main reasons for the delay in schedules in the project are frequent changes on the part of the work order, an estimate of cost and lack of budget in the project, the problem of raw materials and supply chains, and resource management in the project.

The Agile methodology is a way of managing a project by breaking it up into several phases. It involves constant collaboration with the project's partners and continuous improvement at every stage. (Manifesto for Agile Software Development, 2001).

By adopting the Agile method to traditional construction projects, the project can be divided into short sections to track and manage changes while in the project and not long after, to make quick decisions in conjunction with stakeholders and entrepreneurs, and after making these decisions to move on to the next step.

We live In a VUCA world ((short for volatility, uncertainty, complexity, and ambiguity).

A reality that changes daily and brings many challenges to the owners, contractors, consults, and project managers. It is necessary to make quick decisions in short intervals and not expect the project's initial planning to be relevant even after long, often years of execution.

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CASE STUDY



HOW TO INCREASE LOCAL REVENUE IN BULGARIA - MISSION (IM)POSSIBLE?

DESLAVA ZHELEVA KALCHEVA*

Abstract *The topic dedicated to local revenue growth in Bulgaria has been relevant since the start of the decentralization process. Nearly twenty years after the democratic changes, local authorities are experiencing severe funding shortages and difficulties in implementing their capital programs. The topic is becoming more relevant due to the COVID-19 pandemic and the current economic situation - rising inflation and problems related to the revenue collection. The purpose of this article is to present a retrospective analysis of the dynamics of the local revenue in Bulgaria and to calculate key financial indicators. The results are compared with the European Union average. The study presents the main results of the Program for fiscal decentralization in Bulgaria. Based on the analysis of the European practice, local revenue structure in Bulgaria and main fiscal indicators, the possibilities for local revenue growth are presented.*

Keywords: “decentralization, local revenue, tax revenue, shared taxes, Bulgaria growth.

JEL Classification: H24, H71, H77

INTRODUCTION

Fiscal decentralization in Bulgaria has been started in 2002 with the adoption of the first Program for Implementation of the Financial Decentralization Strategy. Today, twenty two years after the beginning of the reform, municipal budgets continue to be underfunded and the share of the local tax revenue in total tax revenue continue to be low. In recent years, the municipalities have been given new responsibilities, but the financial resources for the implementation remain scarce. Local capital expenditures are financed primarily with the funds from the European programs, and municipal investments financed with European funds reach around 80% of the total local investments. The crisis caused by COVID-19, rising inflation in Europe and in Bulgaria, as well as deteriorating economic conditions pose new challenges to the local and regional authorities. Subnational governments increased

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their expenditure levels as a result of the socio-economic crisis arising from COVID-19. In particular, they anticipate significant expenditure increases in social services and benefits, support to SMEs and the self-employed, and public health. More moderate expenditure increases are expected in education, information and communication technologies, adapting local public transport, adapting administrative services and public order and safety. Municipalities, and especially regions, reported large decreases in tax revenue. Among municipal respondents, 86% anticipate a moderate to large decrease in their tax revenue. No category is spared: small and large municipalities are affected alike (OECD, 2020, p. 18).

This article is devoted to the study of the possibilities for local revenue growth in Bulgaria. The topic is on the agenda of the public discussion and relevant for both researchers and politicians. In a period of deepening financial crisis, declining GDP, rising inflation and potential energy crisis, the issue of increasing municipal revenue is becoming very important.

The tasks we set in the present study are: presentation of the structure of local revenue in Bulgaria; preparation of an analysis of the dynamics of the municipal revenue for the period 2003-2020; study of the possibilities for increasing the local revenue and proposals for the introduction of new local revenue and optimizing the collection of the municipal revenues. The study summarizes the most significant results of the reform towards fiscal decentralization in the country.

It this research we are state that a significant growth in the local revenue in Bulgaria can be achieved through the introduction of the shared tax revenues.

The structure of the article is as follows: Introduction; Characteristics of the local revenue in Bulgaria and main results from the fiscal decentralization process; Analysis of the local revenue for the period 2003-2020; How to increase the local revenue and Conclusion. The financial data used in the survey are from the Ministry of Finance and EUROSTAT.

2. CHARACTERISTICS OF THE LOCAL REVENUE AND MAIN RESULTS FROM THE FISCAL DECENTRALIZATION PROCESS IN BULGARIA

The design of the local revenue system has developed significantly since the democratic changes. Based on legislative changes, municipalities are expanding their revenue powers. Since 2003, local authorities have been able to determine the basis and amounts of local fees listed in the Local Taxes and Fees Act and may introduce new fees with an ordinance of the municipal council. In 2005 the Local

Debt Act regulates the possibilities and the way of debt assumption as well as the regulations for the types of local debt.

In 2007 the Constitution of the Republic of Bulgaria was amended, and the municipal councils were given the power to determine the amount of local taxes under conditions, order and within the limits established by the law. For the first time, municipalities receive real tax powers. Local authorities set tax rates in accordance with the legal restrictions, but do not have the competence to determine the types and tax base of local taxes.

Significant changes in the legislation related to municipal revenue and expenditure were observed in 2014, when the Public Finance Act was adopted. The law aims to strengthen the interaction between the legislature, the executive, the judiciary and municipalities to pursue prudent fiscal policies while respecting the budget deficit and consolidated debt benchmarks established for the European Union by the Maastricht criteria. The law transposes the main provisions of the Council Directive 2011/85 / EU of 8 November 2011 on requirements for budgetary frameworks of the Member States and Council Regulation (EC) № 479/2009 of 25 May 2009 implementing the Protocol. for the excessive deficit procedure. The law envisages opportunities for the compiling a program municipal budget. It further the Public Finance Act develops the set of fiscal rules for the subsector “Local government”. A medium-term goal is set for adherence to a balanced budget balance on a cash basis, regulates the procedure for compiling the medium-term budget forecast, the budget forecast for local activities of municipalities and others. For the first time, legislation is being introduced regulating municipalities in financial difficulty and the granting of the interest-free loans for financial recovery (Aleksandrova, Kalcheva, 2021).

Currently, the tax revenue received in the budgets of Bulgarian municipalities are: Immovable property tax, inheritance tax, donation tax, property transactions tax, vehicle tax, patent tax, tourist tax, tax on taxi transport of passengers, other taxes determined by law. The typical municipal fees are: for household waste, for the use of markets and marketplaces, for technical services, for administrative services, for the purchase of graves, for owning a dog, etc.

After the democratic changes, the system of state transfers in Bulgaria is also changing significantly. Until the end of 1992, a centralized approach was used to determine subsidies. The amount of the subsidies is formed as the difference between the normatively valued expenditures of the municipalities and the estimates of the expected revenues. Any excess of municipal revenues is seized by the Ministry of Finance. Municipalities with a negative operating

result receive a supplementary transfer, and municipalities with a positive operating balance provide growth in the revenue. This approach contradicts the idea of the decentralization and municipalities have no motivation to develop financial independence.

Since 1993, the state transfers (subsidies) have consisted of two parts - a general subsidy and a targeted investment subsidy. The method for the determining the amount of subsidies for municipalities is not regulated by law in practice, the decision is taken ad hoc by the Ministry of Finance. In the distribution of the total subsidy between the municipalities the methodology developed by the Ministry of Finance is applied, which is based on objective criteria, taking into account the needs of the municipalities - number of students, residents, socially disadvantaged, etc. The second element of the state transfers for local authorities (active till 2003) is the shared taxes. There are two main taxes, which the state share with the municipalities - 50% of the revenue from the personal income tax and municipal tax, representing a 10% rate on corporate profits. Revenue from shared taxes are distributed among municipalities based on their origin. Municipalities also receive the full amount of profit tax from a companies with 50+ percent municipal participation.

