Eurasian Studies in Business and Economics 18
Series Editors: Mehmet Huseyin Bilgin · Hakan Danis

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Hakan Danis
Ender Demir *Editors*

Eurasian Business and Economics Perspectives

Proceedings of the 31st Eurasia Business and Economics Society Conference

Springer

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Preface

This is the 18th issue of the Springer's series **Eurasian Studies in Business and Economics**, which is the official book series of the Eurasia Business and Economics Society (EBES, www.ebesweb.org). This issue includes selected papers presented at the 31st EBES Conference that was held on April 15–17, 2020. The conference is **co-organized by the *Faculty of Economic Sciences* at the *University of Warsaw, Poland.*** Due to the COVID-19 pandemic, the conference presentation mode has been switched to "online/virtual presentation only."

We are honored to have received top-tier papers from distinguished scholars from all over the world. We regret that we were unable to accept more papers. In the conference, *98* papers were presented and *171* colleagues from *30* countries attended the online conference. Distinguished colleague **Sascha Frohwerk** from *the FOM University of Applied Sciences in Berlin*, Germany, joined the conference as the keynote speaker. In addition to publication opportunities in EBES journals (*Eurasian Business Review* and *Eurasian Economic Review*, which are also published by Springer), conference participants were given the opportunity to submit their full papers for this Issue. Theoretical and empirical papers in the series cover diverse areas of business, economics, and finance from many different countries, providing a valuable opportunity to researchers, professionals, and students to catch up with the most recent studies in a diverse set of fields across many countries and regions.

The aim of the EBES conferences is to bring together scientists from business, finance, and economics fields, attract original research papers, and provide them with publication opportunities. Each issue of *the Eurasian Studies in Business and Economics* covers a wide variety of topics from business and economics and provides empirical results from many different countries and regions that are less investigated in the existing literature. All accepted papers for the issue went through a peer review process and benefited from the comments made during the conference as well. The current issue is entitled "Eurasian Business and Economics Perspectives" and covers fields such as human resources management, management, political economy, public economics, and regional studies.

Although the papers in this issue may provide empirical results for a specific county or regions, we believe that the readers would have an opportunity to catch up with the most recent studies in a diverse set of fields across many countries and regions and empirical support for the existing literature. In addition, the findings from these papers could be valid for similar economies or regions.

On behalf of the series editors, volume editors, and EBES officers, I would like to thank all the presenters, participants, board members, and keynote speakers, and we are looking forward to seeing you at the upcoming EBES conferences.

Best regards

Istanbul, Turkey Ender Demir

Eurasia Business and Economics Society (EBES)

EBES is a scholarly association for scholars involved in the practice and study of economics, finance, and business worldwide. EBES was founded in 2008 with the purpose of not only promoting academic research in the field of business and economics but also encouraging the intellectual development of scholars. In spite of the term "Eurasia," the scope should be understood in its broadest terms as having a global emphasis.

EBES aims to bring worldwide researchers and professionals together through organizing conferences and publishing academic journals and increase economics, finance, and business knowledge through academic discussions. Any scholar or professional interested in economics, finance, and business is welcome to attend EBES conferences. Since our first conference in 2009, around *13,447* colleagues from *99* countries have joined our conferences and *7587* academic papers have been presented. **EBES has reached 2,443 members from 87 countries.**

Since 2011, EBES has been publishing two journals. One of those journals, ***Eurasian Business Review***—*EABR*, is in the fields of industrial organization, innovation, and management science, and the other one, ***Eurasian Economic Review***—*EAER*, is in the fields of applied macroeconomics and finance. Both journals are published quarterly by ***Springer*** and indexed in ***Scopus***. In addition, EAER is indexed in the ***Emerging Sources Citation Index*** (*Clarivate Analytics*), and EABR is indexed in the ***Social Science Citation Index (SSCI)*** with an impact factor of **2.222** as of 2019.

Furthermore, since 2014 Springer has started to publish a new conference proceedings series (**Eurasian Studies in Business and Economics***)* which includes selected papers from the EBES conferences. The series has been recently indexed by **SCOPUS**. In addition, the 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th (Vol. 2), 21st, and 24th EBES Conference Proceedings have already been accepted for inclusion in the ***Conference Proceedings Citation Index—Social Science & Humanities (CPCI-SSH).*** Other conference proceedings are in progress.

We look forward to seeing you at our forthcoming conferences. We very much welcome your comments and suggestions in order to improve our future events. Our success is only possible with your valuable feedback and support!

With my very best wishes,

Klaus F. Zimmermann
President

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Part I
Eurasian Economic Perspectives: Finance

Equity Market Segmentation in Risk-Based Portfolio Construction Techniques

Guido Abate

Abstract Risk-based portfolio construction models—i.e., strategic asset allocation approaches that do not make use of expected returns as inputs, such as optimal risk parity, most diversified portfolio, global minimum variance, and equal weighting—have reached a widespread use in the asset management industry. The aim of this research is to verify how these techniques reach different results depending on whether the global equity market is subdivided on the basis of a sector breakdown, carried out according to the industry sectors of each company, or in function of a geographical breakdown, carried out according to the listing market of each company. An empirical analysis, applied on a representative sample of global equity market indexes calculated by MSCI, is implemented by making use of the typical and most advanced statistical and financial evaluation measures. This comparative analysis reaches consistent results, showing a significant preference for the sector breakdown compared to the geographical one. In conclusion, this outcome can be ascribed to the segmentation of the equity market into sector indexes characterized by better external differentiation and stronger internal coherence. Moreover, sector indexes are characterized by a lower degree of concentration in comparison to the geographical ones.

Keywords Risk-based strategies · Sector indexes · Geographical indexes · Risk parity

1 Introduction

The typical strategic asset allocation begins with the segmentation of the investment universe into distinct asset classes, each one composed of financial assets with homogeneous risk-return profiles. The definition of the asset classes is significant,

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since the forecasting of the market variables is based on the expectations regarding the macroeconomic scenario, in order to forecast the trend of each market sector.

Equity asset classes are commonly identified by geographical or sector criteria (Basile and Ferrari 2016). Geographical criteria assume that stocks listed in the same market are more correlated, because firms operate with the same currency, interest rate curve, economic policy, and country risk. Sector criteria, instead, assume that stocks of companies in the same economic sector are correlated, as the industry determines their sensitivity to the economic cycle and factors such as developments in production processes, technological advancements, competition, infrastructural needs, consumer preferences, and commodities market.

This study is aimed to the inquiry of the segmentation technique most appropriate for risk-based portfolio construction methods in the equity market and an empirical analysis is carried out in order to reach this goal. This research provides an innovative point of view in the field of risk-based techniques, because the existing literature (Roncalli 2014; Scherer 2015; Braga 2016) has not investigated the potential presence of different portfolio performances based upon the segmentation of their assets. In other words, previous research has been focused on the theoretical and empirical implementation of risk-based asset allocations, but has not taken into account the qualitative aspects of the inputs in the portfolio construction process, i.e., whether the grouping of assets into homogeneous economic segments or geographical markets may determinate an impact on the ex-post portfolio risk-adjusted performance. The results of this empirical analysis complement the existing literature, showing a clear preference for the sector segmentation of assets in risk-based techniques, therefore providing a reference to scholars and practitioners alike for the primary decision in portfolio construction, i.e., the technique of segmentation of the investable universe of assets.

The remainder of this study is organized into four sections: Sect. 2 reviews the scientific literature on risk-based techniques of portfolio construction; Sect. 3 explains the methodology implemented and the dataset; Sect. 4 provides the results and their interpretation; and Sect. 5 concludes the study.

2 Risk-Based Strategies: Literature Review

The typical feature of risk-based strategies is the exclusion of the expected returns from their inputs; therefore, they are also known as μ-free strategies. The employment of these techniques requires only the estimation of risk measures, which are the sole inputs needed for asset allocation (Braga 2016). This feature makes these techniques very parsimonious in terms of inputs measurement and, as a consequence, guarantees a limitation of estimation risk.

Their rationale can be traced to the previous research about estimation error (Best and Grauer 1991). In particular, Chopra and Ziemba (1993) have demonstrated that an agent with average risk aversion can suffer losses eleven times higher due to an error in the estimation of expected returns compared to an identical error of

variances. Despite the advantage caused by the simplified estimation of inputs, some scholars have expressed concern about these techniques, given their lack of a defined objective function (Scherer 2011; Lee 2011). Risk-based strategies can be further updated and integrated into other portfolio construction techniques, as, for example, with the Black-Litterman approach (Haesen et al. 2014; Jurczenko and Teiletche 2018).

The following subsections provide details about the most used risk-based techniques, such as optimal risk parity, global minimum variance, most diversified portfolio, and equally weighting.

2.1 The Optimal Risk Parity Portfolio

The theoretical rationale of risk parity has been delineated in a formal way by Maillard et al. (2010) for the first time, after some initial studies by practitioners (Qian 2005, 2006; Neurich 2008). It is founded on the theory of risk budgeting, which states that the process of portfolio construction is based upon the allocation of risk, instead of asset allocation (Denault 2001). Therefore, optimal risk parity prevents the concentration of risk in a minority of large exposures to a small group of assets.

Risk allocation is defined as such that each asset provides the same ex-ante contribution to risk, i.e., an equal contribution to the total portfolio risk (Roncalli 2014; Scherer 2015), and, therefore, this strategy does not omit any asset of the investment universe from the portfolio. Moreover, the allocation of negative risk budgets to one or more assets would concentrate the risk exposure to the other components; for this reason, the relative risk budgets are required to be non-negative.

2.2 The Most Diversified Portfolio

The asset allocation of the most diversified portfolio is the result of the optimization, subject to the usual budget and no short sell constraints, of the diversification ratio (Choueifaty and Coignard 2008), i.e., the ratio between the weighted average of the standard deviations of the returns of portfolio assets and the standard deviation of the portfolio returns. The weights of some assets can be set equal to zero, therefore, in this model, it is not granted that all the assets available in the investment universe are included in the portfolio. Moreover, this technique does not follow the model of risk budgeting and thus this approach does not guarantee ex-ante a homogeneous allocation of risk.

2.3 The Global Minimum Variance Portfolio

The global minimum variance portfolio is the only risk-based strategy that identifies a portfolio lying on the ex-ante efficient frontier (Clark et al. 2013). Actually, the formula of portfolio variance itself is the objective function and thus variances and covariances of assets are the only inputs required by this model. The fact that expected returns are ignored by the portfolio construction is the reason underlying the inclusion of this portfolio into the category of risk-based strategies.

The optimization process is subject to the no short selling and budget constraints and the solution can allow the presence of weights equal to zero, thus the global minimum variance portfolio can exclude some of the assets. The minimization of portfolio risk is reached when all the assets included have the same marginal risk.

2.4 The Equally Weighted Portfolio

The equally weighted portfolio is a heuristic approach, which attributes the same allocation to each asset; thus, it is also known as 1/N strategy and naïve diversification. This method of portfolio construction has often been studied by behavioral finance (Windcliff and Boyle 2004; Abate 2014), due to the lack of a formal objective function that would justify its use.

The equal-weighted strategy adopts the 1/N rule to asset allocation, while the optimal risk parity technique uses the same rule with regards to risk allocation. Moreover, the inclusion of assets is another feature that these two strategies have in common, in fact they both ensure that the full set of available assets is always included in the portfolio. As a consequence, naïve diversification can be implemented without taking into account any sample moment; at the same time, it is regarded a risk-based technique, because its construction rule provides an effective risk diversification.

While the available literature has reached mixed results with regards to the ex-post performances of equally weighted portfolios (Kritzman et al. 2010), some empirical studies, such as DeMiguel et al. (2009), have measured statistically superior results if compared to apparently more advanced techniques.

3 Data and Methodology

In order to compare the efficiency of the two techniques of subdivision of the equity asset class, it is necessary to measure the out-of-sample performances and the statistical moments of the different portfolio construction strategies. In the empirical analysis, which has been implemented with a rolling-window procedure, portfolios are constructed on the basis of the time series of monthly returns of the indexes of the

global stock market, denominated in euro, in excess of the 12-month Euribor rate, employed as a proxy of the risk-free rate. This rate has been chosen because this analysis is carried out from the perspective of an investor resident in the Euro area.

3.1 Statistical Properties of the Sample

The MSCI All Country World Index (ACWI) has been selected as the proxy of the global equity asset class. Following the sector approach, it is subdivided into 11 sector indexes; the geographical approach, instead, identifies six geographical indexes. While more geographical benchmarks could have been selected, but this choice has been avoided because some portfolios could have allocated a large share of their investments to areas of limited importance in the current configuration of the global stock markets. Moreover, a lower number of indexes limits the estimation error. The indexes of this sample are gross total return, i.e., they include the reinvestment of dividends gross of taxes, and have been weighted by free-float. The time series of monthly returns runs from November 1998 to October 2018, for a total of 240 months. This time window has been selected in order to estimate the parameters for the different portfolio construction models on a series of 60 months, which comprises distinct trends in stock markets, including the presence of extreme or rare events. The out-of-sample returns of risk-based strategies are estimated on the remaining 180-months window.

Table 1 provides the statistical sample moments of the full panel of data. As it can be noticed, only one series is subject to positive skewness and all the distributions show leptokurtosis, i.e., the phenomenon also known as "fat tails." Given that equity markets throughout the world are usually highly correlated, the absence of negative correlation coefficients was expected. The presence of asymmetric and leptokurtic distributions requires the testing of their deviations from the Gaussian distribution, which has been carried out taking into account: normality, autocorrelation, heteroscedasticity, and stationarity (Tsay 2010). Table 2 summarizes the outcomes of these tests, which identify clear deviations from the hypotheses of normality, typical of traditional portfolio management. Therefore, risk-based models should be more reasonable, given that they require less estimates and do not limit themselves to the Gaussian distribution.