As a result of the Concept and Program for financial decentralization adopted by the Bulgarian government in 2003, a new approach for determination and distribution of the state transfers is adopted. The new mechanism for determining subsidies is based on the following formula: $C = C1 + C2 + C3$ where: C1 is the amount of the total subsidy (for the state delegated activities); C2 – the amount of the total equalization subsidy (unconditional grant); C3 - the amount of the targeted subsidy for capital expenditures. The shared revenues for the municipalities are eliminated.

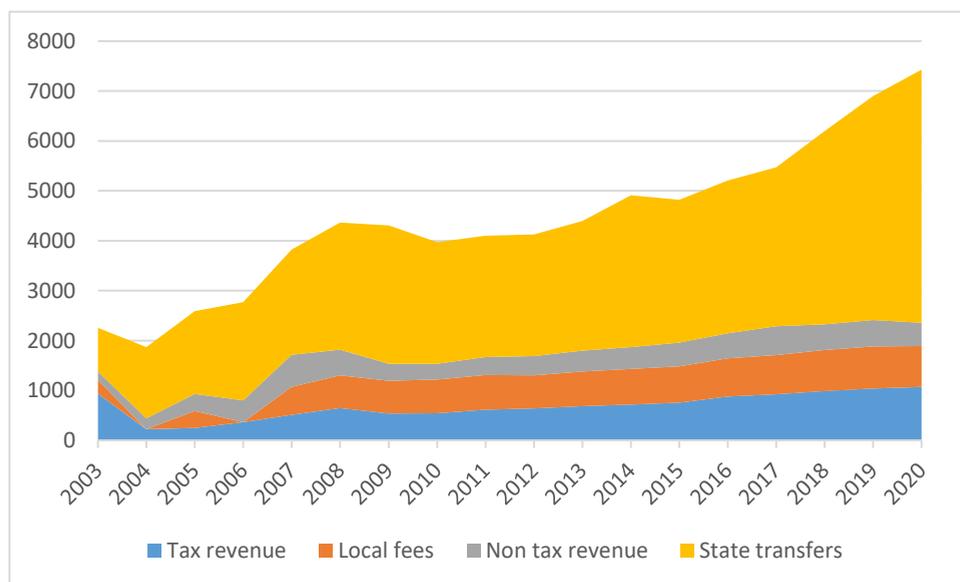
In 2003, a new principle of financing municipalities was introduced. Budget activities are divided into delegated by the state and local. The financing of the activities delegated by the state is provided by funds from the shared personal income tax and a general supplementary subsidy, and the local activities – from the local taxes, the fees, the non-tax revenues and the general equalization subsidy. Financial decentralization was started in 2003 with an incomplete financial resource for the maintenance of the activities delegated by the state, but at the end of the year the state provided with additional funds the full standards for the maintenance of the activities delegated by the state. (Ministry of finance, 2003, p. 97).

3. ANALYSIS OF LOCAL REVENUE FOR THE PERIOD 2003-2020

As a result of the ongoing reform towards fiscal decentralization, the design of the local revenue for the period is changing. Shared revenues are eliminated, some tax revenue are eliminated and new ones are included in their place. Despite the inclusion of the new local taxes, there is no significant change in the structure of the local revenue. In 2003, the revenues from the shared personal income tax are still part of the municipalities' own revenue. In 2004, PIT revenue became part of the total amount of the government transfers. In 2008 the revenue from PIT are centralized and revenues are not transferred / shared to the municipalities.

Graph 1. presents the change in the structure of local revenue for the period 2003-2020.

Graph 1. Structure of the local revenue 2003-2020 (BGN thousand)



Source: Ministry of Finance, own calculation

During the period, the state transfers present the most significant share of the local revenue and vary between 59%-68%. An exception in 2003 is observed, when the tax revenue represent 41% from the total revenue (due to the share taxes) and revenue from state transfers present 39%.

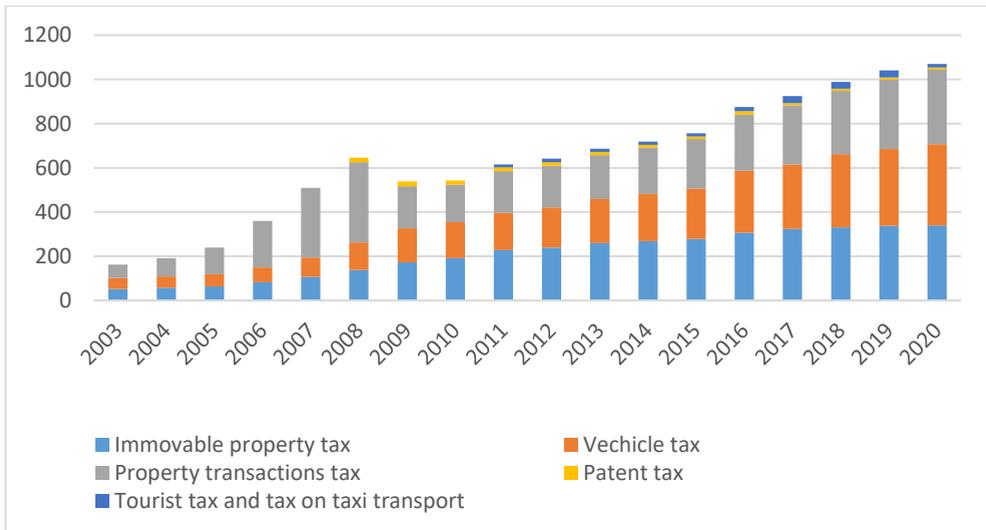
It should be noted, that a significant part of the state transfers is conditional, ie. local authorities do not have the right to determine expenditure areas on their own. During 2020, the proportion of the unconditional state transfers to total state transfers received by local government is around 7% and the proportion of the local government revenue from local resources by total revenue is around 32%.

Tax revenues increase during the study period. We observe exceptionation in 2009, when the global financial crisis affected tax collection and reduced revenue with 15%. The crisis affects non-tax revenues, but does not significantly affect the collection of fee revenues.

As at 31/12/2020 the structure of the local revenue is as follows: tax revenue–14% from the total local revenue; local fees-11 % from the total local revenue, non-tax revenue–6% from the total local revenue; state transfers – 68% from the total local revenue. It should be stressed, that the amount of state transfers includes all extraordinary transfers that municipalities receive during the budget year.

Tax revenues, the basis for financial independence of the local authorities, deserve special attention. Graph 2 presents the structure of the tax revenues for the study period.

Graph 2. The structure of the tax revenue – 2003-2020 (BGN million)



Source: Ministry of Finance, own calculation

Note: the graph does not present revenues from tax on donations and inheritance tax due to its negligible value

During the period, the municipal tax (2003), the profit municipal tax (2003) and the road tax (2005) were revoked, but the patent tax (2008), the tourist tax (2010) and the tax on taxis transport (2011) were included.

However the introduction of the new local taxes, the additional tax revenue are very low. The revenues from the patent tax present about 1% of the local tax revenue, and the revenue from the tax on the taxi transport and from tourist tax - about 2%. In addition, not all municipalities receive revenue from the tax on taxi transport.

The most significant volatility is observed in connection with the property transaction tax revenue. In 2008 the revenues reported a significant peak due to the lively real estate market and the large number of real estate sales transactions. The revenue from immovable property tax provides stable revenues that increase over the years, unlike the revenue from property transactions tax, which are extremely variable and sensitive to changes in the economic situation. (Nenkova, Kalcheva, 2018, p. 99).

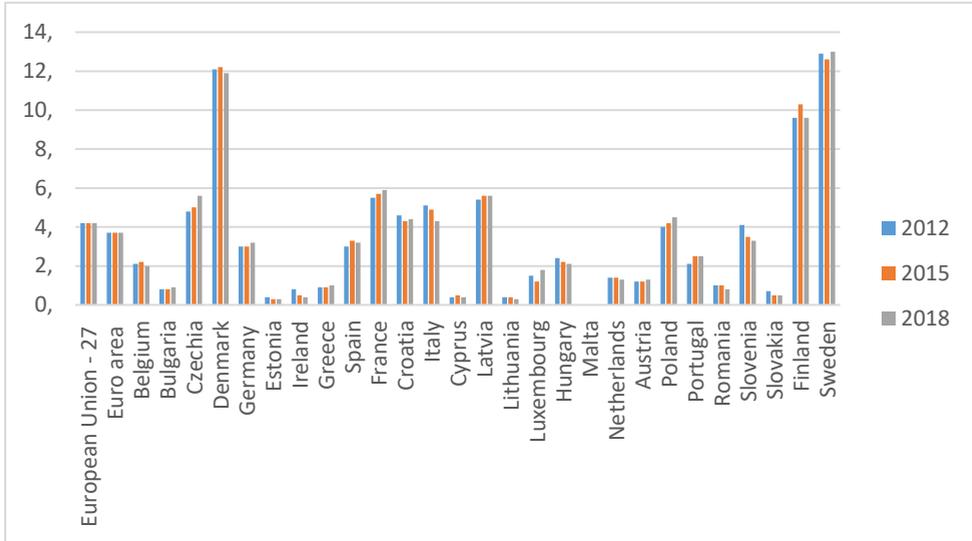
A steady upward trend during the period reported the revenue from vehicle tax. Part of the municipalities report tax rate of the vehicle tax increases. As at 31/12/2020 the structure of the local tax revenues is as follows: immovable property tax – 32%; vehicle tax – 33%; property transactions tax – 32%; patent tax – 0.9%; tourist tax and tax on taxi transport – 1.5%; inheritance tax and tax on donations – 0.05%.

We can summarize that the most significant local taxes are only three and their income present 97% from total local tax revenue. The inheritance tax and donation tax have very low profitability and their importance in municipal budgets is symbolically.

Although the municipal tax revenues increase in absolute value annually, they account for a modest share of GDP and in 2020 reach 0.9%. Graph 3 presents the indicator of local revenue to GDP for the countries in European Union for the period 2012-2018.

The Graph 4 presents the value of the indicator for 2020. We consider the probability COVID-19 crisis impact on the indicator and we present the data separately.

Graph 3. Change in the indicator of local revenues in GDP for 2012-2018 (%)

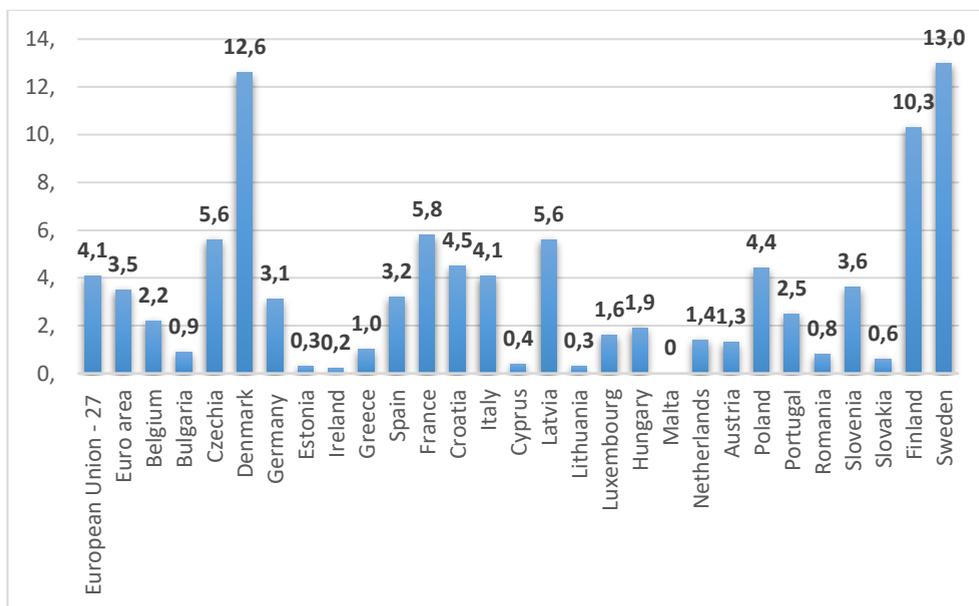


Source: EUROSTAT, own calculation

Based on the presented information, we can outline two groups of countries: countries with low tax revenue and correspondingly lower level of the fiscal decentralization and countries with a traditionally decentralized system and high levels of municipal tax revenue. The first group includes Sweden, Denmark, Finland (the ratio is over 10%), Italy, Poland, the Czech Republic, Croatia, Latvia and France (the ration is above the EU average of 4.1%). The second group includes Slovenia, Spain, Germany, Portugal, Belgium, Hungary, Luxembourg (1.6% -2.6%) and the Netherlands, Austria, Greece, Bulgaria, Romania, Slovakia, Cyprus, Lithuania, Estonia and Ireland. (the ratio is below 1.5%). During the study period, the indicator for Bulgaria did not change significantly and varied between 0.8 and 0.9%, which puts Bulgarian municipalities in one of the last places in terms of share of tax revenues in GDP. Poland, the Czech Republic and Latvia (CEE countries) have achieved a high level of tax autonomy of local authorities.

The Graph 4. presents the indicator of local tax revenues to GDP for 2020.

Graph 4. Share of local tax revenues in GDP for 2020 (EU 27)



Source: EUROSTAT, own calculation

In 2020, the values of the indicator does not change significantly. The EU average decreased from 4.2 to 4.1. Belgium, Germany, Ireland, France, Italy, Luxembourg, Hungary and Poland reported declining. The main reason for the decline in local tax revenue is the COVID-19 crisis. States, regional and local authorities were accepting tax breaks for the businesses and citizens, leading to the declining tax revenue. Bulgaria ranks last in terms of the value of the indicator. Estonia, Ireland, Cyprus, Latvia, Malta, Slovakia and Romania have lower values. It should be noted that some of these countries have higher GDP and a smaller share of the local sector. In addition, the share of local revenue in GDP for Bulgaria in 2020 is 7.7%, and the EU average is 11.7%.

Other indicator for estimation of the local autonomy of the municipalities is Local autonomy index. Local autonomy is a highly valued feature of good governance. The continuous attempts of many countries to strengthen the autonomy of local government shows the importance given to decentralization and reinforcing competences at the lowest level of a state. The eleven variables measured are located on seven dimensions and can be combined to a “Local Autonomy Index” (LAI). (Ladner et all, 2021, p. 1).

One of the variables evaluated is Fiscal Autonomy, which can vary in the range 0-4 (0 local authorities do not set base and rate of any tax; 1 local authorities set base or rate of minor taxes; 2 local authorities set rate of one major tax (personal income, corporate, value added, property or sales tax) under restrictions stipulated by higher levels of government; 3 local authorities set rate of one major tax (personal income, corporate, value added, property or sales tax) with few or no restrictions; 4 local authorities set base and rate of more than one major tax (personal income, corporate, value added, property or sales tax). Estimation for Bulgaria is 1, and average ratio of the countries presented in the study is 1.64. Finland, Germany and Sweden stand out with the highest fiscal autonomy.