3.2 The Implementation of the Empirical Analysis

Portfolio construction strategies are applied on both the sector and the geographical criteria of segmentation of the market portfolio, to identify which one provides superior risk-adjusted performances and preferable statistical properties. All the portfolios are subject to the usual no short-selling and budget constraints (Braga 2016), while no additional constraints on asset or risk allocation have been imposed,

Table 1 Sample moments of the indexes' excess returns

	Benchmark	Expected return (%)	Standard deviation (%)	Skewness	Kurtosis
Sector	MSCI ACWI/Consumer Discretionary	0.48	4.82	−0.46	4.76
	MSCI ACWI/Consumer Staples	0.45	2.96	−0.86	4.19
	MSCI ACWI/Energy	0.56	5.34	−0.11	3.62
	MSCI ACWI/Financials	0.32	5.14	−0.64	5.73
	MSCI ACWI/Health Care	0.44	3.52	−0.58	3.22
	MSCI ACWI/ Industrials	0.48	4.69	−0.90	5.77
	MSCI ACWI/Information Technology	0.59	6.90	−0.38	4.45
	MSCI ACWI/Materials	0.57	5.32	−0.61	5.48
	MSCI ACWI/Real Estate	0.48	4.85	−0.87	6.74
	MSCI ACWI/Telecom Services	0.18	4.66	−0.37	4.90
	MSCI ACWI/Utilities	0.33	3.37	−0.92	4.14
Geographical	MSCI Emerging Markets	0.81	5.10	−0.53	4.73
	MSCI Europe ex UK	0.35	4.77	−0.54	4.27
	MSCI Japan	0.26	4.88	0.11	3.46
	MSCI North America	0.43	4.20	−0.67	4.33
	MSCI Pacific ex Japan	0.53	4.08	−0.68	4.54
	MSCI United Kingdom	0.29	3.93	−0.63	3.74

Source: Author's analysis on Morningstar Direct data

because their inclusion would mitigate the characteristic features of the models, which would reduce the significance of this comparison. Portfolios are rebalanced every three months, thus, with a total time series of 240 monthly returns and the 60 returns used for the first in-sample estimates, 60 portfolios for each strategy have been constructed, with a total of 180 out-of-sample monthly returns. Given the different levels of turnover of the models employed, transaction costs have been taken into account. A higher turnover causes more costs at each rebalancing date and, as a consequence, it reduces net returns. A transaction cost of 0.2% is applied to each index, given the relatively high liquidity of the index-tracking financial instruments available in the markets, such as exchange-traded funds. The models object of this empirical analysis are:

- Equally weighted portfolio
- Global minimum variance portfolio
- Maximization of the Sharpe ratio (for comparison with risk-based models)
- Minimization of the conditional Value at Risk (VaR) at the 95% confidence level
- Most diversified portfolio

Table 2 Tests of deviations from the Gaussian distribution of the indexes' excess returns

		Jarque-Bera test[a]		Lilliefors test[a]		Ljung-Box test		Engle's ARCH test		Ljung-Box test on x^2		ADF test[a]	
	Benchmark	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value
Sector	MSCI ACWI/ Consumer Discretionary	39.42	0.001***	0.08	0.001***	10.79	0.0556*	18.67	0.002***	23.71	0.000***	−6.28	0.001***
	MSCI ACWI/ Consumer Staples	43.70	0.001***	0.07	0.003***	6.61	0.251	24.02	0.000***	22.76	0.000***	−5.61	0.001***
	MSCI ACWI/ Energy	4.30	0.091	0.04	0.500	2.52	0.773	11.00	0.052*	8.80	0.117	−6.64	0.001***
	MSCI ACWI/ Financials	91.16	0.001***	0.08	0.002***	17.63	0.004***	53.50	0.000***	102.35	0.000***	−6.35	0.001***
	MSCI ACWI/ Health Care	13.72	0.007***	0.09	0.001***	5.76	0.331	14.54	0.013**	19.25	0.002***	−6.30	0.001***
	MSCI ACWI/ Industrials	108.96	0.001***	0.10	0.001***	14.75	0.012**	24.58	0.000***	37.49	0.000***	−6.03	0.001***
	MSCI ACWI/ Information Technology	26.83	0.001***	0.09	0.001***	6.44	0.266	61.97	0.000***	95.07	0.000***	−5.57	0.001***
	MSCI ACWI/ Materials	76.68	0.001***	0.06	0.076*	12.10	0.033**	29.71	0.000***	32.05	0.000***	−6.93	0.001***
	MSCI ACWI/ Real Estate	170.77	0.001***	0.09	0.001***	18.84	0.002***	42.89	0.000***	77.90	0.000***	−6.25	0.001***
	MSCI ACWI/ Telecom Services	41.64	0.001***	0.08	0.001***	17.77	0.003***	38.78	0.000***	78.06	0.000***	−5.49	0.001***
	MSCI ACWI/ Utilities	47.26	0.001***	0.10	0.001***	5.76	0.330	10.49	0.063*	13.17	0.022**	−5.30	0.001***

(continued)

Table 2 (continued)

	Benchmark	Jarque-Bera test[a]		Lilliefors test[a]		Ljung-Box test		Engle's ARCH test		Ljung-Box test on x^2		ADF test[a]	
		stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value
Geographical	MSCI Emerging Markets	41.12	0.001***	0.06	0.056*	15.46	0.009***	11.41	0.044**	14.98	0.011**	−6.42	0.001***
	MSCI Europe ex UK	27.67	0.001***	0.07	0.012**	10.37	0.066*	21.53	0.001***	35.07	0.000***	−5.36	0.001***
	MSCI Japan	2.61	0.224	0.04	0.345	15.85	0.007***	5.72	0.334	5.33	0.378	−5.85	0.001***
	MSCI North America	35.52	0.001***	0.09	0.001***	8.63	0.125	31.05	0.000***	52.23	0.000***	−5.99	0.001***
	MSCI Pacific ex Japan	42.37	0.001***	0.08	0.002***	7.03	0.218	13.78	0.017**	15.19	0.010***	−5.97	0.001***
	MSCI United Kingdom	21.42	0.001***	0.06	0.024**	6.82	0.235	26.42	0.000***	39.19	0.000***	−5.63	0.001***

Source: Author's analysis on Morningstar Direct data

[a] The *p*-values of Jarque-Bera test, Lilliefors test and ADF test are bounded in the interval [0.0010, 0.5000]

***, **, and * represent statistical significance levels of 1%, 5% and 10%, respectively

- Optimal risk parity, employing the conditional VaR (95%) as its measure of risk
- Optimal risk parity, employing the standard deviation as its measure of risk

4 The Results of the Analysis

4.1 The Statistical Features of the Portfolios

Table 3 provides the statistical features of the out-of-sample excess returns of each portfolio. As a first consideration, it can be noted that these techniques provide returns significantly in excess of the risk-free rate, giving the opportunity to investors of allocating their wealth also in relatively aggressive strategies. All the distributions have negative skewness and kurtosis in excess of 3, in agreement with the indexes of the selected asset classes. The tests of deviations from normality employ the same techniques used for the equity benchmarks and their results are summarized in Table 4.

Table 3 Sample moments of the portfolios' excess returns

	Strategy	Expected return (%)	Standard deviation (%)	Skewness	Kurtosis
Sector	Equally weighted	0.60	3.60	−1.12	6.46
	Global minimum variance	0.61	2.74	−1.01	4.99
	Max Sharpe ratio	0.73	3.61	−0.97	4.78
	Minimum conditional VaR 95%	0.56	2.91	−0.92	4.48
	Most diversified portfolio	0.65	3.22	−1.18	6.08
	Risk parity conditional VaR 95%	0.61	3.39	−1.22	6.63
	Risk parity standard deviation	0.61	3.37	−1.19	6.47
Geographical	Equally weighted	0.56	3.47	−1.06	5.81
	Global minimum variance	0.60	3.40	−1.25	6.21
	Max Sharpe ratio	0.85	4.42	−0.80	6.24
	Minimum conditional VaR 95%	0.58	3.52	−1.10	5.97
	Most diversified portfolio	0.45	3.29	−0.90	5.41
	Risk parity conditional VaR 95%	0.56	3.40	−1.14	6.02
	Risk parity standard deviation	0.56	3.41	−1.10	5.91

Source: Author's analysis on Morningstar Direct data

Table 4 Tests of deviations from the Gaussian distribution of the portfolios' excess returns

		Jarque-Bera test[a]		Lilliefors test[a]		Ljung-Box test		Engle's ARCH test		Ljung-Box test on x^2		ADF test[a]	
	Strategy	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value	stat	*p*-value
Sector	Equally weighted	127.38	0.001***	0.10	0.001***	13.55	0.019**	28.54	0.000***	45.15	0.000***	−5.34	0.001***
	Global minimum variance	60.31	0.001***	0.09	0.002**	3.80	0.579	29.01	0.000***	35.08	0.000***	−4.96	0.001***
	Max Sharpe ratio	51.74	0.001***	0.06	0.072*	3.93	0.559	16.18	0.006***	19.54	0.002***	−4.83	0.001***
	Minimum conditional VaR 95%	41.82	0.001***	0.09	0.001***	3.72	0.591	17.35	0.004***	22.97	0.000***	−5.19	0.001***
	Most diversified portfolio	113.40	0.001***	0.09	0.002***	7.16	0.209	22.43	0.000***	29.70	0.000***	−5.11	0.001***
	Risk parity conditional VaR 95%	143.76	0.001***	0.10	0.001***	13.38	0.020**	30.84	0.000***	46.95	0.000***	−5.26	0.001***
	Risk parity standard deviation	132.90	0.001***	0.11	0.001***	13.01	2.33%	28.75	0.000***	44.77	0.000***	−5.24	0.001***
Geographical	Equally weighted	92.64	0.001***	0.11	0.001***	15.76	0.008*	23.32	0.000***	40.36	0.000***	−5.30	0.001***
	Global minimum variance	123.95	0.001***	0.12	0.001***	16.97	0.005***	24.94	0.000***	38.93	0.000***	−5.69	0.001***
	Max Sharpe ratio	97.92	0.001***	0.10	0.001***	10.80	0.056*	15.10	0.010**	20.73	0.001***	−5.62	0.001***
	Minimum conditional VaR 95%	102.57	0.001***	0.09	0.003***	9.63	0.086*	24.04	0.000***	27.01	0.000***	−5.81	0.001***

	Most diversified portfolio	67.87	0.001***	0.10	0.001***	16.53	0.006***	21.75	0.001***	37.06	0.000***	−5.69	0.001***
	Risk parity conditional VaR 95%	107.17	0.001***	0.11	0.001***	15.84	0.007***	21.29	0.001***	36.18	0.000***	−5.38	0.001***
	Risk parity standard deviation	99.63	0.001***	0.11	0.001***	16.90	0.005***	23.52	0.000***	40.79	0.000***	−5.36	0.001***

Source: Author's analysis on Morningstar Direct data

[a]The *p*-values of Jarque-Bera test, Lilliefors test and ADF test are bounded in the interval [0.001, 0.500]

***, ** and * represent statistical significance levels of 1%, 5% and 10%, respectively

The Jarque-Bera test rejects the presence of normality and a similar result is shown by the Lilliefors test, which identifies only one case in which it is accepted. The Ljung-Box test indicates six portfolios not subject to autocorrelation. Moreover, Engle's ARCH test and the Ljung-Box test on the squared residuals identify heteroscedasticity in all the tested time series. According to the Dickey-Fuller ADF test, all the portfolios are stationary. In conclusion, these tests replicate the same results of the ones carried out on the indexes, both geographical and sector.

4.2 Comparative Analysis

The first aspect considered in the comparison of the two market segmentation techniques is the assessment of portfolio risk, because it is the core of risk-based models. This analysis is carried out by measuring the standard deviation and the conditional VaR at 95% confidence level. Efficiency is also taken into consideration, given that rational economic agents seek to select the asset allocation with the highest risk-adjusted performance. The appraisal of portfolios' efficiency is based on two measures typical of the asset management industry, i.e., the Sharpe ratio and the Sortino ratio, and, given the presence of non-normal returns, on the conditional Sharpe ratio (95%), calculated as the ratio between the mean return in excess of the risk-free rate and the conditional VaR (95%). Finally, due to the rejection of the hypothesis of normality, it is necessary to evaluate also skewness and kurtosis.

According to the standard deviation (Table 3), the sector segmentation appears to be preferable to the geographical one, as indicated by the comparative results for each asset allocation technique, except for naïve diversification. Surprisingly, the techniques which seek to maximize the Sharpe ratio reach out-of-sample suboptimal results. The conditional VaR (95%) of each portfolio for both the segmentation techniques (Table 5) confirms that the sector criterion is systematically preferable to the geographical one. More in detail, the two methods of subdivision of the global equity market portfolio reach opposite results when they are employed in techniques seeking the minimization of the conditional VaR (95%). Actually, the portfolio built by making use of sector indexes has lower ex-post risks than almost every other asset allocation technique, except the global minimum variance portfolio. The minimization strategy of the conditional VaR (95%) applied on geographical indexes, instead, achieves a severely negative result, showing empirically the inconsistency of the ex-post asset allocation if compared to its inputs.

When efficiency is measured by the Sharpe ratio, the sector segmentation is significantly preferable by a rational investor. Moreover, the strategy of portfolio construction maximizing the ex-ante Sharpe ratio reaches a positive result out-of-sample, but the most efficient asset allocation is reached by the global minimum variance portfolio made of sector indexes. Given that the distributions are not Gaussian, the Sharpe ratio is not an optimal measure of efficiency. To overcome this limitation, the Sortino ratio is employed too. In fact, it can be regarded as the

Table 5 Risk-adjusted performance measures of the portfolios' excess returns

	Strategy	Sharpe ratio	Sortino ratio	Conditional VaR (95%)	Conditional Sharpe ratio (95%)
Sector	Equally weighted	0.17	0.23	−9.02%	0.07
	Global minimum variance	0.22	0.32	−6.67%	0.09
	Max Sharpe ratio	0.20	0.29	−8.75%	0.08
	Minimum conditional VaR 95%	0.19	0.28	−7.01%	0.08
	Most diversified portfolio	0.20	0.28	−8.10%	0.08
	Risk parity conditional VaR 95%	0.18	0.25	−8.66%	0.07
	Risk parity standard deviation	0.18	0.25	−8.56%	0.07
Geographical	Equally weighted	0.16	0.22	−8.92%	0.06
	Global minimum variance	0.18	0.24	−8.98%	0.07
	Max Sharpe ratio	0.19	0.29	−10.20%	0.08
	Minimum conditional VaR 95%	0.17	0.23	−9.32%	0.06
	Most diversified portfolio	0.14	0.19	−8.51%	0.05
	Risk parity conditional VaR 95%	0.17	0.23	−8.95%	0.06
	Risk parity standard deviation	0.16	0.23	−8.87%	0.06

Source: Author's analysis on Morningstar Direct data

excess return compared to the minimum acceptable return (MAR) per unit of downside risk. In this study, the MAR is the risk-free rate.

Table 5 provides the values of this asymmetric risk-adjusted performance measure. Notwithstanding its distinct theoretical framework, the ranking is the same reached with the Sharpe ratio. Therefore, also in this case, the sector segmentation appears to be significantly preferable to the geographical criterion. Economic agents' aversion to tail risk (i.e., negative returns in the extreme left of the distribution) can be taken into account by the conditional Sharpe ratio (95%). Table 5 reports the values of this measure, which exhibit a clear resemblance to those of the two preceding measures of risk-adjusted performance. It can be noticed that the higher degree of efficiency of the sector criterion is confirmed again. Table 3 provides the levels of skewness. The fact that this moment is not included in any asset allocation technique causes a certain randomness in the results; thus, in this case, it is not possible to identify a preference for a criterion of equity market segmentation. Like for the skewness, also kurtosis has not been taken into account as an input in any of the portfolio construction strategies object of this analysis. Yet, sector indexes seem to provide a better result with regards to this extreme risk measure (Table 3).

According to the outcomes of the empirical analysis, the techniques that minimize a risk measure have reached better results when employing sector indexes. More in detail, the global minimum variance portfolio constructed with sector indexes has shown the best performance, thanks to the diversification typical in this segmentation criterion. In contrast, the techniques of the optimal risk parity have not reached the the top ranks of the different evaluation measures taken into account. Nevertheless, it can be noted that also for these strategies the sector segmentation is preferable to the geographical one. These findings imply that portfolio managers should group their assets according to their economic sector in order to aim at superior risk-adjusted performances.

5 Conclusions

These evidences provided by the empirical analysis can be evaluated taking into account the theory of the optimal risk parity strategy, which gives a primary importance to the estimation risk. It applies strict constraints on the asset allocation, given that all the assets must provide the same percentage risk contribution ex-ante and thus none can be excluded from the portfolio. The constraints have been set in order to avert the concentration of risk and to limit the amount of transaction costs. If, as in this analysis, the estimation risk is not high, these constraints do not allow the construction of efficient portfolios in terms of risk-adjusted performance.

This analysis reaches substantially coherent results with respect to the two techniques of segmentation of the equity asset class, highlighting a significant preference for the employment of sector indexes. This conclusion is due to the classification of the equity market into sector benchmarks that enjoy a better external differentiation and a higher degree of internal coherence. In addition, they are also characterized by a lower concentration. Actually, this feature guarantees that the results of the risk-based techniques are not caused by the relative performance of the geographical areas with higher market capitalization, as, instead, is the case of the geographical segmentation.

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Forecasting the Dividend Policy Using Machine Learning Approach: Decision Tree Regression Models

Hanaan Yaseen and Victor Dragotă

Abstract Dividend policy is still one of the most discussed issues in corporate finance. Many papers are determined to find which are the most relevant factors influencing dividend payments. The list of possible determining factors of dividend policy is very large, being difficult to integrate all of them in the decision-making process. In our paper, we propose an approach based on machine learning methods, using decision tree regression models. Using a database of 11,248 companies from 70 countries, for the period 2008–2014, we found the most relevant input factors which determine the level of the dividend payout ratio. On this shortlist of factors, both companies' financial indicators (size, return on equity, beta, leverage, market-to-book ratio, foreign holdings) and sociocultural factors at the country level (legal origin, GDP/capita, pluralism index, social progress index, democracy index, Hofstede's harmony hierarchy and egalitarianism indexes) are present. The best prediction models are similar for both developed and developing countries.