The second variable related to the fiscal autonomy of local governments is Financial transfer system. The variation of the variable is between 0 and 3 (0 conditional transfers are dominant (unconditional = 0- 40% of total transfers); 1 there is largely a balance between conditional and unconditional financial transfers (unconditional = 40- 60%); 2 unconditional financial transfers are dominant (unconditional = 60-80%); 3 nearly all transfers are unconditional (unconditional = 80-100%). Estimation for Bulgaria is 0 due to the high dependence of the municipalities of the state transfers. The significant part of the transfers is conditional. The average value for the countries for 2020 is 1.6. The local authorities with low dependence on state transfers are in Croatia, Finland, France, Norway, Portugal and others.

The next interesting variable is financial self-reliance. It is varied between 0 and 3 (0 own sources yield less than 10% of total revenues; 1 own source yield 10-25%; 2 own sources yield 25-50%; 3 own sources yield more than 50%). Estimation for Bulgaria is 2, and average value of the variable is 1.94. The countries with the highest value are Finland, France, Greece, Norway, Sweden and others.

The specified variables are only some of the variables that form Local autonomy index. The other variables are: institutional depth, policy scope, interactive rule, effective political discretion, borrowing autonomy, organizational autonomy, self-rule. Local Autonomy sums up all the variables. The average LAI for 2020 is estimated at 21.46. The data shows an increase of local autonomy between 1990 and 2020, especially in the Central and Eastern European countries. Countries with a high degree of local autonomy include the Nordic countries, Switzerland, France, Portugal and the USA (Ladner et al, 2021, p.1).

The countries with the highest value of the indicator in the EU are Finland (32.35), Sweden (28.29), France (27.84), Portugal (27), Spain (26.45). Estimation of Local autonomy index for Bulgaria is 21. There is no change in the ratio for the period 2014-2020. On the one hand, the country indicator is close to the average for the survey countries. On the other hand, variables such as the Financial transfer system and Fiscal Autonomy show the strong dependence of municipalities on state transfers and the low levels of tax local revenue. In addition, the unchanged value of the index means that there are no new steps towards fiscal decentralization in Bulgaria.

In recent years, the crisis caused by the COVID-19 pandemic, the increase in the minimum wage, rising inflation and the need for urgent investment in the water sector and municipal road infrastructure have put on the agenda the issue of the increasing municipal revenue.

Based on the above, we can summarize that Bulgarian municipalities are highly dependent on the state transfers, and this limits their spending policy and independence. Revenue from the local fees are conditional and cover the cost of the local services provided. Municipal revenue can be increased by changing tax revenues and improving the collection of municipal revenues.

4. HOW TO INCREASE THE LOCAL REVENUE

1.1. Tax revenue

Shared Personal income tax

As we already mentioned, tax revenues are an essential element of the revenue system of local authorities. They provide the highest level of autonomy and allow the determination of an independent municipal expenditure policy. In the budgets of the European countries, local tax revenue are formed by the tax revenues, which municipalities determine within certain limits and by tax revenues shared by the state.

Shared tax systems are very widespread in Europe. In these schemes, sub-national governments receive a percentage of the receipts of a State tax via precise mechanisms, with or without localisation (principle of “fair return”). In this case, sub-national governments generally have little or no leeway (Dexia, 2008, p. 9).

According to the OECD (2018), the local and regional authorities in Germany, Poland, Portugal and Slovenia receive revenue from share taxes. As

some authors (Mikavilov) believe that shared taxes are close to government transfers, we should draw the main dividing lines.

According to the OECD report we can use 4 criteria to distinguish the shared taxes and typical state transfers. The criteria are as follows:

- 1) Risk sharing: Is the amount of revenue allocated to the sub-central level strictly related to total tax revenue (e.g. as a given share of annual tax revenue), i.e. does the sub-central level of government fully bear the risk of tax revenue slack and fluctuations?
- 2) Un-conditionality: Is sub-central government free to use the revenue allocated, i.e. are the revenues unconditional (non-earmarked)?
- 3) Formula stability: Is the revenue share between the central and the sub-central government predetermined in advance and not changed in the course of a fiscal year?
- 4) Individual proportionality: Is the revenue share of each sub-central government strictly related to what it generates on its own territory, i.e. is there no horizontal redistribution or fiscal equalisation across sub-central governments?

We are talking about strict tax sharing, if an arrangement fulfils all four criteria and we can add the revenue to the local tax revenue. If an arrangement fulfils the first three criteria but not the fourth (individual proportionality), it will be referred to as tax sharing. If an arrangement does not fulfil the first three criteria, it will be referred to as intergovernmental grant. (Blöchliger H. and Petzold O., 2009, p.4-5).

Given the structure of the local revenue in Bulgaria and given the shared revenues they municipalities have received in the past, the introduction of shared tax revenue is a good alternative for local revenue increases.

Revenue sharing can be done in two ways: a) transfer of a part of the revenues from the respective revenue source, which arise on the territory of a given territorial unit; (b) the transfer of part of the revenue from the relevant revenue source, which is collected at national level and distributed among local authorities under a specific scheme, on the basis of certain indicators and criteria. The first method of sharing is known as strict tax sharing. The second method uses equalization criteria related to the number of inhabitants of a given local territorial unit, area of the municipality, etc.

When applying the criterion for distribution of the place of generation of the tax base, there is a risk of serious fiscal differences between the individual

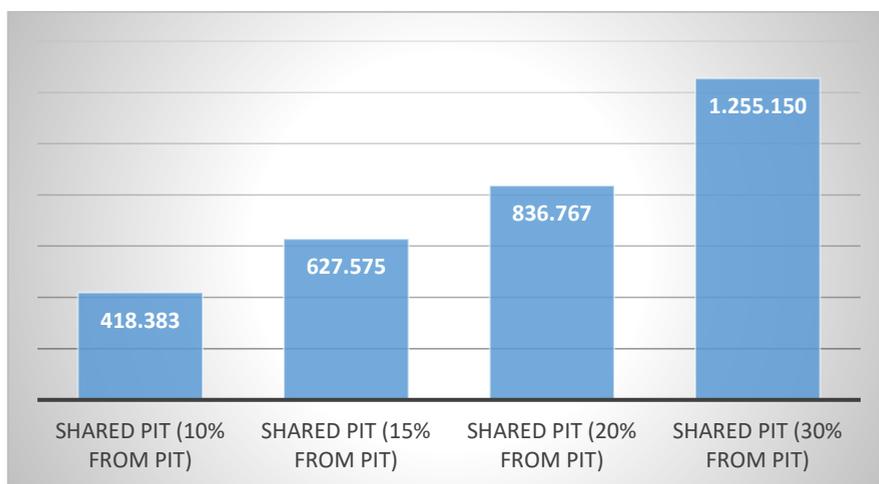
municipalities. The reason for this is that on the territory of large municipalities there is higher employment, higher population, higher tax base. Most of the revenues from shared taxes will remain on the territory of large municipalities with high own revenues, and small municipalities will add minimal revenues to their budgets. To avoid this risk, various mechanisms are applied, including equalization criteria, for the distribution of shared revenues. Providing shared revenues in the local budgets is seen as a step towards successful fiscal decentralization.

For the purposes of the study, we will consider of revenue sharing from PIT. We accept that the revenue will be distributed among the municipalities according to additionally accepted criteria, which allow overcoming serious fiscal imbalances. The set of additional criteria is not the scope of this study.