Keywords Dividend policy · Dividend policy forecasting · Decision tree · Dividend payout ratio

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1 Introduction

Dividend policy is one of the issues that received in time a great attention from the academic community (Miller and Modigliani 1961; La Porta et al. 2000; Fama and French 2001, etc.). A large number of determining factors of dividend policy is proposed in the scientific literature (see also Table 1), proving a great level of heterogeneity in nature (financial, ownership, legal, cultural, gender, etc.) (La Porta et al. 2000; Fama and French 2001; Fidrmuc and Jacob 2010; Ye et al. 2019). This extreme diverse list of factors can be a challenge for financial analysts in predicting, for instance, the amount of dividend paid by different companies. In this context, the question is which from this multitude of factors better explains the dividend policy?

In the last two decades, there is an increasing interest in literature to investigate financial decision-making problems using artificial intelligence and machine learning techniques. Machine learning is used in bankruptcy prediction (Charalambous et al. 2000), credit scoring (Chen and Huang 2003), etc. Our paper use machine learning approach for forecasting dividend policy, using decision tree regression models (hereafter, DT). They are non-parametric methods, suitable for figuring out variable interactions effect and non-linearity relations among them, which can be very appropriate for explaining dividend policy.

Our research investigates which are the most representative factors that determine the dividend payout decision, using machine learning approach. We use dividend payout ratio (DPR) as the measure for dividend policy, modelled through decision trees. This indicator is used in the larger part of studies dedicated to dividend policy (La Porta et al. 2000; Fama and French 2001; von Eije and Megginson 2008; Fidrmuc and Jacob 2010, etc.). We found that, in addition to financial factors (e.g. size, ROE, leverage, beta, market-to-book value, foreign holdings), some sociocultural factors are also relevant in explaining dividend policy. For instance, using decision tree, French Civil and German Civil legal origins, Harmony, Egalitarianism, GDP/Capita, Pluralism Index and Social Progress Index are relevant in explaining DPR.

Some other contributions of our study can be considered. First, most of the methodologies used in the past take into consideration Panel Data Estimated Generalized Least Squares (Khan 2006; Andres et al. 2009, Yaseen 2019; Yaseen and Dragotă 2019), GLM models or OLS models (Aivazian et al. 2003; Thanatawee 2013). Therefore, using the machine learning approach, we test the accuracy of the models considering the classical determinants found relevant in previous studies (Shao et al. 2010; Ucar 2016; Jiang et al. 2017) and also, sociocultural factors that are significant when we analyze the dividend policy (Fidrmuc and Jacob 2010; Ucar 2016). The methodology is applied on a large database (11,248 companies from 70 countries), comparative to other studies (e.g. La Porta et al. 2000 use companies from 33 countries). The countries included in our sample are from different continents (Africa, North and South Americas, Asia, Australia and Europe), providing a large diversity regarding the cultural values, but also legal systems (our sample includes common law, but also civil law countries) (as in Dragotă et al. 2019). This

Table 1 Determining factors of dividend payout ratio (a non-exhaustive list)

Factor	Studies	Observations
Size—Ln (total assets)	Faccio et al. (2001) (+); Fidrmuc and Jacob (2010) (−); Thanatawee (2013) (+); Chen et al. (2017) (+); Jiang et al. (2017) (+); Yaseen and Dragotă (2019) (+); Yaseen (2019) (+); Ye et al. (2019) (+)	
Return on equity (ROE)	Yaseen and Dragotă (2019) (+); Yaseen (2019) (+), Yaseen (2021) (+)	
Return on assets (ROA)	Fidrmuc and Jacob (2010) (−); Thanatawee (2013) (+); Chen et al. (2017); Jiang et al. (2017) (+); Ye et al. (2019) (+)	
Volatility of ROA over the past five years	Chen et al. (2017) (−)	
Leverage	Faccio et al. (2001) (−); Thanatawee (2013) (−); Chen et al. (2017) (−); Jiang et al. (2017) (−); Yaseen and Dragotă (2019) (−); Yaseen (2019) (−); Yaseen (2021) (−), Ye et al. (2019) (+)	
Growth in sales	La Porta et al. (2000) (−); Faccio et al. (2001) (−); Fidrmuc and Jacob (2010) (−)	
Retained earnings/total common equity	Thanatawee (2013) (+); Ye et al. (2019) (+)	
Cash/assets	Chen et al. (2017); Jiang et al. (2017) (+); Thanatawee (2013) (+)	
Shares' volatility (Beta)	Yaseen and Dragotă (2019) (−), Yaseen (2019) (−), Yaseen (2021) (−)	
Market-to-book ratio	Thanatawee (2013) (+)	
Tobin's Q	Jiang et al. (2017) (−); Ye et al. (+)	
Standard deviation of previous two years' weekly stock returns	Ye et al. (2019) (−)	
Liquidity	Jiang et al. (2017) (+)	
Firm age: The logarithm of firm age since incorporation	Thanatawee (2013) (+/−)	
Common law	Ye et al. (2019) (−)	
Civil law	La Porta et al. (2000) (−); Faccio et al. (2001) (−)	

(continued)

Table 1 (continued)

Factor	Studies	Observations
French civil law	La Porta et al. (2000) (−)	La Porta et al. (2000) mention this factor as robustness check.
German civil law	La Porta et al. (2000) (−)	La Porta et al. (2000) mention this factor as robustness check.
Low protection of shareholders (index) (La Porta et al. 2000)	La Porta et al. (2000) (−);	
Dividend tax advantage (comparative to retained earnings), as defined by La Porta et al. (2000)	La Porta et al. (2000) (+); Fidrmuc and Jacob (2010) (−)	
Percent of shares held by the controlling shareholder of the firm	Jiang et al. (2017) (+)	
Numbers of independent directors on board	Jiang et al. (2017) (+)	
Multiple owners	Faccio et al. (2001) (+)	
Indicators related to the number of female directors in board of the firm	Ye et al. (2019) (+)	E.g. number of female directors on board; female independent non-executive directors as a percentage of non-executive directors on board; number of female independent non-executive directors on board, etc.
Harmony (Schwartz 1994, 1999)	Yaseen and Dragotă (2019) (+)	
Hierarchy (Schwartz 1994, 1999)	Fidrmuc and Jacob (2010) (−), Yaseen and Dragotă (2019) (−)	
Egalitarianism, Intellectual autonomy, Affective autonomy (Schwartz 1994, 1999)	Fidrmuc and Jacob (2010) (+)	
Embeddedness, Mastery (Schwartz 1994, 1999)	Fidrmuc and Jacob (2010) (−)	
Individualism (Hofstede 2001)	Fidrmuc and Jacob (2010) (+)	
Power distance and Uncertainty avoidance (Hofstede 2001)	Fidrmuc and Jacob (2010) (−)	
GDP / capita and Gini index	Yaseen (2019) (+)	
Social Progress index	Yaseen (2021) (+)	
Democracy index	Dragotă and Yaseen (forthcoming) (+)	Dragotă and Yaseen (forthcoming) use many measures for democracy.

Source: Developed by the authors based on the literature
Note: in this table, only the significant independent variables in regressions are mentioned. The result (+/−) should be interpreted as a direct / indirect dependence in some regressions

large database can offer a more complete perspective on dividend policy's determinants in an international context.

In corporate finance literature, our paper can be a contribution to finding the best predictors for dividend policy. Our paper can be also useful for practitioners, in the decision-making process, when the levels of cash flows (dividends) are predicted.

The outline of the remaining paper is as follows. The next section summarizes the most relevant literature on dividend policy. Section 3 describes the methodology and data. Section 4 presents and discusses the results of the research. The last section concludes.

2 Theoretical Background

Dividend policy is a classical concern in finance (e.g. Lintner 1956; Walter 1956; Miller and Modigliani 1961). A large variety of issues can be put in connection with dividend policy: corporate finance and governance, management's and investors' behaviour, power in negotiation, agency problems, asymmetrical information, etc. Concordantly, many different indicators can be connected with the dividend policy, each of them with its informative power and serving in one manner or in another to describe dividend policy (Dragotă et al. 2019): the propensity to pay dividends, dividend payout ratio, dividend/sales, dividend/cash flow, dividend/total assets, dividend yield, dividend initiations and omissions, dividend re-initiations, etc.

In time, different studies proposed contradictory viewpoints regarding the best optimal dividend policy, emphasizing the importance of dividend payments (Graham and Dodd 1951; Lintner 1956; Bhattacharya 1979), or, by the contrary, the one of retaining the net earnings, as a financing source for investments, thus determining an increase in companies' market value (Walter 1956). In this context of debates, Miller and Modigliani (1961) stated their well-known proposition regarding the irrelevance of dividend policy on companies' market value. However, following Miller and Modigliani (1961), many researchers proposed different explanations for dividend policy, and proving some lacks in the irrelevance proposition, taking into account issues like taxation (Desai and Jin 2011), agency problems (Rozeff 1982; Easterbrook 1984; La Porta et al. 2000; Fidrmuc and Jacob 2010), asymmetrical information (Bhattacharya 1979), cultural and behavioural determinants (Shao et al. 2010; Ucar 2016), etc. All of them can suggest different decisions, sometimes in contradiction, but with a potential huge impact on shareholders' wealth (Dragotă and Delcea 2019).

Over the years, different studies identified more and more factors that can affect dividend policy (only for exemplification, see Table 1). Some of these studies use large databases (many companies, but also many countries), thus providing a description of dividend policy in a more and more general context (Fatemi and Bildik 2012; Zheng and Ashraf 2014; Ye et al. 2019). Other studies provide a deeper understanding of dividend payments' determinants in the national context (e.g. Khan 2006; Andres et al. 2009). Table 1 presents only a few of the factors that affect

dividend payout ratio, as reflected in previous studies. Of course, we do not consider this list exhaustive, still others and other factors being added in recent studies. We restricted our presentation only to the DPR because this is dividend measure considered in our study.

The extensive list of the determinants of dividend payout ratio is very diverse in nature. We can find here financial (characteristic for the company, but also for the capital markets), legal, macroeconomic, sociocultural, related to ownership, corporate governance, gender, etc. factors. In many cases, they can be (sometimes strongly) correlated, which make difficult the justification the choose of some of these factors to the detriment of others. In other cases, the justification for considering only some of the factors is mainly related to the data availability. All of them can be used for predicting one company's dividend policy and one direction in literature is to quantify the accuracy of manager's or financial analyst's dividend forecasts and to find the factors that determine their accuracy (Brown et al. 2000, 2008; Bilinski and Bradshaw 2015). For instance, Bilinski and Bradshaw (2015) show that financial analysts' dividend forecasts are associated with market dividend expectations and, therefore, are superior to the time-series modelling method. These results suggest that financial analysts' dividend forecasts can be useful information for investors.

In our study, we use machine learning for the same purpose. Machine learning is defined as the field of intersection between computer science and statistics and it seeks to answer to the questions: "How can we build computer systems that automatically improve with experience, and what are the fundamental laws that govern all learning processes?" (Mitchel 2006). Two main ideas can be derived from here: (1) How to create and design automatic processes that learn from their own experiences? and (2) How to data mine the historical records to help the prediction of future similar classification issues? On the one hand, machine learning helps to take some conclusions from the data and, on the other hand, it finds the algorithms and computational architecture which can be used effectively to describe the system, the task or the decision (Carbonell et al. 1983; Mitchel 2006). Machine learning uses data to train a model and, then, using the trained model, to make predictions from new data. Also, the mathematics of machine learning supports very fast calibration (training), and this calibration is done by minimizing some loss function through optimization (Dreyfus 1973; Rumelhart et al. 1986). Machine learning algorithms include Artificial Neural Networks (ANNs), Decision Trees (DT)—pattern recognition (Nilsson 1965; Uhr 1966), Deep Learning (DL)—ANN with a very large number of hidden layers, very large number of nodes, and different activation functions that are continuous, bounded and non-constant (Hornik 1991; Telgarsky 2016), Support Vector Machines, Bayesian classifiers and Genetic Algorithms (Won et al. 2012).

An increasing literature investigates financial decision-making problems using artificial intelligence and machine learning techniques. For example Er and Hushmat (2017) used Neural Networks and Genetic Algorithms along with traditional models to generate investment signals (buy and sell) for stocks and futures. One of the main results of the study reveals a higher overall performance for artificial intelligence

strategies to the detriment of classical strategies. Machine learning is used in bankruptcy prediction (Charalambous et al. 2000; Anandarajan et al. 2001; Pendharkar 2005; Popescu and Dragotă 2018), credit scoring (Chen and Huang 2003), event studies (Abdou et al. 2012), etc. Abdou et al. (2012) investigate the impact of dividend policy on stock prices and on dividend yields, comparing the accuracy of the conventional regression versus machine learning through neural networks. Using different financial indicators as control variables, they proved that the machine learning approach has higher accuracy index than classical regressions. Thus, the machine learning approach could minimize better the errors and they could perform better also in forecasting other dividend policy indicators.

Won et al. (2012) suggest a genetic algorithm to predict the future dividends based on the past dividends and the past stock prices. They applied, as prediction model, the model of Marsh and Merton (1987). However, we did not find in the past literature studies having as purpose to forecast the dividend policy (dividend payout ratio, dividend per assets or other dividend metrics) through machine learning approaches.

A decision tree is a type of supervised learning algorithm (having a pre-defined target variable) that is mostly used in classification problems (Kotsiantis 2007; Dey 2016). Decision tree learning is one of the most widely used and practical methods for inductive learning (Schlimmer & Fisher 1986; Goh et al. 2018). This refers to the rules which are applied for data set separation. The data set is separated into more samples in order to create clusters and to increase the accuracy and the degree to which the dependent variable belongs to a certain class. The rules applied for splitting the data are called the inducted rules. Decision tree is a non-parametric method and suitable for figuring out interaction effect or non-linearity between dependent and independent variables (Ryo and Rillig 2017).

Decision Trees are widely used machine learning algorithms (Soni et al. 2011; Goh et al. 2018). They are used because of the following advantages compared to the Generalized Linear Models or other Panel data models: (1) Solves potential issues on non-linearity; (2) DT are especially useful in areas in which there is no clear theory of how the patterns arise; (3) DT do not assume any probability distribution function for the dependent variable—it is almost a discrete analysis (Jang and Lee 2019). Regarding the last point, this is probably the best way to overcome the normality distribution assumption for the DPR, considering that the DPR is following a Tweedie Distribution (Dragotă et al. 2019). Also, DT can be more interpretable than other neural network models.

If panel data starts with the model and then see how good it looks like in terms of parameters, DT effectively finishes with the best model. Panel data analysis is a parametric model where the distribution of the dependent variable matters, while the DT are non-parametric models and they simply take the data as they are and do not assume a specific distribution for the endogen variable.

3 Methodology and Data

3.1 Methodology

In our study, we have modelled dividend policy using machine learning approach. As application, we have modelled dividend payout ratio using decision tree regression. In this study, we have used CART (Classification and regression tree), which is a recursive partitioning method to be used both for regression and classification (Breiman et al. 1984). CART is constructed by splitting sub-sets of the data set using all predictor variables to create two child nodes repeatedly, beginning with the entire data set. The following chart shows how a decision-making using a decision tree works (see Fig. 1):

The best predictor is chosen using a Gini index as measure of inequality (impurity) in sample (Goh et al. 2018). The Gini index is then used to create the split points (decision nodes—D) and break the dataset into smaller sub-sets. Then, the tree is built by repeating the process recursively for each child until one of the conditions is matched: all the tuples belong to the same attribute value, there are no remaining attributes or there are no more instances. The following chart describes the Decision Tree Process (see Fig. 2):

Gini index is calculated as follows (Breiman et al. 1984; Du and Zhan 2002):

$$Gini\ (D) = 1 - \sum_{i=1}^{m} p_i^2.$$

where p_i is the probability that a tuple in D belongs to class Ci.

The data was split into training and testing—80% for training and 20% for testing, respecting country-company-year observation order in our database (countries and companies are in the alphabetical order and then years from 2008–2014).

We used Phyton 7.32, Jupyter Notebook and as the interactive computing environments for both Decision Tree Regression (Muller and Guido 2016; Fiévet and Sornette 2017; Farrukh et al. 2017). Phyton is one of the most used

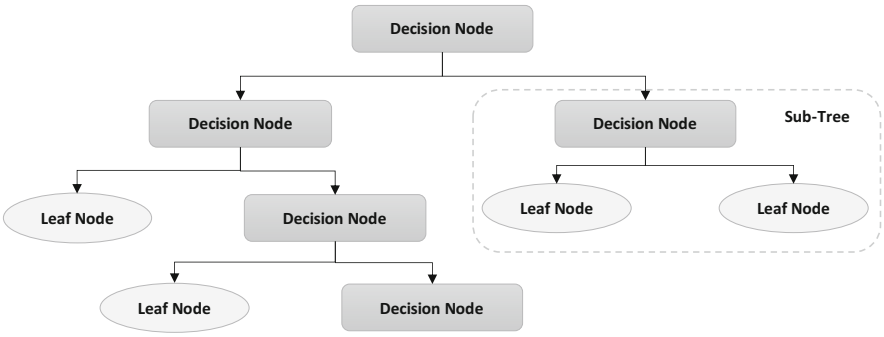

Fig. 1 Flowchart structure for a decision tree. (Source: Authors' own graph)

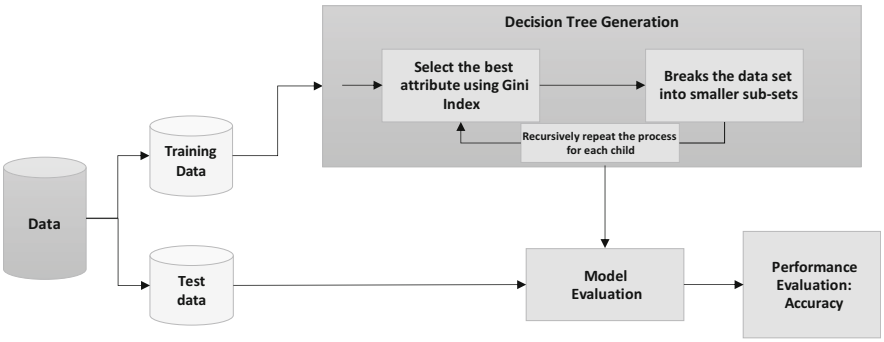

Fig. 2 Decision tree generation process. (Source: Authors' own graph)

programming languages for machine learning because it is stable in learning, it is flexible, independent and simple to use. It allows developers/researchers to write reliable systems due to its simplicity and big community of researchers who use it. It has a reduced time to run a code for machine learning compared to other programming languages. Jupyter is a free, open-source, interactive web tool known as a computational notebook, which researchers can use to combine software code, computational output, explanatory text and multimedia resources in a single document. Jupyter is used because of its simplicity, its improved architecture and more accessible interface compared to other computational notebooks. Visual Studio Code was used for visualizing the Decision Tree. It was chosen also because of the flexibility and accessible interface.

3.2 Data

Financial information was collected from the Thomson Reuters Worldscope database[1] and include most part of the companies listed in the most important national equity indices. We started from a sample of 14,071 companies from 81 countries for the period 2008–2014.[2] From this initial sample, we excluded all the companies with negative earnings and also those companies with negative dividend payout ratios (as in La Porta et al. 2000; Fidrmuc and Jacob 2010). We considered only cash payments and no other so-called dividends (e.g. stock dividends), which are not effective forms of remuneration in cash (Fidrmuc and Jacob 2010). We have included in our database only the countries with at least 10 companies with available data for the entire period. Also, we have not included in our study the financial

[1]The data was collected from the platform provided by Deloitte Management Consulting in Romania.

[2]This period includes also the period of financial crisis. However, the dividend payout ratio per year had the same distribution across the years (Dragotă et al. 2019).

institutions, due to their differences in reporting (e.g. differences in the calculation of total revenues) and their specific legal requirements. In addition, we included in our database only those companies which presented data available for the entire period analyzed. In the case of a group of companies, which activate in different countries, we considered each company as being a different entity, assuming that each company is influenced by the local factors. We excluded Palestinian Territories because the database of La Porta et al. (2000) does not provide information regarding the legal origin of this territory. We excluded also Hong Kong and South Korea due to the fact that they cannot be associated with any of the 8 religions and denominations in order to proper calculate the Pluralism Index. The final database consists in 11,248 companies operating in 70 countries[3] in the period 2008–2014 (see Table 3).[4]

Due to the manner of constructing the database, the number of companies per country is constant for the entire period. The average number of companies per country is 168. All the adjustments made on the initial sample and the final sample used in our empirical analysis are described in Table 2.

Considering the purpose of our study, we used the Dividend payout ratio (DPR) which is probably the most popular indicator in describing dividend policy (Lintner 1956; La Porta et al. 2000; He et al. 2017; Jiang et al. 2017; Dragotă et al. 2019, etc.) and quantifies exactly the part from the profit which is distributed to shareholders. DPR is calculated as:

$$DPR_t = \frac{D_t}{NE_t} \tag{1}$$

where DPR is the Dividend payout ratio, D is the amount paid as dividends, NE is Net earnings, and t is the year.

Control variables[5] used in the models are selected based on the data available in the initial database and also based on the past literature (see Table 1). The main financial indicators used in this study are presented in Table 3:

The data for the sociocultural factors was collected from different international data sources as follows (see Table 4):

[3]These countries are: Argentina, Australia, Austria, Bahrain, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, China, Cote d'Ivoire, Croatia, Czechia, Denmark, Egypt, Estonia, Finland, France, Germany, Ghana, Greece, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Kazakhstan, Kenya, Kuwait, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Malta, Mauritius, Mexico, Morocco, Netherlands, New Zealand, Norway, Oman, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Serbia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, Tunisia, Ukraine, United Arab Emirates, United Kingdom, United States, Venezuela, Zambia, and Zimbabwe.

[4]Relatively the same database is used, in another contexts, in Yaseen (2018, 2019), Yaseen and Dragotă (2019) and Dragotă et al. (2019).

[5]Descriptive statistics of the data and correlation matrix for the variables used in the models are available upon request.

Table 2 The construction of the final sample

Description	Companies
Total number of companies exported from the database	14,071
Banks and investment trust	−1540
Companies without a specific industry (not mentioned in the database)	−30
National Banks	−2
Companies with negative assets, negative sales, negative income or negative equity	−675
Companies from countries with less than 10 companies	−78
Companies from Hong Kong, Palestine and South Korea[a]	−498
Final sample	=11,248

Source: Own table based on data from Thomson Research Worldscope Database
Notes: [a] We excluded Hong Kong and South Korea due to the fact that they cannot be associated to any of the 8 religions and denominations in order to proper calculate the Pluralism Index, based on Barro and McCleary (2003) database. We excluded Palestinian Territories because the database does not provide information regarding the legal origin of this territory

Table 3 Definition of control variables

Control variable	Calculation method/Definition
ROE (%)	Net profit/Total equity at the end of the year
Leverage	Total liabilities/Total equity
Beta	The volatility of companies' shares in the last 5 years
Company size	Ln (Total assets)
Market-to-book value	Market capitalization/Total book value
Foreign holdings	The percentage of shares held by foreign investors

Source: Own table

In the selection of the possible determinant factors of DPR used in this study, we have started from the lists presented in Table 1, reflecting the already identified determinants of DPR in previous studies. This list can be impressive, even it is not exhaustive. However, in some cases, a strong correlation occurs between variables because these ones express the same thing (for instance, in explaining DPR, company size can be proxied by total assets (as in Jiang et al. 2017; Ye et al. 2019), market values (market capitalization), by the percentile ranking of a company in the range of market values in the respective years (von Eije and Megginson 2008; Banyi and Kahle 2014), or by the percent of listed firms with the same or lower market capitalization (Fama and French 2001; Denis and Osobov 2008; Fatemi and Bildik 2012). In these cases, we have opted for only one measure (in our case, total assets). Also, some variables can be considered alternative measures for the same phenomenon (e.g. La Porta et al. 2000 and Faccio et al. 2001 use a dummy defined as 1 if the country adopted civil law and 0 otherwise, but Ye et al. 2019 use a dummy defined as 1 if the country adopted common law and 0 otherwise). Moreover, for some variables consecrated in previous studies, we did not have available data (one of the most prominent is the impact of share repurchases; however, share repurchases imply the end of the quality of shareholder, which implies a different behaviour, Dragotă et al. 2019).

Table 4 Sociocultural variables

Sociocultural variable	Data source
Legal origin	Andrei Shleifer database[a]
Social Progress index	The social Progress imperative—a global non-profit Organization[b]
GDP/ capita	World Bank Database[c]
Democracy index	Freedom House[d]
Harmony, hierarchy and egalitarianism	Schwartz database (Schwartz 2006)[e]
Religion	McCleary database[f]
Pluralism index	Calculated based on the religion data collected[f]

Source: Own table

[a]http://scholar.harvard.edu/shleifer/publications/economic-consequences-legal-origins

[b]https://www.socialprogress.org/—data on social health, for almost all the countries around the world (146 countries). The Social Progress Index was launched in 2014. Therefore, data for 2014 were taken into account and considered stable for the entire period analyzed. The social progress does not change significantly from one year to another. This assumption was checked for the period of 2014 to 2018. It is also in line with the stability of all the other cultural variables

[c]World Bank Database—https://data.worldbank.org/indicator/SI.POV.GINI/—It was used a proxy for the quality of life for the population which lives in a specific country (Yaseen 2019)

[d]https://freedomhouse.org/report/freedom-world/freedom-world-2018#anchor-one- Democracy index is determined based on the ratings and scores given by around 100 analysts and researchers, for each country in the word (209 countries and territories) (Freedom House 2018). For more details regarding the methodology of the Democracy data, see the Freedom in the World 2018 Methodology at https://freedomhouse.org/report/methodology-freedom-world-2018

[e]Schwartz cultural values were identified from a wide survey of over 60,000 people around the world to find common values, out of a list of 10 values, that act as guiding principles for people decisions and actions (Schwartz 2012). Based on these values, Schwartz (2012) created seven cultural dimensions, which characterize each country in lower or higher level. Same database was used in related studies as Shao et al. (2010) and Yaseen and Dragotă (2019)

[f]http://scholar.harvard.edu/mccleary/data-sets—for the percentage of the population that has each religion. Pluralism Index is calculated based on Herfindahl Index: Pluralism = 1—Herfindahl, where Herfindahl index is calculated by the formula $\sum S_i^2$ where S_i denotes the proportion the proportion of each religion in a specific country. The pluralism index represents a measure for religion concentration within a country (homogeneity)

As result, only the following possible determinants were considered: size (measured through ln(total assets)), ROE, the volatility of shares (beta), leverage, market-to-book ratio, the percent of foreign holdings, French civil law, German civil law, harmony (Schwartz 1994, 1999), hierarchy (Schwartz 1994, 1999), egalitarianism (Schwartz 1994, 1999), GDP/capita, Pluralism Index, Social Progress Index, Democracy Index.

4 Empirical Results

The main results suggest that DPR can be predicted with a high accuracy using the Decision Tree methodology. The smallest accuracy is presented under Model 1, where only control variables (the financial variables) are used to predict the

DPR—accuracy index is 75.5%. However, it can be easily observed that these factors (size, ROE, beta, leverage, market-to-book ratio, foreign holdings) explain the most part of the dividend payout ratio. Models 2 to 17 present different and increased accuracy indexes by adding other sociocultural variables (see Table 5). Even the marginal explanatory power is relatively modest, it can be noticed.

Among the other factors, the best predictors are the French Civil and German Civil legal origins, Harmony, Egalitarianism, GDP/Capita, Pluralism Index and Social Progress Index. By adding these variables, the accuracy increased by 5.8 and 5.4 percentage points (M4, M12 and M15). Another interesting result is that the accuracy index decreases lower than 75% (M1) if we add Foreign Holdings and Pluralism Index in some of the models.

GDP per Capita can be a good explanatory variable in predicting DPR. This is in line with Yaseen (2019). The accuracy index is higher in models with GDP per Capita instead of Democracy index, which means that we can have a better forecast of DPR for a specific company if we use the life standard of the population instead of the level of democracy.

In Fig. 3, the visualization for the decision tree for DPR can be followed. This visualization is useful to understand how machine learning is constructed and how it can help with the prediction. Using this estimated model, we can predict the level of the dividend payout ratio if we know the exact value of the determinants, and the results will be accurate, with 79 to 82% accuracy. The Decision Tree, resulted based on our dataset, appears to be very complex and with numerous inter-connections between variables. For example one of the determinants can influence the DPR in multiple ways and considering its value in more than one layer. These interactions could not be seen using traditional regression models.

Next, we have used decision tree for modelling DPR for the case of developed and, respectively, developing countries (see Tables 6 and 7). The countries are categorized as being a developed versus developing economy based on World Bank criteria (low versus high income country[6]). The results of the accuracy Index, using Decision Tree for developed countries, is presented in Table 6:

Social progress leads to a better accuracy compared to GDP/capita, when added to the classical model (81.3% compared to 79.6%) in developed countries. Also, as another interesting result, in the case of developed countries, the use of the democracy index as predictor determines a higher accuracy index (80.3%, in M16) compared to GDP/capita (79.9%). In the case of the entire population, the result is reversed. Also, harmony compared to hierarchy is more representative for developed economies. It leads to higher accuracy (M3/4 compared to M5/6). However, the results on the accuracy index for developed countries are in line with developing countries when we look on the added value which is coming from sociocultural factors (see Table 7).

[6]Please refer to Nielsen (2011) for methodology on how World Bank categorizes the country as being developed versus developing economy in comparison to the International Monetary Fund.

Table 5 DPR predicted through decision trees: results for all countries

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17
Control variables	Size	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	ROE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Beta value	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Leverage	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Market-to-book value	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Foreign holdings	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X
SocioCultural variables	FR		X	X	X	X	X	X	X	X	X			X	X	X	X	X
	GR		X	X	X	X	X				X	X	X	X	X	X	X	X
	Harmony			X	X				X	X								
	Hierarchy					X	X								X			
	Egalitarism				X			X	X	X						X		X
	GDP/capita				X						X		X					
	Pluralism index											X	X		X	X		
	SPI						X		X					X	X	X		
	Democracy index									X							X	X
	Accuracy index	75.5%	80.1%	79.7%	81.3%	79.7%	79.4%	80.4%	80.0%	80.1%	79.1%	79.4%	80.9%	79.8%	80.2%	81.3%	77.9%	79.0%

Source: Own Results using Phyton 3.7.2

Note: Same results also for subsamples of the database (per year or by splitting the dataset into developed and developing countries)

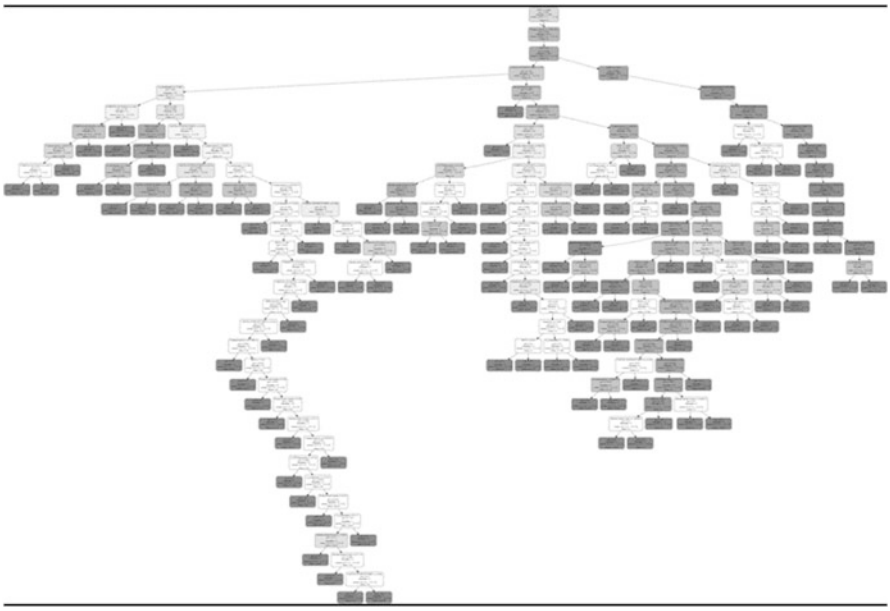

Fig. 3 Decision Tree Visualization for DPR. (Source: Own graph using results from Phyton and Visual Studio Code)

Decision Trees have better results for developing countries (see Table 7) compared to developed countries (Table 6). Starting with the classical model (M1), and by comparing the models for developing versus developed economies, there might be the case that in developed countries are other omitted variables that can predict DPR ratio with a higher accuracy. As robustness checks, we split the data into different testing and training samples. The results for M4 for all countries and different sample splits are presented below (see Table 8).