Based on the shared revenue, local authorities can access to the highest income taxes with a flexible tax base. Tax sharing overcomes the problem of creating serious fiscal differences between the jurisdictions. Local revenue increases through shared taxes does not imply increasing the tax burden on the local population. In general, local authorities are free to determine how shared revenue is spent.

In 2020, the total revenue from personal income tax amount to BGN 4,183,835 thousand. Figure 5 presents four options for percentage sharing of tax revenues with municipalities. In the fourth option (sharing 30% of revenues), the total amount of the shared tax revenue exceeds the total amount of the local tax revenue.

Graph 5. Options for sharing PIT (thousand BGN)



Source: Ministry of Finance, own calculations

The Revenue from personal income tax is suitable for sharing with local authorities because:

- Individuals live and work most often on the territory of the same municipality and the application of this tax avoids the export of the tax burden
- Tax revenues reflect the economic situation, as a result of which there is tax elasticity
- The use of the tax as a shared local tax does not create obstacles to the functioning of the single internal market and has nothing to do with international trade (Naydenov, 2012, p. 92).

Based on the transitional practice over the years and the availability of shared income from PIT in 2003, we believe that this option is suitable for local revenue growth in Bulgaria. In the practice of the EU countries there is a significant growth in municipal revenues on the basis of shared revenues.

Surcharge (Personal income tax)

In a number of countries, local authorities can determine the so-called "surcharge", "additional tax" or a percentage above the rate set by the state. "Additional taxes" provide the municipalities with the fiscal autonomy, as they independently determine the amount of the allowance. The central government defines the tax base and collects both its own revenues and those of the local government. EU countries where local and regional authorities have the right to impose additional rates are Belgium, Croatia, Italy, Denmark, Norway, Sweden, Finland and Iceland.

For instance, the Flemish municipalities have a very large number of available tax instruments, ranging from surcharges on federal personal income tax and regional property tax revenues to over 120 different purely local taxes, fees and user charges Geys, B., and F. Revelli. (2011), p.411). Corporate income tax and value added tax in present day Belgium are federal taxes; personal income tax is also mainly federal, but regions (and municipalities) are permitted to add positive or negative surcharges; the immovable property tax goes to the regions, which set its base rate although the municipalities may.

Both local taxes are surcharges determined only by the municipalities: - the local income tax is a surcharge on the federal income tax levied on individuals; the rate of the surcharge is between 0 and 10% and, in practice, is a tax on labor income (savings income is taxed separately); and - the local property tax is a

surcharge on the regional property tax; its base, also defined at federal level, is an imputed income on immovable property; this tax is levied on all taxpayers – individuals, companies, charities – on the basis of the location of the property (Ge´rard, M., H. Jayet, and S. Paty. 2010, 337)

In Italy, Regional taxation systems are here defined in terms of the level of the average rate of the regional surcharge on the tax on personal income (Imposta sul reddito delle persone fisiche [IRPEF]), over which regional authorities in Italy have fiscal autonomy, along with the number of income brackets in each region (Del Bo, C. F. (2018), p.60).

There are two possibilities for imposing surcharge - on the basis of "residence" or "place of work". For example, if municipalities have the right to impose a PIT surcharge, the legislator must determine which municipality will impose and receive the tax - the one where the person has a permanent address or the one where the person works. The studied practice in Europe shows that traditionally the revenue from the tax allowances go to the municipality where the person has a permanent address. In Italy, for example, people must first register in the municipality where they live and then be able to work.

The opportunity for the local tax revenues increases in Bulgaria is to impose a tax surcharge on personal income tax. In Bulgaria, the idea of introduction of the surcharge on personal income tax has already been discussed. This idea includes the possibility for the municipal council to set a tax surcharge between 0.5% and 2% based on the income of individuals, at the expense of reducing the central rate of personal income tax (personal income tax is a flat and it is 10%). In other words, if the local surcharge tax is a maximum of 2%, the PIT rate will be 8%. The additional municipal revenue from surcharge 2% shall be around BGN 83,676,000. This amount is lower compare with the alternatives for the shared revenues. One of the risks posed by this proposal is the deepening of the fiscal imbalance between the few rich municipalities and the many poor municipalities. Tax revenue will be low in sparsely populated municipalities with limited jobs and will lead to minimal revenue growth.

According to European Commission (2022) disparities between and within regions remain high in Bulgaria. In 2019, GDP per capita was largely below 50% of the EU average across all regions, except in the southwest region that includes the capital city. Closing the gap in regional disparities by boosting the economic potential of Bulgaria's less developed regions would contribute to the country's long-term sustainable and inclusive growth.

Another problem in the implementation of this proposal is way of the imposed of the surcharge - at the place of residence or at the place of work of the person receiving the income. In Bulgaria, there is a practice of people from small municipalities to work in large neighboring municipalities. This practice shifting the tax burden and not being able to achieve proportionality of taxation.

Change in the tax base of Immovable property tax and base of the Property transactions tax

The tax base of the immovable property tax is the tax assessment. The tax assessments of the properties in Bulgaria have not been updated for years and lags significantly behind the market ones. The last update of real estate tax assessments was prepared in 2006. Since then, market prices have increased many times, and the difference between market and tax assessments is more than significant. The update of the tax bases will lead to increase of the local tax revenue.

The update will lead also to revenue from property transactions tax growth. Currently, the actors in the real estate properties market have choice for the implementation of the deals. They can choose the tax base or market base in connection with the payment of the property transactions tax. Often, they prefer the lower tax base. After amendment of the tax base, the revenue from property transactions tax shell be higher.

1.2. Other opportunities for local revenue growth

Municipalities may introduce measures to improve the collection of property taxes, some of which are: full review of arrears and identification of bad debtors; sending invitations for implementation; preparation of a plan for audits of large debtors; use of the services of a Private Enforcement Agent.

Municipalities applying tax rates in the low range can gradually increase the amount of taxes. Before such a step, however, an analysis of the social tolerance of the population must be prepared and its ability to pay higher taxes must be assessed.

Local authorities can optimize property income and revenue by renting out their properties at near-market prices, updating their contracts regularly and monitoring for bad debtors.

Revenues from municipal fees can be increased by increasing their amount or by introducing new fees. As fee revenues are targeted and generally follow the pricing of the service, a significant increase is difficult to justify. In

recent years, however, more municipalities are introducing new fees in order to improve urban conditions. An example of such fees is the introduction of a parking area in the city center.

According The International Cooperation Agency of the Association of Netherlands Municipalities (VNG) due to insufficient capacities local governments in many countries face a resource mobilisation gap up to 80% or 90%. This effects the basic service delivery tremendously. Bridging the tax gap and increasing service delivery is only possible when two preconditions are met:

- First and foremost, a trustworthy and accountable local government must be in place. To increase revenue collection and improve service delivery, accountable local governments – ones that understand their main task as delivering good services in a customer-oriented manner to their citizenry – need to be in place.
- The second and equally important component is the citizens. It is crucial that they understand the importance of a constructive dialogue with their local government and are stimulated to participate and contribute to their city's or regions planning and prioritisation processes.

Based on the prepared analysis we can confirm that a significant growth in municipal revenues can be achieved by introducing shared tax revenues. The introduction of a tax surcharge is not particularly suitable for the conditions in which Bulgarian municipalities operate, namely depopulation of municipalities and strong concentration of labor in the bigger municipalities. Updating the real estate tax base will lead to revenue growth, but it will be much lower compared to the introduction of shared revenue. The other proposed measures can be implemented and lead to a gradual increase in municipal revenues, but would not significantly change the structure of local revenue.