The idea of this robustness check is to see if the accuracy is stable even if we change the training data sample and the testing data sample. Thus, the main results are stable and robust to different subsamples. The results for developing countries are still more accurate than the ones for developed countries, which means that for the later ones there might be other relevant factors that can be used to better predict the dividend payout ratio.

5 Conclusions

In this paper, we use machine learning to forecast dividend policy. We build a model that could forecast the dividend payout ratio, using decision tree regressions and also considering a wide list of determinants. In the list of determinants of dividend payout ratio, we have included both financial and sociocultural factors.

Table 6 DPR predicted through decision trees: results for developed countries

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17
Control variables	Size	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	ROE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Beta value	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Leverage	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Market-to-book value	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Foreign holdings	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X
SocioCultural variables	FR		X	X	X	X	X	X	X	X	X			X	X	X	X	X
	GR		X	X	X	X	X				X	X	X	X	X	X	X	X
	Harmony			X	X				X	X								
	Hierarchy					X	X								X			
	Egalitarism				X			X	X	X						X		X
	GDP/capita				X						X		X					
	Pluralism index											X	X		X	X		
	SPI						X		X					X	X	X		
	Democracy index									X							X	X
	Accuracy index	79.6%	80.4%	81.3%	81.3%	79.2%	79.9%	79.0%	81.7%	79.3%	79.9%	79.9%	79.1%	80.4%	80.5%	80.3%	80.3%	79.8%

Source: Own Results using Phyton 3.7.2

Note: Same results also for subsamples of the database (per year or per region)

Table 7 DPR predicted through decision trees: results for developing countries

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17
Control variables	Size	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	ROE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Beta value	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Leverage	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Market-to-book value	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Foreign holdings	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X
SocioCultural variables	FR		X	X	X	X	X	X	X	X	X			X	X	X	X	X
	GR		X	X	X	X	X				X	X	X	X	X	X	X	X
	Harmony			X	X				X	X								
	Hierarchy					X	X								X			
	Egalitarism				X			X	X	X						X		X
	GDP/capita				X						X		X					
	Pluralism index											X	X		X	X		
	SPI						X		X					X	X	X		
	Democracy index									X							X	X
	Accuracy index	81.1%	82.4%	77.4%	75.9%	82.7%	85.3%	77.3%	76.2%	77.2%	84.0%	83.1%	84.4%	82.8%	83.1%	80.0%	82.4%	78.1%

Source: Own Results using Phyton 3.7.2

Note: Same results also for subsamples of the database (per year or per region)

Table 8 Accuracy score for DT for different subsamples

	2008–2012	2012–2014	Entire period
Training/testing	80%–20%	80%–20%	2008–2012—Training 2012–2014—Testing
Developed countries	75.2%	80.2%	77.3%
Developing countries	82.3%	86.7%	85.3%
All countries	77.3%	82.4%	81.3%

Source: Results using Phyton 3.7.2

Decision trees were used in order to highlight some interactions between variables which are difficult to be observed in modelling dividend payout decision. Therefore, the study highlights that, among financial factors (size, ROE, leverage, beta, market-to-book value), some sociocultural factors are also relevant in explaining dividend policy. These factors come to support the fact that the dividend policy is a human-made decision and in the end, this decision is influenced by both financial indicators and human factors which can influence significantly the decision to distribute higher or lower dividends.

For instance, using decision tree, French Civil and German Civil legal origins, Harmony, Egalitarianism, GDP/Capita, Pluralism Index and Social Progress Index are relevant in explaining DPR. The accuracy index for the models is above 75%, which means that the models can predict with high accuracy the DPR based on the above list of determinants. The results are relatively similar for both developed and developing countries. However, some differences occur. For instance, the democracy index seems to be a better predictor than GDP/capita for developed countries, the result is reversed in the case of developing ones.

On the other hand, the results of the study show that the sociocultural factors are better predictors for developing countries, compared to developed countries. This is highlighted by higher accuracy index for developing economies, with more than 2 p.p. higher than for developed economies. Also, by using the factors mentioned above and considering a higher accuracy ratio in the period between 2012–2014, the dividend payout ratio can be forecasted better in periods of stability/normality, rather than in immediately after crisis periods.

Immediate next step in this research is to find the top for the dividend payout ratio, in order to see if simplified models by using the top five predictors would be enough to have a high accuracy ratio.

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The Volatility Case of European REITS and Non-REITs

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Abstract Real estate investment trusts have had a difficult time penetrating the European real estate market while non-real estate investment trusts were a widely accepted investment vehicle in all EU member states. This study aims to examine the lack of popularity of real estate investment trust in the European market through the lens of European property research association index performance, comparing real estate investment trust with non-investment trusts head to head in terms of return, co-movement, liquidity and volatility modelling using the GJR-GARCH model. The results showed that, that European real estate investment trusts indexes were not a good diversification strategy. They exhibited high volatility, did not return to the previous stock index level, gave a poorer return to their competitive counterpart, had a higher shock persistency and strong correlation with the stock market index. Although some advantages of real estate investment trusts were identified, such as higher liquidity and stronger resilience to bad news asymmetry, overall, the European real estate market was very fragile. Possible study nuances could be attributed to the fact that investment trusts in the European market were still very young, and their index initial starting point came right at the peak of the real estate price bubble.

Keywords Real Estate · REITs · Non-REITs · GJR-GRACH · Volatility

1 Introduction

The real estate sector has always been paramount not just to economics but also to the general well-being of citizens. Especially after the 2008 real estate market crash, as millions of people had lost their homes, a search for more sustainable real estate

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development options still continues. In 2019, leaving the private real estate companies aside, there were two ways how real estate investment organized itself on a stock exchange: it was either as a real estate operating company (REOCs, equivalently Non-REITs) or as a real estate investment trust (REIT). The main differences between the two structures can be boiled down to three main components namely tax neutrality, compulsory profit distribution rule and operational restrictions.

Tax neutrality comes in a form that rental income is treated as business income and therefore can be deducted, whilst if current income is distributed to shareholders, it is not taxed by income tax. The second component makes it compulsory to pay out ~90% of earned income to the shareholders, thus making owning a stock more as an indirect acquisition of real estate in a stock form. The third one, although varying strongly from country to country, ensures that speculative behaviour is limited by the rules of mandatory acquisition of property that must be followed for at least 5 years, during which no quick resale can happen. This type of limitation makes REITs a passive investment vehicle with limited speculative abilities. To thrive it must orient itself in terms of long-term value investment.

Although both stock options were far from being new, according to the European property research institute, in 2018 only 13 out of 28 EU countries provided REITs as a legal entity option (EPRA 2018). Countries like Poland, Slovakia, Lithuania, Latvia, Estonia, Czech Republic, Portugal, Slovenia, Croatia and others were devoid of the latter investment vehicle. Strangely enough, even such a developed country like Germany had enacted the REIT regime only in 2008. Many questions arise because of such circumstances: Why were not REITs widely adapted by other countries? Is Europe's market too small for REITs? Are REOCs capable of doing everything that REITs can? Is it less safe to invest in REITs than REOCs?

As stated in the by EPRA, in 2018 the size of the USA and Canada commercial real estate was valued at EUR 8778 billion, while that of Europe was at EUR 7483 billion. At first glance, there was enough of raw material to work with as the numbers were not very far off (EPRA 2018). However, discrepancies arise when analyzing the size of listed real estate (LRE). The USA had EUR 1270 billion of LRE, out of which 46 billion were owned by non-REITs and 1224 billion owned by REITs, while Europe had only EUR 458 of LRE, out of which 196 billion euros were owned by REITs and 262 billion owned by non-REITs. It is evident that REITs have conquered the USA market by holding 96% of LRE, while in Europe REITs amount only to 42%. This gap of LRE could be explained by the nature of operations of REOCs and REITs. As stated by Falkenbach and Niskanen (2012), the practical implications for REITs tax neutrality were that it made them a valuable asset for not only usual real estate participants, but also for equity holders, banks and financiers. Many investors used REITs as a supplement to their diversification strategy. Lee and Stevenson (2004) stated that REITs were an increasingly attractive addition to the portfolio. Mahmood et al. (2015) similarly found positive diversification benefits. Thus, financial players pushed real estate supply onto stock exchange from which they can derive additional value. Considering these details, the LRE gap would be less visible if REITs were more widely adopted in Europe.

However, adopting any new system to a country stock exchange has its dangers and costs. First, the members of the parliament have to approve regime addition legislation at the parliament level and at the central bank level. Second, the avoidance of unnecessary volatility and price disruptions is important as the goal should always be oriented towards the sustainability and making the real estate market more competitive. Hence, since time is expensive at all government institution levels, it is crucial to have enough evidence that such systems are beneficial to the real estate market.

Many authors like Bers and Springer (1997), Anderson et al. (2002), Ambrose et al. (2005), Tahir et al. (2012), Topuz and Isik (2017) argued that REITs were a very good investment vehicle, claiming that, REITs were efficient in their costs, displayed economies of scales, managed to attract better investment opportunities than their counterparts and were less overleveraged. However, very few compared REITs and REOCs when conducting statistical analyses and even fewer attempted to study volatilities, which describes the riskiness of an asset. Kawaguchi et al. (2012), Lee et al. (2012), Liow and Schindler (2014), Agarwal and Hu (2014), Bhargava et al. (2010), Case et al. (2012), Zhou (2011, 2016), Morri and Cristanziani (2009), Lee and Stevenson (2004) and Kola and Kodongo (2017) have attempted some sort of volatility testing, but the data was either old, non-comparable between REITs and REOCs or they were using less sophisticated models. Therefore, the purpose of this paper is to conduct a performance and volatility analysis of REITs and REOCs in order to find out whether any significant differences between the divergent firm structures can be observed.

This paper is structured as follows: Sect. 2 concentrates on the literature review of the existing empirical volatility studies; Sect. 3 introduces the data source and methodological guidelines that have been followed; Sect. 4 presents the results that have been obtained using the GARCH model; Sect. 5 concludes the study's findings.

2 Literature Review

The amount of research about Non-REITs and REITs is low, especially lacking is the performance and volatility comparison of Non-REITs and REITs. Therefore, other studies in different fields of volatility measurement must be used as proxies. Researchers like Nelson et al. (2006), Cheung and Lilian (1992), Wang and Figlewski (2000), while studying firms on the stock exchange, have found that higher levered beta increased the stock price volatility although it was conditional on other factors as well. This hypothesis was initially developed by Black (1976) and Christie (1982) who stated that a drop in a stock price (negative return) increased financial leverage, which made stock riskier, and as a result, its volatility rose. According to the studies by Grybauskas and Pilinkienė (2019), Falkenbach and Niskanen (2012) and Morri and Cristanziani (2009), the existing leverage restrictions of REITs, which fluctuated from 40 to 60%, translated into REITs being more

dependent on long-term financing and being less debt-financed. In the period of 2006 to 2009, REITs were less leveraged from 15% to 22%. Unfortunately, this less levered beta contributed to higher volatility contrary to the existing higher-debt-higher-volatility hypothesis. When analyzing the period of 2006 to 2010 for European indexes, Falkenbach and Niskanen (2012) stated that annual volatility for REITs stood at 29.6%, while REOCs were at 27.2%; however, REITs outperformed REOCs with the annual return of −9.7%, whilst the latter companies held at −14.1%. Furthermore, investment in public real estate was more volatile and produced less returns than other indexes like S&P or MSCI Europe, although standard deviation and returns were similar between REITs and REOCs. Correlation coefficient among REITs and REOCs stood at 0.13. Compared with other European indexes, REITs on average had a correlation of 0.75, while REOCs around 0.135, concluding that at this time period, or maybe just because the 2008 crisis was related to the real estate bubble, REITs and REOCs were a poor diversification tool. A study by Zhou (2016) also noted that both leverage and volatility feedback effects were at work and highly persistent in the U.S. REIT market. The leverage effect dominated the volatility feedback effect, and both effects were found to be non-linear.

Interestingly, most researchers like Baskin (1989), Hussainey et al. (2011), Allen and Rachim (1996) have found that the vast dividend payouts were negatively related to stock price volatility, while high dividend yields depending on the study sample had a negative and positive relationship. Unfortunately, these hypotheses entirely did not apply to REITs as they paid tremendous amounts of dividends because of compulsory payout regulations and constantly maintained high yields, whilst still displaying bigger than average volatilities. Lastly, Kawaguchi et al. (2012) analyzed the USA equity REITs for the period of 1985 to 2012. Interestingly, their findings suggested that REITs had a negative stock price elasticity in Greenspan era, but changed to a positive one as interest fell. The authors asserted that there exists a negative relationship between equity value and volatility (an increase in stock price will reduce volatility).

Regrettably, the paper by Falkenbach and Niskanen (2012) was the only study found to be comparing European REITs and REOCs volatilities and returns simultaneously. Other authors either analyzed volatilities solely for REITs or carried out analyses with different purposes. Some proxy relatable research was done by Liow and Schindler (2014) who, by using a dynamic conditional correlation GARCH model, indicated a tendency of return convergence between public real estate companies and stock markets in an international environment. Through the time period of 1990 to 2010 descriptive statistics revealed that UK public real estate companies had been on average by 0.646% more volatile in standard deviation than UK non-real estate equity firms; in Germany, real estate companies were more volatile by 0.66%, in France by 0.20%, in the USA by 1.001%. The correlation between real estate companies with local stock market firms stood at 0.5 in the USA, 0.45 in Germany, 0.5 in France and 0.62 in the UK. After calculating the GARCH model, high persistency had been detected for real estate firms, for Germany alpha and beta summation was equal to 0.9881, in France, the UK and the USA it was 0.994, 0.998 and 0.9989, respectively.

Bhargava et al. (2010) discovered that there was no causative link between REOCs and domestic REIT returns; furthermore, while adopting the TGARCH model for testing volatility persistency, spillovers and asymmetries, the authors concluded that shocks were persistent for REITs as alfa + beta was close to 1. Finally, the researchers also concluded that there existed spillover effects from REOC and mortgage financing companies to REIT as well from global REITs to domestic REITs. Similarly, Case et al. (2012) compared Nareit USA REIT index with a CRSP value-weighted Cap-based Portfolio market index and treasury bills. Unconditional correlation for REITs with regards to CRSP index stood at 0.55, and for treasury, it was 0.27. The GARCH model indicated high shock persistency near 0.996. While constructing efficient portfolios for USA companies, authors Lee and Stevenson (2004) found that REITs consistently provided good diversification results, especially when constructing a long-term horizon portfolio. Using a multivariate GARCH model and a generalized VAR volatility spillover index, Liow (2013) discovered that all seven European real estate markets were endogenous. France's real estate securities had a dominating volatility effect on other countries, volatility spillovers moderately increased as Euro was more widely adopted.

A paper by Kola and Kodongo (2017) chose to study Belgian, South African and USA REIT index volatilities by applying a GARCH(1,1) model. In all three models, REIT indexes displayed strong persistency, for Bulgaria alfa + beta summation showed 0.99 coefficient, for the USA 1 and for South Africa 0.75, but the latter model was not significant. Also, by applying generalized methods of moments, the authors concluded that different macroeconomic risk factors helped explain excess returns of REITs. For Bulgaria, GDP growth, industrial production growth and exchange rates were found positively significant; in South Africa GDP growth, change in inflation was positively significant; and in the USA only prime lending interest rates were positively significant. Supporting evidence came also from the study by Koulakiotis and Kiohos (2015), in which they used a positive trading model to analyse USA REITs and non-REIT in the time span of 25 years. The authors concluded that long-term volatility results were aligned with the fact that autocorrelation persisted over long lags, and thus volatility decayed at a slow hyperbolic rate.

After reviewing prior literature on real estate companies, a lack of REIT and REOC volatility analysis was identified. Most researchers focused on USA REITs index or equity stocks and very few dealt with European REITs and REOCs. The identified study by Falkenbach and Niskanen (2012), which studied EPRA indexes of REIT and REOCs, only used a simple standard deviation formula for the calculation to make inference about the REIT and REOC structure volatility and measured REIT performance for only four years from 2006 to 2010. That being said, an analysis niche has been discovered. In the next section, the methodological approach to volatility modelling will be stated.

3 Methodology

It is crucial to correctly select the appropriate data sample for the analysis. For REIT and REOCs, the FTSE EPRA Nareit Developed Europe REITs and Non-REITs indexes, which are a subset of the FTSE EPRA Nareit Developed Index, were chosen separating the existing constituents into both REITs and Non-REITs indexes. They are calculated by the worldwide respectable brand FTSE Russel to provide diversification possibilities and insight to investors. Stocks are weighted and selected both to ensure that the index is investable and to confirm that the indexes are tradable. The requirements for the company to be included in the index are as follows: it must be common stock listed in an eligible country and on an eligible stock exchange; it must be classified in ICB as super sector real estate (8600), ICB supersector heavy construction (2357) or ICB subsector home construction (3728); the company has to derive 75% of EBITA from relevant real estate activities, minimum size, detailed English company report, minimum liquidity.

The FTSE EPRA Nareit Developed Europe REITs index was launched in March 2006, it includes 65 constituents, 33 companies come from the UK, 11 from Belgium, 6 from France and 2 from Germany. The FTSE EPRA Nareit Developed Europe Non-REITs index in total had 40 companies, 16 of which came from Sweden, 9 from Germany, 6 from the UK and 5 from Switzerland. The top five members of the REIT index were: "WFD Unibail-Rodamco," which focused on a retail sector, owned a net market capitalization of EUR18,663 M and had the biggest weight of 13.47%; "Segro," which concentrated on industrial activity, owned a market cap. of EUR 10,664 M and had a weight of 7.69%; "Gecina," which focused on office activities, owned a market cap. of EUR 7853 M and had an index weight of 5.74%; "Land Securities Group," which was a diversified REIT, owned a market cap. of EUR 7762 M and had a weight of 5.6%; "British Land Co," which was also a diversified REIT, owned a market cap of EUR 6687 M and had a weight of 4.82%. In total these companies had a weight of 37.32%. For the Non-REIT side, the constituents were: "Vonovia SE," which focused on residential activities, owned a market cap. of EUR 25,872 M and had a weight of 22.36%; "Deutsche Wohnen SE," which focused on residential property, owned a market cap. of EUR 12,039 M and had a weight of 10.41%; "Swiss Prime Site," which was a diversified non-REIT company, owned a market cap. of EUR 6992 M and had a weight of 5.98%; "Aroundtown SA," which was a diversified company, owned a market cap. of EUR 6706 M and had a weight of 5.8%; "LEG Immobilien AG," which focused on residential activities, owned a market cap. of EUR 6502 M and had a weight of 5.62%. In total these five companies made a weight of 50.17%. Although weights help the indexes to be fairer, top five companies still made the biggest impact on the returns of these indexes (FTSE Russell 2019).

Additionally, for benchmark comparison, the STOXX Europe 50 Index was added. This index includes Europe's leading Blue-chip companies. The index covers 50 stocks from 17 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal,

Table 1 Summary statistics for REIT, Non-REIT and STOXX 50 indexes

	Europe REIT (2012–2019)			Europe Non_REIT (2012–2019)		
Type	Price	Returns (*100)	Volume	Price	Returns (*100)	Volume
Mean	748	0.00498	210477052	803	0.01489	12225394
Median	754	0.02805	38729726	795	0.04332	20107699
Min.	306	−12.532	1288072	252	−8.6389	990480
Max.	1310	7.58831	478114208	1395	10.6940	550811200
Std.	1830	1.36361	237892442	2847	1.20772	202963389

Source: Bloomberg Terminal. Prices are in Euros

Spain, Sweden, Switzerland and the United Kingdom. The data for the indexes were retrieved from a well-respected data source the Bloomberg terminal which is considered as a reliable source of information for financial and economic data. The access to the Bloomberg Terminal data was provided by the Kaunas University of Technology in Lithuania. Summary statistics for the three indexes are provided in the Table 1.

For measuring volatility, a couple of actions are taken. First, summary statistics are overviewed by calculating means and standard deviation.

Secondly, an ARMA model is fitted. It has the following formula:

$$x_t = \sum_{i=1}^{P} a_i x_{t-i} + e_t + \sum_{i=1}^{Q} \beta_i e_{t-i} \tag{1}$$

where x_{t_i} is the lag return of the index and e_{t_i} is the lag of error term.

Thirdly, for more in-depth analysis of the volatilities, a GJR-GARCH model, which was created by Engle (1982) and Glosten et al. (1993), is used. A generalized autoregressive conditional heteroskedasticity model is applied on the time series to measure the shock persistency and innovation impact on the error term variance as a function of the previous error terms. The formula for GJR–GARCH model is as follows:

$$r_t = \mu + \epsilon_t \tag{2}$$

$$\epsilon_t = \sigma_t z_t, z_t \text{N.I.I.D}(0,1) \tag{3}$$

$$I_{t-1} = \{y_1 x_1 \ldots.., y_{t-1} x_{t-1}\} = \{e_1, \ldots..e_{t-1}\} \tag{4}$$

$$E\left(\epsilon_t^2 | I_{t-1}\right) = \sigma_t^2 \tag{5}$$

$$\epsilon_t \mid I_{t-1} = \tilde{N}\left(0, \sigma_t^2\right) \tag{6}$$

$$\sigma_t^2 = \omega + \alpha \epsilon_{t-1}^2 + \beta \sigma_{t-1}^2 \tag{7}$$

$$\sigma_t^2 = \omega + (\alpha + \gamma I_{t-1}) \epsilon_{t-1}^2 + \beta \sigma_{t-1}^2 \tag{8}$$

$$I_{t-1} = \begin{cases} 0 \text{ if } r_{t-1} \geq \mu \\ 1 \text{ if } r_{t-1} \leq \mu \end{cases} \tag{9}$$

where r_t is the returns of a particular index, μ is a mean model, ϵ_t are the error terms received from the mean model (it also has a mean of zero and variance of sigma square), σ_t^2 is the squared error term variance, z_t is normally distributed innovation, $I_{t\ -\ 1}$ is bad/good news dummy variable and ω, α, β are equation parameters. The GJR-GARCH model is a more advanced model of GARCH and gives better volatility estimation results. It is an empirically observed fact that negative shocks at time $t_{t\ -\ 1}$ have stronger impact on the variance at time t than positive shocks. This asymmetry earlier was called a leverage effect because the higher risk was believed to arise from higher volatility, which happened because of negative shock leverage; however, nowadays scientists believe that this channel effect is too small. To satisfy non-negativity condition, coefficients have to be $\alpha > 0$, $\beta \geq 0$ and $\gamma + \alpha > 0$. The model is still acceptable even if $\gamma < 0$, provided that $\gamma + \alpha > 0$. The time series and residuals from ARIMA models are tested by Ljung–Box test, the formula is as follows:

$$Q = n(n+2)\sum_{k=1}^{h} \frac{\widehat{p}_k^2}{n-k} \tag{10}$$

where n is the sample size, p ^ is the sample autocorrelation at lag, k, h is the number of lags being tested. The Ljung–box test hypotheses are as follows:

H0 The data are i.i.d. (the correlations in the population from which the sample is taken are 0, so that any observed correlations in the data result from the randomness of the sampling process).

H1 The data are not i.i.d., they exhibit serial correlation.

It is important that the Ljung–box test finds significant autocorrelation between the different lag periods of the stock returns for REOCs and REITs. Otherwise, if no autocorrelation exists, when the lags do not hold any important information that could be detected by the GARCH model. Thus, concluding that the stock return deviations are not predictable. The number of lags for ARIMA or GARCH models is identified by using autocorrelation and partial autocorrelation functions and also by using AKAIKE information criteria. In general, the statistical model is divided into three parts, (a) the mean model; (b) volatility process; (c) distribution for the standardized residuals. In the first part, we fit an ARIMA model if autocorrelation exists, in the second part the GJR–GARCH model is implemented if the Ljung–box test rejects null hypothesis, and finally a test for standardized residuals is carried out.

4 Results

The chosen time period of 2006 to 2019 for the performance analysis was the only date duration available for the European REIT and Non-REIT. This is because the indexes itself were constructed and provided by EPRA only in 2006. The late index construction was also amplified by the fact that most European countries came very late to the REIT regime (Germany established only in 2008, Italy in 2007). For this reason, suboptimal factors were at play when analyzing general performance and volatility. First, the analysis was being carried out at the end of the long-term-debt growth cycle, which was marked by the 2008-economic crash and more precisely the economic crises was related to the real estate sector. Consequently, the index starting price for REITs was at overvalued position. Secondly, the REIT industry at this time period was very new in Europe since conversion to REIT structure only begun to take place around 2009. Therefore, from adaptation standpoint, REITs had one of the most volatile conditions to enter the market and give good performance results. The conditions are portrayed in Fig. 1 for better visualization and understanding.

The total assets for European REITs and Non-REITs indexes in 2018 were 1631.54 and 2413.40 billion respectively which is around 34% smaller for REIT companies. In 2018 REITs had a total debt to total assets ratio of 35.9%, while REOC at 41.43%. In the period of 2012 to 2018 REITs had a lower leverage from 9% to 5.5%. Average dividend yield for the time period of 2012 to 2018 for REIT companies was 4.6%, while for REOCs it was only 2.75%. The lower dividends coincide with the theory that REOCs usually reinvest their profits more often than REITs. Keeping these reasons in mind, the analysis of holding period returns did not yield good results. The 13-year holding period returns for REITs, Non-REITs and STOXX50E were minus 17%, 31% and—minus 2%, respectively. The annual returns were as follows: REITs—minus 1.9%, Non-REITs—2.8% and STOXX50E—minus 0.25%. A big split was recorded in 2015 between REITs and REOCs, which indicated to the investors that REIT did not manage to get back to their initial value or they might have been extremely overvalued from the start thus leaving price correction the only available scenario.

The problem of such poor performance again came from unfortunate time period right after one of the biggest real estate market catastrophes. It could be that leverage constraints did not allow REITs to accelerate their recovery while more speculative behaviour from REOCs helped increase profits. Additionally, the fact that REOCs have been established significantly earlier gave an upper hand to REOCs to position and prepare oneself to incoming market threats. However, this gives an interesting perspective that in a time of economic recessions and stagnation REOCs might bounce back faster to the initial value. Despite that, this is partially a speculative conclusion as further research should verify such performance differences from the perspective of how reinvested earning impacted the price growth. This is shown in Fig. 2.

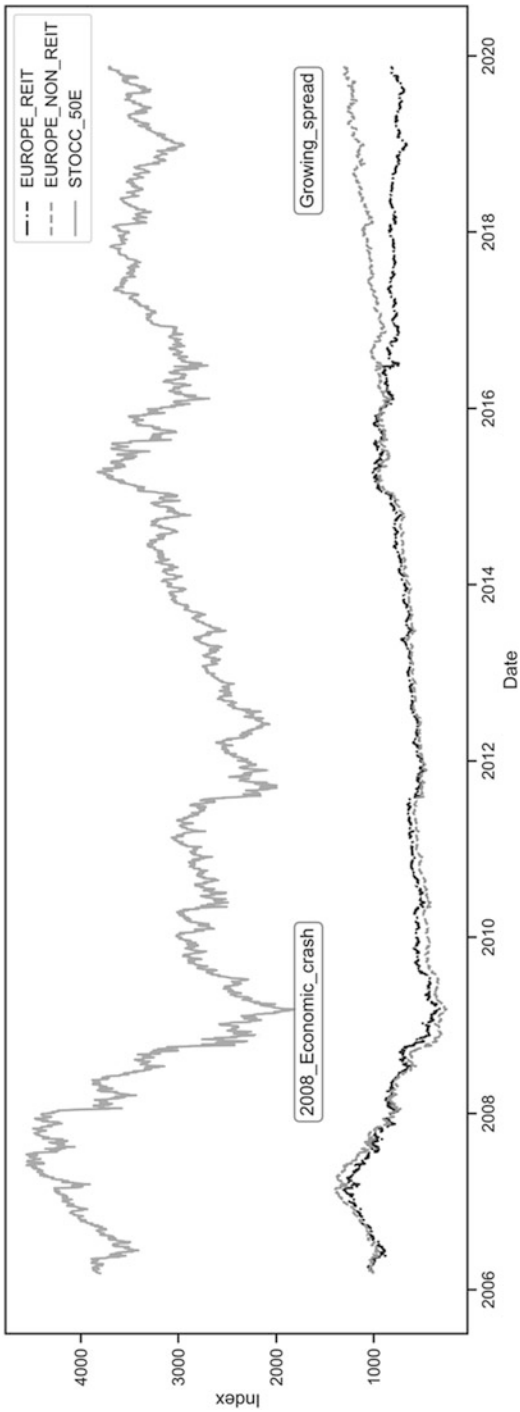

Fig. 1 FTSE EPRA Nareit Developed Europe REITs, Non-REITs and STOCC-50E price graphs. (Source: Bloomberg terminal)