CONCLUSION

In recent years, the local and regional authorities in Europe have faced a number of challenges – the COVID-19 crisis, rising inflation, rising social spending. This puts on the agenda the research of the opportunities for the local revenue growth.

Municipalities in Bulgaria are traditionally high dependent on the government transfers and report modest tax autonomy. Although the local taxes are seven, the fiscally significant taxes are only three and form over 95% of the municipal tax revenue. Tax revenues account for less than 1% of GDP.

At the same time, spending needs, both in terms of current expenditures and in terms of capital investment, are growing. Based on the empirical research and historical research on the structure of the local revenue, we believe that a significant growth in tax revenues and increase of the fiscal independent of local authorities in Bulgaria, can be achieved by introducing shared tax revenue. If the state share 30% of the revenue from Personal income, the amount of total local tax revenues will be double. This approach is in line with European good practice and the European Charter of Local Self-Government. Other options, but with lower profitability, are the introduction of a tax surcharge, the updating of real estate tax assessments and the introduction of measures to improve collection.

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MISCONCEPTIONS REGARDING THE X- RAY PROFESSION

SARIT H. MALUL MARKOVICH*

Abstract: *X-ray technicians constitute the third largest group among health care professions. Many people are unfamiliar with and unaware of the profession and the work areas and extensive options that it offers. Moreover, those who are acquainted with the profession and are interested in it, usually have a misconception about the nature of the work and the risks it involves. This paper aims to present a review of the literature that discusses the imaging profession as a field that is misconceived. The paper shows that there is shortage of X-ray technicians on the labor market. It explores whether this shortage is affected by the wide public's misconception about the X-ray technician profession regarding the following issues: engaging in a profession that involves ionizing radiation; making a decision about the choice of the profession; and temporarily misconceiving the profession during the COVID-19 pandemic for fear of being exposed to the virus at work. The literature review illustrates that except for a few countries, there is severe shortage of X-ray technicians on the labor market. The assumption is that this shortage is due to the misconceived image of the profession. This image is associated with a lack of clarity regarding the nature of the profession, its various study pathways and specializations and, mainly, the misguided information about the exposure and risks involved when working in an ionizing radiation environment. This perception has a strong impact on the decision to choose the X-ray technician profession and directly affects the low supply that exists today on the labor market.*

Keywords: *supply, misconception, decision-making. X-ray technician, COVID-19 pandemic.*

1. INTRODUCTION

X-ray technicians are part of the para-medical staff in every medical institution. They belong to the medical imaging setup, together with radiologists,

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nurses, and medical technologists. Within the framework of their job, X-ray technicians have to perform independently most complex diagnostic and therapeutic procedures that require a wide theoretical background, clinical training, technical skills, and high self-efficacy. The branches of imaging include: Ultrasound (US), Computerized Tomography (CT), PET-CT, Magnetic Resonance Imaging (MRI), X-rays, invasive radiology, radiotherapy, dental X-rays and mammography. Imaging tests constitute an essential and most central procedure that enables doctors from all fields to make a preliminary and accurate diagnosis in a wide variety of diseases and diagnosis situations in many areas, such as oncology, neurology, orthopedics, cardiology, and so on.

The world of imaging is increasingly developing in all areas of medicine. The technological development entails an increased demand for numerous imaging tests that are performed by X-ray technicians (Smith, 2007; Smith-Bindman, 2008; Vanckaviciene, 2014). The COVID-19 pandemic exposed in particular the distress of manpower and increased the workload in hospitals (Rahman Razu *et al*, 2021).

Choosing a profession is a complex process that is directly connected to the process of decision-making. Making decisions related to the choice of field of studies and profession is a complex and challenging process, and might cause many difficulties to the participants. This process is sometimes perceived as a stressful experience and might even evoke anxiety. The decision-making process is difficult by itself, the more so when it is affected by an insufficient and inconsistent information (Lipshits-Braziler *et al*, 2015).

One of the public's misconceptions about the profession is associated with the risk of working in an ionizing radiation environment. The public understands that ionizing radiation is dangerous, projecting it directly onto a profession that deals with ionizing radiation. Hence, people perceive this profession as dangerous and risky and prefer not to learn it. The lack of knowledge or biased information has direct impact on the decision not to learn this profession as a career for life. This paper discusses the current perceptions of the imaging profession, based on the review of the literature.

2. LITERATURE REVIEW

Worldwide supply of X-ray technicians

The world of imaging that makes use of advanced technology for the purpose of diagnosis and therapy, is increasingly developing in all areas of

medicine. The demand for diagnostic imaging services is constantly growing, due both to the progress of technology that enables a wider variety of diagnostic options, and to the rising population age. Already today there is shortage of X-ray technicians on the labor market. The demand for a skilled staff of technicians for manning the positions in the medical sector is continuously rising. Hence, meeting the market demands in the next decade requires an increase of about 30% in the number of students who learn the profession already now (Smith, 2007; Vanckaviciene, 2014).

Furthermore, even prior to the COVID-19 pandemic, shortage of X-ray technicians was felt on the labor market. In 2019, radiology departments in the United States reported a 8.5% under-staffing of X-ray technicians, even without an updated survey of this issue. Managements of numerous hospitals indicated they had an insufficient number of technicians working full time (American Society of Radiologic Technologists, 2019; Laniado, 2021).

Although the diagnosis of the COVID-19 contamination is microbiological, the imaging technologies (chest CT, chest X-rays, and chest MRI) play an important role in supporting the diagnosis, rating the severity of the disease, defining treatment guidelines, identifying risks, and assessing the reaction to the treatment. Imaging tests are actually the first line of diagnosis, since they are extensively and economically available.

Table 1. Comparison of X-ray technician profession between OECD member-states and Israel

	Israel	OECD member states
Professional Title and Identity	BA degree and Certification Diploma. The diplomas enable X-ray technicians to work in all the varied imaging professions. The curriculum is adapted to the curricula of most European Union countries (Soraski-Ichilov Hospital, n.d.).	The degrees change from country to country of the European Union. Some of the countries have more than one title for various specializations. The generic title is “radiographer / radiotherapist” (Couto et al, 2017).
Wages	The average annual wages are NIS 157,482 (Salary Expert, n.d.)	There are considerable differences in the income levels between the private and public sectors (Frija et al, 2021). Average Base Salary in Romania - 53.636 RON/year Italy - 41.992 € Luxembourg – 71.202 € Germany - 51.683 € (Salary Expert, n.d.)

	Israel	OECD member states
Educational structures	Three years studies in a program, combined with BA studies, and clinical training in X-rays and imaging school (Ministry of Health, 2022).	Most of the institutions offer BA studies. The duration of the programs ranges between 3 to 4 years, depending on the country (Couto et al, 2017).
Regulation of the profession	Failure to regulate the profession by law and the employment of X-ray technicians must not depend on the presentation of a certificate to the employee, until the profession is regulated by law (State Comptroller, 2015).	In %96 of the European Union member-states, the profession of radiography is regulated by law. Only in Romania it is not regulated. In 26 member-stages, professionals are required to register in a regulatory body in order to practice. 81% of the member-states require registration for the purpose of practicing. In Austria, Estonia, Poland, and Slovenia the registration is mandatory. In 4% member-states (The Netherlands) the registration is optional (Couto et al, 2017).
Supply and demand	There is no updated database with the number of X-ray technicians who actually practice the profession, the forecast of their retirement and the prediction of new X-ray technicians joining the field (State Comptroller, 2015). Due to the technological development, more and more imaging technology machines are introduced to the market. Hence, the demand for employment is increasingly growing (Soraski-Ichilov Hospital, n.d.).	Dr. Jonathan McNulti (2018), President of the European Federation of radiographer Societies, argues that due to the lack of homogeneous education and curricula of X-ray technicians, about 50% of the societies that are members of this organization, do not have a sufficient number of X-ray technicians and the other half produces too many of them.