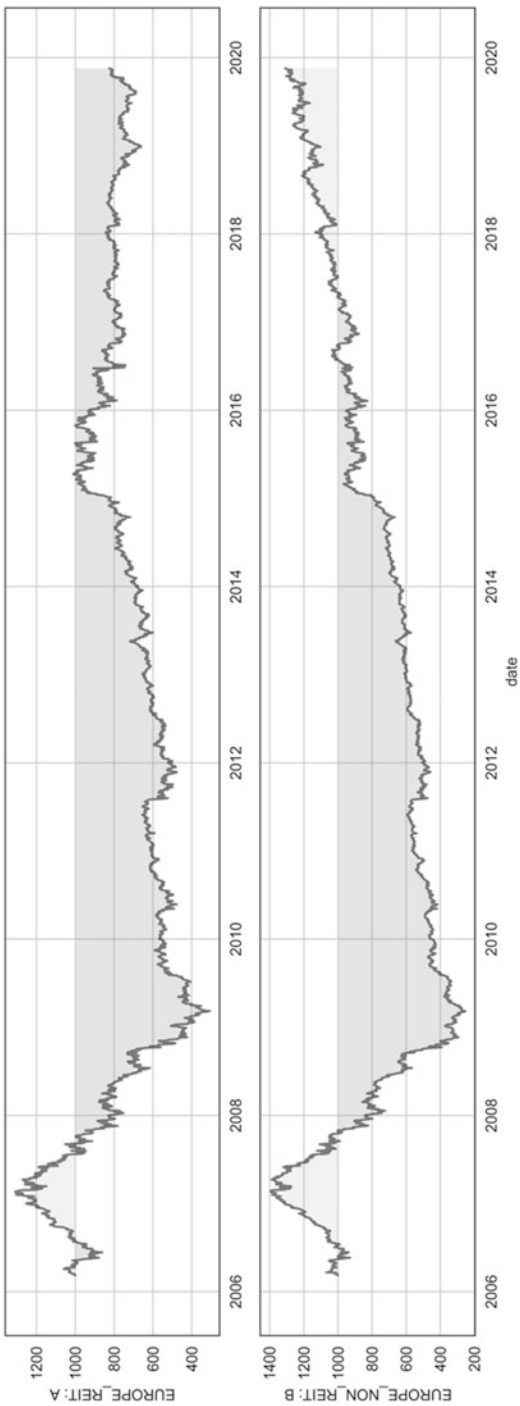

Fig. 2 FTSE EPRA Nareit Developed Europe REITs and Non-REITs bounce back price graphs. (Source: Bloomberg terminal)

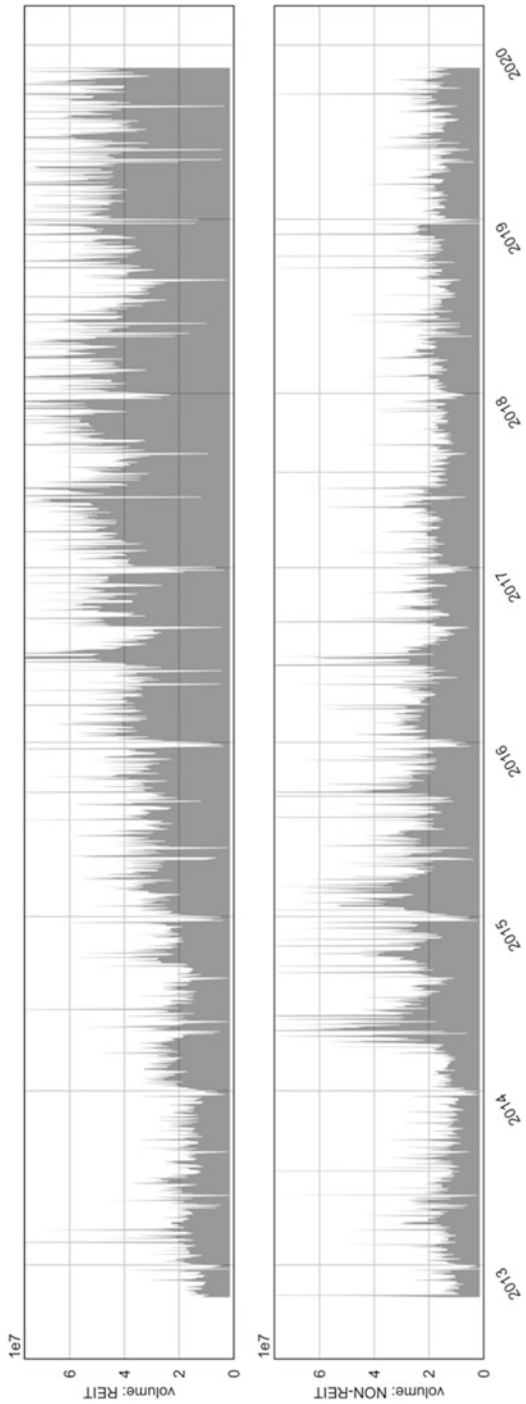

Fig. 3 The trading volume of FTSE EPRA Nareit Developed Europe REITs and Non-REITs indexes. (Source: Bloomberg terminal)

The claims by Lee and Stevenson (2004), Mahmood et al. (2015) that REITs were a good diversification tool to use in an investment portfolio were hardly applicable for the European real estate market in this time period of 2006 to 2019. Perhaps in the US real estate market REIT performance had given different results. The annual average volatility for REITs, Non-REITs and STOXX50E was 21.64%, 19.17% and −21.85%, respectively. Despite lower leverage, REITs were more volatile than Non-REITs by 2.47%. As far as the volume trading, REITs on average were traded at 21047705, while REOCs were traded at 12225394, meaning that the demand for REITs was bigger by around 42%3 although the tradability differences became more apparent only after 2014. A small growth of liquidity for REOCs was recorded in 2014 to mid-2016 period, but after that, the REOCs trading volume levels dropped to a consistent average level of 21838684 against 53216246 for REITs. Although REITs gave worse performance than REOCs in terms of volatility, in the period of 2016 to 2019 the trading average volume gap of REITs from REOCs increased to 58.97%, thus making them more liquid assets to own. The trading volume changes are depicted in Fig. 3.

Figure 4 provides a view of correlograms, distributions and scatter plots between REITs, REOCs and STOXX50E indexes. The distribution of returns of each data sample was very close to the normal distribution. This is because of the law of large numbers, i.e. as the sample size increases, the data converges to the true mean. The scatter plots similarly showed that the index returns were closely related to each other with some small deviations. Interestingly, the Pearson correlation coefficient was positive for all sets of indexes, which implies that as one index moved up or down, the other index or stock moved in lockstep, in the same direction. The acquired correlation coefficient among REITs and REOCs was 0.84 points which are considered very high in terms of co-movement. However, as mentioned previously the analysis of returns showed a completely different picture since a growing performance gap was recorded between these two stocks. Therefore, the correlation coefficients were very misleading for any investor and should not be trusted solely in a portfolio diversification scheme. With regards to portfolio diversification than comparing with STOCC-50 index, the European REOCs were less correlated with the general stock market and stood at 0.66 points while for REITs coefficient was at 0.7 points. Evidently, REOCs were a better diversification tool than REITs. Falkenbach and Niskanen (2012) also found that REITs were closely related to the market movements, however, where study results diverge was that REOCs correlation with the stock market in Falkenbach and Niskanen (2012) study was around 0.14, which is vastly different from 0.66 found in this study. Both studies agree that REOCs were a better diversification tool than REITs.

Lastly an ARIMA–GARCH model was applied. Firstly, a differencing of lag was enough to make the data stationary for REITs as well as for Non-REITs, and by using the Ljung–Box test significant autocorrelation was detected for both company structures. The autocorrelation of the raw returns of each company can be seen in Fig. 5. Then, after developing a custom algorithm for finding the best ARIMA lag model that tests all lags and then compares the AIC criteria and significance levels, it

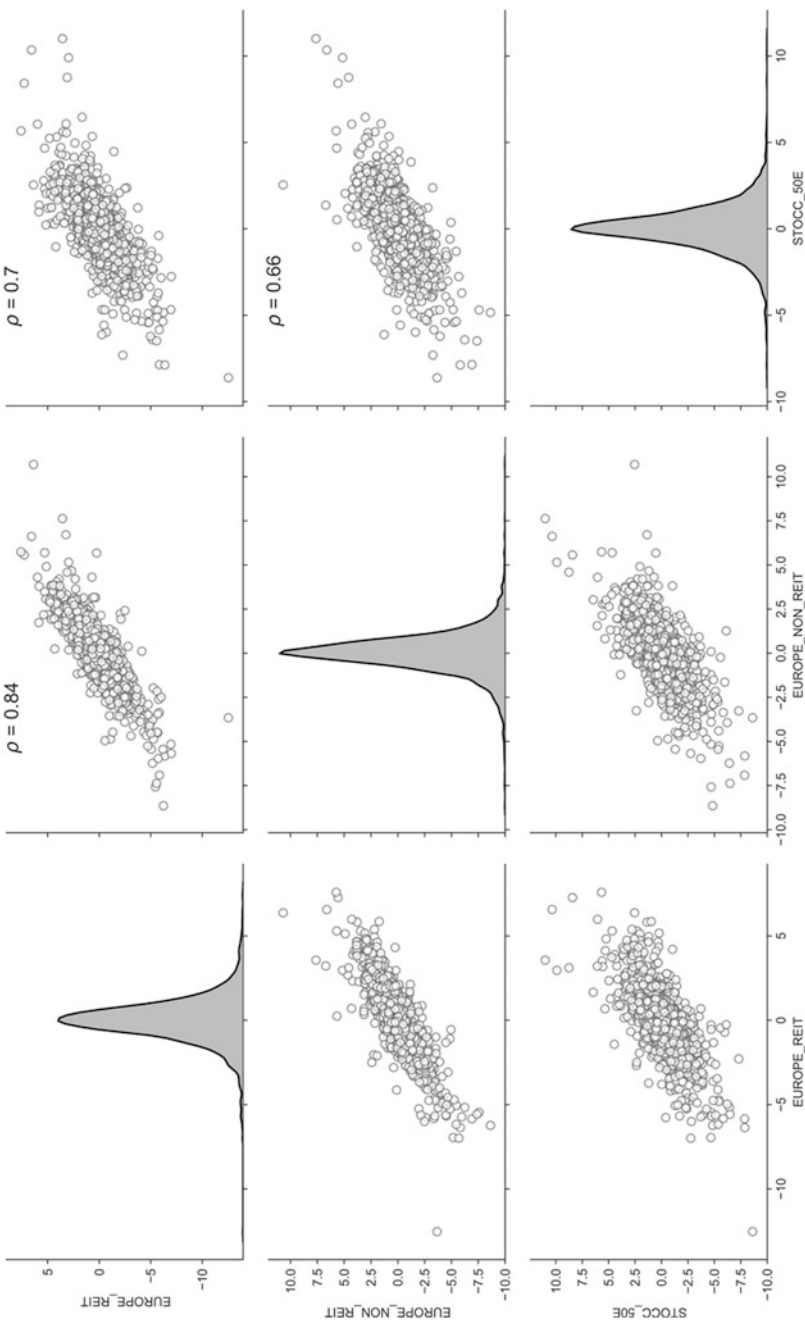

Fig. 4 Correlogram of European REITs, Non-REITs and STOXX50E along with distribution in the diagonal. (Source: Authors own calculations)

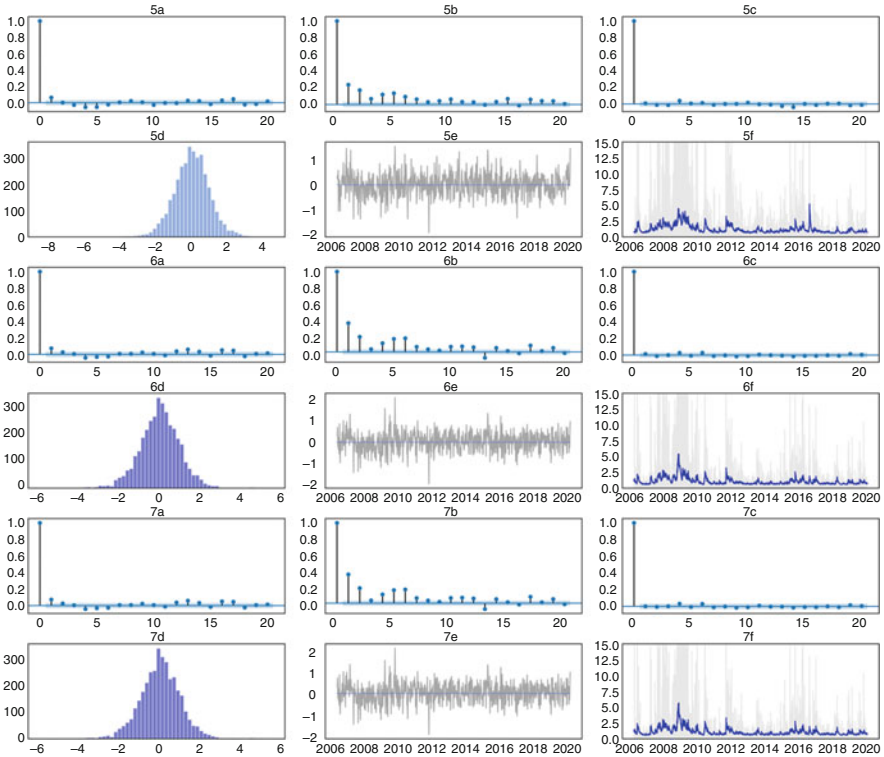

Fig. 5 Number 5 indicate REITs, numbers 6 and 7 indicate Non-REITs. Letter "a" depicts—autocorrelation of raw returns, "b"—autocorrelation of ARIMA squared residuals, "c"—autocorrelation of GARCH standardized residuals, "d"—standardized residual kernel density plot, "e"—stationary white noise, "f'—fitted conditional volatility. (Source: Authors own calculations)

was reported that the best ARIMA models for REITs and REOCs were (4,0,3) and (3,0,2), respectively. All coefficients were significant at 5% level for both ARIMA models for both companies the ARIMA–GARCH (Appendix).

Furthermore, the autocorrelation was tested again for the residuals for ARIMA if they had any clustering. The results indicated that squared residuals had significant autocorrelation for both company types, thus requiring to model the conditional volatility. The optimal number of lags was again chosen by the AIC criteria and the significance of the coefficients. The most accurate model for GJR–GARCH for REITs was with (1,1,1) lags and for REITs with (1,1,2) lags. The student-T distribution, which is considered as the industry standard for modelling financial data, was applied to capture the fat-tails of returns. However, because an objective comparison was desired between two company types, an additional GJR–GARCH model was developed for comparing the conditional volatilities if the model parameters were equal.

Finally, after GARCH modelling the autocorrelation was no longer significant and white noise processes were retrieved. The standardized residuals became reminiscent of normal distribution. The $\alpha + \beta$ in the GJR-GARCH model measures the persistence of any shock to the volatility. In the REIT model, these coefficients amounted to 0.9316, for non-REITs in the GJR-GARCH (1,1,1) to 0.9099 and in GJR-GARCH(1,1,2) to 0.8837. Using these results, it can be stated that for European REITs shock evoked volatility has longer lasting persistency effects than for REOCs, although for both companies the sum of these parameters was very close to 1. Lastly, the asymmetric coefficient γ of 0.1133 for REITs and GJR-GARCH (1,1,1)—0.1446, GJR-GARCH(1,1,2)—0.1866 for REOCs, showed that the latter company type is more sensitive to bad news inflicted shocks. Comparing the findings to the previous studies that used GARCH modelling techniques, REITs similarly showed high shock persistency which was over 0.9 in the Bhargava et al. (2010), Case et al. (2012) and Kola and Kodongo (2017) models. A researcher Zhou (2011) even found that REIT shock persistency was close to 1 which again confirms that the findings in this study are in accordance with the existing literature regarding REITs. Unfortunately, at this time period it is unknown if any studies existed that analyzed REOCs with GARCH models, thus it is hard to know if the results of this study would differ.

5 Conclusions

The REITs have a long and difficult road ahead of them in the European market. In 2019 only 13 out of 28 European countries had such systems in place. In order to persuade the remaining countries to adopt the REIT structure through parliamentary procedures, profound benefits have to be cited. Many authors admit that due to different leverage requirements, REITs were less leveraged than non-REIT companies from 9% to 5.5% in the period of 2012 to 2018. According to economic theory, a company that has a lower debt-to-assets ratio should display smaller deviation in its stock price as it is less impacted by interest rates and abrupt market shocks in its daily operations. Contrary to the latter claim, European REITs exhibited larger volatility compared to non-REIT ranging from 2.4% to 2.47% depending on the chosen time period and on the different study methodology. The European REITs also exhibited different performance results, in the period of 2006 to 2010: they managed to surpass non-REIT returns by 4.4%, while on the holding period of 2006 to 2019 REITs had fallen behind by 15%. REITs were not able to return to the initial 2006 price index level, while non-REITs had considerably surpassed it. A concerning gap between price index splits of REITs and non-REITs emerged in 2018. The trading volume size for REITs was clearly ahead of their competitors by having a larger daily average trading size of 58.97% compared to Non-REITs in the time period of 2012 to 2019, meaning that REITs were a more liquid investment. Also, in the latter time period REITs yielded bigger dividends averaging at 4.6% annually, while non-REITs yielded only 2.75%.