In Europe, there are varied and different titles, according to the specializations that each country attributes to the X-ray technician profession. The difference attests to several versions of the profession. European professional organizations define names of the profession in order to offer unification. Nevertheless, when the title is not homogeneous and international, this can reflect lack of homogeneity related to the body of knowledge, as well as to levels of autonomy and authority throughout the European Union. Moreover, there are differences between the countries as far as the acquired education is concerned. The observed differences might put in risk the mobility of professionals if these

regulations are different. X-ray technicians who have studied in one country, might not be able to work in another country (Couto *et al*, 2017).

Furthermore, in Europe, there are differences in the levels of wages between the private and public sector. This exacerbates the shortage of human resources in the public sector, causing many to leave the public sector and even the country (Frija, 2021).

Israel witnesses a development in the field of imaging that requires the training of professional and highly qualified workers. However, no specific BA in the subject of X-ray and imaging is awarded in Israel and the profession is completely non-regulated and open to everyone. This is due to the differences of opinion regarding the curriculum between the Ministry of Health and the Council for Higher Education (State Comptroller, 2015).

Thirty-eight countries around the globe have some kind of regulatory guidelines for radiology staffs, and the standards are dramatically changing from country to country. Today, 13 American States only have bills for licensing requirements or have no licensing laws at all. That implies that every person can perform sophisticated X-ray procedures merely after several weeks of training. These states are: Alabama, Alaska, District of Columbia, Georgia, Idaho, Kansas, Missouri, New Hampshire, North Carolina, North Dakota, Oklahoma, South Dakota, and Wisconsin (Collings and Nolen, 2002). Failure to regulate the law regarding this profession is a factor that harms the professional image. The non-regulation facilitates employing any person to operate the imaging machines without formal training. The non-conformity of the curriculum and the legal regulation of the X-ray technician profession, might lead of many different perceptions of this profession among the worldwide public.

The Choice of Profession

Choosing a profession is one of the most important and meaningful decisions in people's life (Blustein, 2013). Different people have different preferences that guide them in the choice of profession, a choice that is affected by various factors that are partly associated with the quality of the work itself. One of the main factors that motivate people in the choice of profession is their personal preferences that describe how they imagine their work environment (alone/in a team, calm/dynamic, etc.); which training they have to undergo (long academic studies, short courses, or certificate studies); options of promotion and personal development; working conditions and wages.

Moreover, choosing a profession is a process in which people have to decide between varied pf alternatives. The decision-making is manifested by a set of considerations and comparison of the different professions, while collecting and processing information. Sometimes, this process involves uncertainty that partly relates to questions such as: Am I really interested in this particular field? Will I be admitted to the studies? Will I enjoy the studies? Will I succeed in the studies? Will I be satisfied with the work? and so on (Gati and Krausz, 1996).

The meaning that people attribute to their work is one of the considerations in choosing a profession. The meaning of work refers to people's beliefs, values, and positions about the results of their work, as well as the roles or goals that it will add to their life. Career, work, and vocation are three ways by which people can relate to their work and even derive satisfaction from it (Nord and Brief, 1990). Furthermore, for certain people, work is a means of obtaining a funding resource for their leisure time, whereas others are not motivated only by economic gains but also of self-esteem, power, and influence. For people who view their work as a vocation, work is an inseparable part of their private life. It helps them in actualizing themselves, contributes to the general level and, hence, they invest a lot in it (Bella, 1987).

Difficulties in choosing a field of studies and profession

One of the difficulties in choosing a profession is due to the fact that people are not ready to make a decision. This lack of readiness can stem from unwillingness to make a decision now, believing that the choice of profession is for life. This is one profession that has to materialize all the expectations and, hence, this decision is accompanied by apprehension of making a commitment and of failing (Gati and Krausz, 1996).

Another difficulty is lack of information about the future profession. People do not know which factors should be taken into consideration in the decision-making process. For example: which skills are required for this profession? Are my skills suitable for this profession? In what am I qualified or unqualified? People have insufficient knowledge about themselves. They do not know what preferences and considerations are necessary for choosing a profession, e.g., insufficient knowledge about existing professions, what characterizes these professions, and what are the properties necessary for each profession (Gati and Krausz, 1996).

Inconsistent and unreliable information can also constitute a difficulty in choosing a profession. The existing information includes contradictions and discrepancies between objective and subjective information, between what people

think about themselves and what others think about them. Moreover, there are internal conflicts caused by people's deliberation with themselves: difficulty to compromise on important considerations, i.e., training duration, distance from the place of studies, as well as a number of professions that equally interest people and they find it hard to decide. There are also external conflicts resulting from gaps between people's own preferences and the preferences of the meaningful figures in their life, who are usually parents, friends, siblings, or any other person whose opinion is important. The conflict arises when the hesitating people prefer a certain consideration or choose a certain profession, but the meaningful figures have another preference (Gati and Krausz, 1996).

Ionizing Radiation

Working in an ionizing radiation environment

X-ray technicians' work is both physical and mental. They daily life heavy weights, as well as cope with repetitive actions, long hours, difficult patients, demanding doctors, and others (Romano, 2012). By virtue of their work, X-ray technicians operate radiation-emitting equipment and, during their work, are at risk of exposure to ionizing radiation at different levels. This discourages the wide public due to the apprehension of working in an ionizing radiation environment.

Moreover, since the atom bombs on Hiroshima and Nagasaki and the accident in the Chernobyl reactor, the public is apprehensive of being exposed to ionizing radiation. As a result, and since there is some risk of exposure to radiation when working in the various imaging field, many studies have explored the relation between exposure to radiation during work and an increased risk of different types of cancer. Radiologists and X-ray technicians are the largest and first group exposed to artificial, manmade radiation within the framework of their occupation. Studies that monitored large population groups of radiation workers found a relationship between the duration of work in radiation environment and a growing risk to contract leukemia. Other studies investigated the relation to solid tumors but found no significant relation. Research findings showed that the increased risk was manifested among those who worked during the 1950s. At that time, the occupational exposure was higher and workers in this profession were unaware of protection against radiation as is common today (Shinji, 2004).

Additional studies conducted in earlier years, starting from the 1940s and up to circa 2010, found a relation between work in an ionizing radiation environment and an increased risk of various types of cancer (Steven, 2006; Wakeford, 2009).

Later studies of this field indicate that, undoubtedly, high-level radiation is dangerous and constitutes a considerable risk factor for the onset of cancer. Nor is there any doubt that radiation during childhood is a considerable risk factor. Nevertheless, it cannot be proven that the low radiation to which X-ray technicians are exposed during their work constitutes a considerable risk factor and increases the risk of cancer (Kitahara, 2018; Preston, 2016; Terrence, 2015).

This could be due to the X-ray technicians' very low exposure to radiation during their work in recent years, compared to previous years. One of the factors that affect this change is the technological development of equipment in the last years that decreased the level of radiation emitted from the machines. Digital X-ray machines, three-dimensional processing of films, and radiation-reducing software were developed. For example, the new CT machines include a film processing software that allows a 40% to 60% decrease of the emitted radiation level, without damaging the quality of the results. Moreover, systems that reduce the radiation level by about additional 10% were installed (Waldermar, 2012).

Furthermore, today, there is a deeper epidemiological understanding of the way studies are conducted, neutralizing variables that might bias the results if they are not taken into consideration. For example, X-ray technicians who became sick with cancer, not because they were exposed to radiation at work, but because they smoked, had a history of cancer in the family, lived next to high voltage line, or other similar reasons.

Living in an ionizing radiation environment

From the day we are born, we live in an ionizing radiation environment. The ionizing radiation that naturally surrounds us is referred to as background radiation and it comes from four main sources: (i) cosmic radiation that reaches planet earth from particles that are outside our solar system. This radiation is higher when people live in a higher place or during flights; (ii) solar radiation that is mostly non-ionizing, emits also particles with high energy that reach the range of the ionizing radiation; (iii) natural terrestrial radiation sources in the ground, rocks, and various crops, mainly radioactive isotopes of Uranium and Thorium in the ground, and potassium in bananas and nuts; and (iv) Radon gas that is the product of Uranium dissolution, and constitutes about 50% of ionizing radiation to which people are exposed.

Background radiation differs from place to place over the globe and it is mostly affected by the composition of isotopes in the soil, as well as by the height of places of living. The background radiation in Israel, which comes from natural

sources, amounts to approximately 2mSv per year. For the purpose of comparison, the background radiation in Romania is 2.7mSv per year, in the United States about 6mSv annually, and the overall worldwide radiation is about 2.4mSv per annum (Israel Atomic Energy Commission, no date).

In some areas around the world, the background radiation is significantly higher than the average and it amounts to 100 times more than annual average radiation (e.g., Guarapari, Brazil; Kerala, India; Ramsar, Iran). People who live in areas with high background radiation emulate the occupational exposure in terms of exposure to low radiation levels over a long period of time, unlike short and high exposures that characterize areas of accident (such as Chernobyl). The question is whether background radiation in worldwide areas with high background radiation affect the incidence of cancer. This question cannot be answered unequivocally, yet many epidemiological monitoring studies conducted around the globe have not indicated an increase of cancer cases (Israel Atomic Energy Commission, 2011; Jolyon, 2009; Krishnan, 1999).

The annual average exposure of workers in an ionizing radiation environment is less than one millisievert (Haruz-Shitz, 2004). Much of the equipment operated by X-ray technicians does not involve at all the use of machines that emit ionizing radiation. For example: the ultrasound machine that functions by means of sound waves, and the MRI machine that functions by means of magnetic field (Geva, 2006). A relatively small part of the X-ray technicians' work is performed in the field of radiation, like imaging in an operating theater where the staff uses a suitable protection equipment (Ministry of Health, 2015a).

The public's level of knowledge about ionizing radiation

A study conducted in Jedda, Saudi Arabia, assessed the level of public knowledge about ionizing radiation, information sources available to the public, and the preferred sources of education. The participants were requested to rank their confidence with respect of their knowledge about ionizing radiation. They also answered questions about the perception of their risk, the source from which they received health-oriented information, and their preferred education method. Only 3% of the 244 participants "knew" about ionizing radiation. The participants over-estimated the risk of nuclear plants, since it was ranked as the source with the highest health risk, followed by medical sources (Nasr *et al*, 2019).

Another study that assessed the public's knowledge and perception of ionizing radiation, was conducted in six locations in Vermont. Although the respondents had a level of high education that was more than the average, the study

showed many misconceptions about actual risks of exposure to ionizing radiation, particularly in the case of medical imaging tests. Consequently, health care professional will have a deep and positive impact on the public's understanding of ionizing radiation (Evans *et al.*, 2015).

Research findings show that there is a lot of defective and wrong information about “radiation and radioactivity” on the Internet. The Internet is the first choice of students who are searching information for their studies. Wrong information downloaded from the Internet can lead to misconceptions not only about these topics but also about scientific terms. Most of the information on the Internet has not been written by experts and the wrong information is copied from several other websites. Every person can create websites without checking the accuracy of the information (Sesen and Ince, 2010).

Impact of the Covid-19 Pandemic on the X-Ray Technician Profession

X-ray technicians' apprehensions of exposure to the COVID-19

Like in other parts of the health care system, the COVID-19 pandemic has exposed and exacerbated the distress of imaging workers. The pandemic demonstrated the workloads that have been dramatically aggravated due to the increased use of CT machines for diagnosing the disease. An updated study shows that X-ray technicians are also apprehensive of the increased radiation resulting from the overuse of CT machines during the pandemic.

In Spain, the apprehension was examined among 546 X-ray technicians by means of questionnaires, and the findings indicated that the COVID-19 pandemic was perceived as a serious threat to their health. The workers were apprehensive of spreading the pandemic and transmitting it to members of their family, their colleagues, and their patients. During that period, the staff's morale was lowered, there was insufficient contamination control, and the risk management was defective (Ruiz, 2021). Furthermore, the pressure and exhaustion of X-ray technicians were increased following the outbreak of the COVID-19 pandemic. This was due to the fact that health care workers were at an increased risk of contamination. The apprehensions, particularly of the unknown, the anxieties, tensions, and workload, greatly affected the X-ray technicians (Huang *et al.*, 2020).

In South Africa, a study was conducted among 60 X-ray technicians who responded to an online open-ended questionnaire, describing their experiences during the COVID-19 pandemic. The thematic analysis yielded three topics: (i) new work flow and operations. For example: changes in the working environment,

the use of personal protection equipment, and social distancing; (ii) effects on workers' well-being, such as stopping workers' vacations; and (iii) X-ray technicians' strength: the workers' strength that was prominent during that period, the ability to adjust to a new and challenging way of working, dedication to the profession, expertise and skills, have all helped them to confront the new challenges (Lewis and Mulla, 2021). Understanding the impact of the COVID-19 pandemic on X-ray technicians will allow hospital managements, professional bodies, and educational institutions to re-assess the allocation of resources to this profession, training, policy, regulations, and so on.

The COVID-19 pandemic as a factor affecting the choice of profession

The outbreak of the COVID-19 pandemic entailed increased workload and contamination risks among medical staffs. Studies of this field illustrated that this affected the career planning of health care and medicine students, the choice of their future workplaces, and choice of their employment time. Findings showed that the number of students who preferred clinical medicine, public health, pharmacology, and dentistry had considerably increased after the outbreak of the pandemic. On the other hand, the number of students who chose nursing and medical technology had considerably decreased (Zheng *et al*, 2021).

3. CONCLUSIONS

This paper indicates a potential improvement of the supply of X-ray technicians in the medical sector, as a way of preventing an under-staffing crisis in the field of diagnostic imaging services.

- a) Based on specialized literature and official statistics, the paper has shown a growing shortage of X-ray technicians in the medical sector. While the world of imaging is accelerating side-by-side with the progress of technology and the numerous options that enable an accurate diagnosis, the literature discussed in this paper illustrates three main issues related to the shortage of medical imaging staff: (a) There is a misconception about the X-ray technician profession, namely engagement in a profession that involves ionizing radiation;
- b) There is a temporary misconception during the COVID-19 pandemic regarding the X-ray technician profession. This is due to exposure to the COVID-19 and to the frequent use of imaging machines for diagnosing the patients while working as X-ray technicians;

- c) Countries differ in the curriculum and legal regulation associated with the X-ray technician profession.

The paper concludes that the issues discussed contribute to a misperception of the X-ray technician profession, which affecting the career planning of young people and decreasing the number of those who choose this field of study and work.

Since increasing the number of students in the field is needed in order to meet the demands of the market, the paper emphasize the urge to find appropriate marketing strategies meant to dispel misconceptions and raise awareness among young people who are at the stage of choosing their future profession and plan to enroll in higher education institutions. Thus, our future research will focus on understanding perceptions and proposing the marketing strategy.

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