Correlation-wise the REITs and non-REITs showed high co-movement with a Pearson coefficient of 0.85, meaning that they are both closely related, while REITs with the stock market index resulted in 0.7 coefficient. Furthermore, a more advanced analysis of conditional volatility, shock persistency or clustering on the European real estate market has not been found by previous authors. Therefore, by applying a GARCH model it was discovered that European REIT had a higher alfa + beta sum of 0.0212 in the same parameter GJR-GARCH model and that of 0.0463 in a different GJR-GARCH model. Only in the asymmetric coefficient gamma European REITs were superior in being less sensitive to bad news outbreak by having a difference of gamma of 0.0305 in the same parameter GJR-GARCH and that of 0.0724 in a different GJR–GARCH model.

The study concludes that contrary to other authors, this paper opposes the notation that the European REITs indexes were a good diversification strategy for any portfolio. They exhibited higher volatility, did not return to the previous stock index level, gave poorer return to their competitive counterpart (non-REITs), had a higher shock persistency and strong correlation with the stock market index. Although some advantages of REITs over non-REITs were found, such as higher liquidity and stronger resiliency to bad news asymmetry, overall, the European real estate market was very fragile. Possible study nuances could be attributed to the fact that REITs in the European market were still very young, and their establishment came right at the peak of the real estate price bubble. Further investigation should be undertaken if such an effect is found to carry any weight to REIT performance.

Appendix: ARIMA and GARCH Model Results for REITs and Non-REITs

ARIMA models			
Index	European REITs	European Non-REITs	European Non-REITs
Obs	3555	3555	–
Model	ARMA(4, 3)	ARMA(3, 2)	–
Method	MLE	MLE	–
AIC	12269.964	11408.298	–
Parameter	Coefficients	Coefficients	Coefficients
AR(1)	1.4789*** (0.239)	−0.6484*** (0.017)	–
AR(2)	−1.3529*** (0.335)	−0.9445*** (0.012)	–
AR(3)	0.5969* (0.211)	0.0757*** (0.016)	–
AR(4)	−0.0608* (0.021)		–
MA(1)	−1.4213*** (0.238)	0.7234*** (0.002)	–

(continued)

ARIMA models			
Index	European REITs	European Non-REITs	European Non-REITs
MA(2)	1.2654*** (0.319)	0.9965*** (0.003)	–
MA(3)	−0.5357* (0.191)		–
GJR–GARCH models			
Distribution	Standardized student's *t*	Standardized student's *t*	Standardized student's *t*
Method	MLE	MLE	MLE
Model	GJR-GARCH (1,1,1)	GJR-GARCH (1,1,1)	GJR-GARCH (1,1,2)
AIC	10696.6	9769.04	9768.25
Parameter	Coefficients	Coefficients	Coefficients
Omega	0.0236*** (0.00603)	0.0257*** (0.0063)	0.0316*** (00071)
Alpha	0.0452*** (0.01)	0.0257*** (0.0092)	0.0314*** (0.01)
Gamma	0.1133*** (0.002)	0.1438*** (0.023)	0.1858*** (0.029)
Beta(1)	0.8864*** (0.016)	0.8847*** (0.018)	0.5152*** (0.124)
Beta(2)	–	–	0.3387*** (0.119)

Notes: *** Denotes significance levels at 0.01, * at 0.1. Numbers in parenthesis are standard errors

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Part II
Eurasian Economic Perspectives: Game Theory

Investigating Role of Social Value Orientation in Individual's Decision-Making Evidence from the Ultimatum Game

Mostafa Hosseini Deldoost and Mohammad Taghi Saeedi

Abstract In the conventional literature of economics, human preferences are defined based on self-interest and independence from social contexts and norms. In practice, however, human behaviors and actions are seriously influenced by social norms (such as fairness and beliefs) individual's and the mutual behavior of others. Given that people's social values influence the decision-making process, this study aims to investigate individual's social value orientations in hypothetical and real conditions. Therefore, the triple-dominance measure and the ultimatum game were used to determine the social orientation of individuals in hypothetical and real conditions, respectively. In total, 64 students were randomly selected from the faculty of Economics, University of Tabriz, and the required data were collected within two weeks in January 2019. Since the data were not normally distributed, the non-parametric techniques of Chi-square and Wilcoxon were employed to explain the correlation between the research variables. The results showed that the assumptions were very simplistic and misleading in the neoclassical economic paradigm. Individual's personality traits and social value orientations affected their decisions, so that about 75% of people chose the equality strategy, instead of maximizing their self-interest. The results also indicated a significant difference in the strategies and decisions of the proposers in both hypothetical and real conditions. In other words, in addition to self-interest, the behavior and action of the dividers in the ultimatum game were a function of personality and environmental factors.

Keywords Behavioral economics · Ultimatum game · Social value orientation · Hypothetical bias · Real conditions

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1 Introduction

Many economic theories are based on the concept of rational choice, which is manifested as the economic man. The main characteristic of a *Homo economicus* is to maximize pleasure and minimize pain. Based on these theories, it is assumed that the economic man is isolated from the society, like Robinson Crusoe; it does not matter what the source of his/her preferences and choices is or how valuable they are, the important point is to maximize his/her self-interests (Robbins 1935). Considering this concept and according to the rational choice theory, Individuals in any situation choose the option that best suits them based on their self-interests (Green 2002). Accordingly, neoclassical economic theories define themselves as anti-behavioral, so that in most of these theories, cognitive studies and social psychology have no place and human beings always act in such a way that suits best to them in all circumstances (Mullainathan and Thaler 2000).

Since simplifications such as frictionless over ground or neglecting air resistance in the exact sciences, like physics, have sometimes led to dramatic progress in natural sciences, conventional economics has also sought to simplify and present an ideal type by introducing the rational man in accordance with natural sciences. Therefore, it has led scholars of the classical school, especially the neoclassical school, to build abstract economic models independent from values and unrelated to other social sciences, such as psychology; in these models, only the relationship between human and goods, and not the relationship between human and human, is considered.

In the neoclassical economic paradigm, assumptions are very simplistic and too far from reality. For example, the assumption of the *Homo economicus* rational behavior is a simple one. Among various definitions and justifications, this assumption provides a powerful analytical framework for analyzing human behaviors. According to psychological studies, not only self-interests, but also social conditions and beliefs, affect one's decisions. Keynes argued that in order to find a complete solution to economic problems, one cannot rely entirely on economic considerations, but also on ethical and social considerations that go beyond economics. Interdisciplinary studies such as economics, cognitive science, and psychology using laboratory methods confirm the effect of cognitive and emotional variables on people's decision-making process (Sanfey et al. 2003). In this regard, behavioral economics uses the theories of economics, psychology, and cognitive sciences to investigate how people make decisions in the real world. Decision-making in risky situations and behavioral games such as the ultimatum game or Allais paradox indicates a violation of the selection mechanism based on the von Neumann-Morgenstern expected utility and, in general, human rational behavior is defined in the neoclassical school and game theory.

The impact of various factors (other than self-interest) on individual's behaviors has been studied in different frameworks (Balliet et al. 2009; Bieleke et al. 2016; Bogaert et al. 2008; Fiedler et al. 2013; Gärling et al. 2003; Gong and Sanfey 2017; Joireman et al. 2003; Mavrodiev et al. 2013; McClintock and Allison 1989; van

Dolen et al. 2012). The theory of social value orientation (SVO) is one of the frameworks proposed in these studies. According to this theory, people do not make decisions only based on the same criteria such as self-interests when evaluating resource allocation between themselves and others, but also on different motivations, goals, and values (Murphy et al. 2011).

SVO is defined as a personal trait, reflecting how people deal with social I liked this word. In this regard, researchers define SVO in three ways (prosocial orientation, individualistic orientation, and competitive orientation). Prosocialists or egalitarian are those who try to maximize their own and others' self-interests in dealing with social issues; individualists are those who simply seek to maximize their own achievements when facing social issues, regardless of the achievements of others, they neither assist nor interfere; ultimately, competitive people are those who always seek to maximize the difference in achievement between themselves and others in their favor (Wei et al. 2016). Individual's social values are considered to be the strongest social element influencing human behaviors due to their effect on human orientations, actions, and interactions. The concept of justice has an important and prominent role among social values that affect individual and social actions. This important and challenging concept in economic exchanges is usually defined as the proper distribution of different types of goods between two people (Tabibnia et al. 2008).

In this regard, behavioral games prove that players care not only about self-interest, but also about fair treatment mutually (Akerlof and Kranton 2010). In bargaining games, people behave differently in sharing interests. Theoretically, these behaviors can be classified into two categories: In the first perspective, researchers believe that people behave rationally and act in their own self-interests (utility is merely a function of self-interest). According to the second perspective, people's evaluation of utility is not only a function of self-interest, but also the concept of fairness and social considerations affect the utility resulting from distribution (Karagonlar and Kuhlman 2013).

According to the proposed theory, people have different orientations based on their personal values. The existence or effect of these orientations on human behaviors has been investigated by researchers in various studies. In this regard, new studies in the field of laboratory economics show that not only social values affect people's behavior, but also the impact of these values on people's behavior is different in hypothetical and real conditions (FeldmanHall et al. 2012; Grebitus et al. 2013; Vlaev 2012). Neuroscientists have also differentiated between behavior and the brain when making actual and hypothetical choices, depending on the intensity of neural activation (Camerer and Mobbs 2017) According to the results, people generally do not behave in the same way when dealing with social issues in real and hypothetical situations. Previous studies have focused on contingent valuation and questioning individuals about their willingness to pay deal with environmental issues (Diamond and Hausman 1994; Loomes 2006), which have generally been exaggerated. This dual behavior in hypothetical and real conditions is called hypothetical bias, which can be objectively reflected in social psychology in the social

orientation of individuals in terms of exposing their preferences and sharing interests between themselves and others (Van Vugt et al. 1995).

Behavioral economics researchers such as (Kahneman et al. 1982), (Thaler 1980), and (Camerer and Loewenstein 2004) have criticized the ideas of conventional economics as psychologically unrealistic principles. These researchers use laboratory and experimental methods to directly observe and test economic phenomena and behaviors in a controlled setting. These experiments make it possible to draw clear inferences about human behaviors, most of which are not possible outside the laboratory. However, laboratory economics has limitations for its validity. The most important critique of the artificial behavior of participants and even their incorrect answers to the questions posed was made by (Wallis and Friedman 1942). Therefore, it is necessary for researchers to use appropriate tools to gain the trust of the participants regarding the occurrence of real behaviors.

In recent decades, a relatively large number of experimental studies have been conducted on behavioral games such as ultimatum and dictator games. Some of these studies have examined players' behavioral changes as the total stake increases. In general, some have found that increasing the total stake can be effective in changing the behavior of at least one group of players, while a number of studies have not provided acceptable evidence for the relationship between these two variables. (Cameron 1999) reviewed several economic experiments. By reviewing the sections of bargaining games, such as the ultimatum game, they examined the relationship between increasing the total stake and the behavior of players. They found that increasing the total stake in the ultimatum game had a slight effect on the behavioral change of the players; however, this change in the dictator game led to a decrease in the fairness[1] of the proposers.

(Hoffman et al. 1996) examined the relationship between players' behavior and increased total stake from $10 to $100 by conducting the ultimatum game involving 98 pairs of players. They found that increasing the total stake had no significant effect on the share of offers. They also reported that as the total stake increased, the rate of rejected offers by responders decreased significantly, representing those responders were willing to accept more unfair offers for higher amounts of money.

These results were somewhat similar to the results obtained by (Cameron 1999) in Indonesia, (Munier and Zaharia 2002) in France and Romania, and (Slonim and Ruth 1998) in Slovakia. Cameron (1999) increased the total amount of money by about three times of the average monthly expenses of the participants. Their findings showed no correlation between the total amount of money and the offered amount. Similarly, Munier and Zaharia played the game for $7 and $360 with students from France and Romania. Their findings also demonstrated no correlation between the offered amount and the increase in the total amount of money. Slonim and Ruth played this game for about $50 with students from the Slovak Republic. Despite the differences in the total amount of money, the offered amounts were almost at the

[1]The term "fairness" and "justice" are used interchangeably in this paper.

same level: 42% in Indonesia, 43% in France, 37% in Romania, and 43% in Slovakia.

One possible explanation for the relatively fair behavior of proposers could be that they are aware of the responders' sensitivity to unfair offers and, considering the risk of rejecting such offers, they behave more cautiously (Holt and Laury 2002; Prasnikar and Roth 1992). According to Robbins (1935), the number of responders who wanted to punish a player with unfair offers or to lose a game's payoff decreased as the total amount of money increased.

Andersen et al. (2011) found a significant relationship between the increase in the total stake and the change in the behavior of both groups of proposers and responders in the northeastern region of India. Bechler et al. (2015) also reported the same relationship in the ultimatum and dictator games.

The main focus of the present study is on analyzing the behavior of the proposers, but the behavior of the responders in a particular condition is also examined. This study aims to investigate people's SVOs in real and hypothetical conditions. Therefore, laboratory economics techniques were used to explain the differences in decision-making under the influence of SVO in real and hypothetical conditions. Accordingly, the triple-dominance measure (Van Lange et al. 2007), and the ultimatum game were employed to determine SVOs in hypothetical and real conditions, respectively. The difference between this study and previous works is that, in this study, people's SVO was first determined in hypothetical conditions, and then, to determine the behavior of players in real conditions, the ultimatum game was performed in two states, whether the divided amount of money was already specified or not specified. To achieve the objectives of the research, the following questions are raised:

1. Does the proposer adopt the same behavior and strategy in the ultimatum game in hypothetical and real conditions, whether the total amount of money is specified or not? In other words, do people have different SVOs in hypothetical and real conditions, whether the total amount of money is specified or not?
2. Does the proposer in the ultimatum game make the same offers when they are aware of the total amount of money or not? In other words, can the total amount of money that should be divided lead to different decisions by the proposer?

And final question addressed in this research is does proposer's SVO predict the decisions one makes in an ultimatum game?

The paper is structured as follows; in the first section, the theoretical foundations is presented. In the following methodology and data collection are presented in the next section results of the experiments are discussed. The paper ends with a discussion and conclusion.

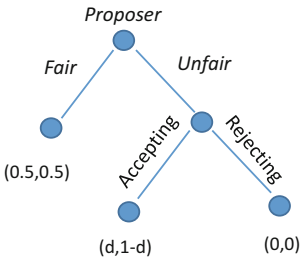

Fig. 1 Schematics of the ultimatum game. (Source: Authors own study)

2 Theoretical Foundations

The ultimatum game is a well-known one-shot anonymous sequential bargaining game introduced by Güth et al. (1982), in which there is an amount of money and two players. In this game, the first player, called the "proposer," divides an amount of money between him/herself and the other person $d \in \langle 0, 1 \rangle$ (who is usually unknown to the divider). Then, the proposer makes an offer to the second player, called the "responder," who has the right to either reject or accept it. If the responder accepts the offer, the amount of money specified by the proposer will be divided; but if the responder rejects the offer, neither player receives any money (Güth et al. 1982). In the literature of laboratory economics, there is another game similar to the ultimatum called dictator game; the main difference between these two games is in giving the responder the right to choose. In the dictator game, unlike the ultimatum game, the responder should accept the division offer, which can be either fair or unfair, without any right to choose. The schematics of the ultimatum game can be shown as Fig. 1.

A concept called "Nash equilibrium" is used to predict the behavior of players in the game theory. This equilibrium reflects the best response to the opponent's strategy, so that none of the players are motivated to deviate from this point. The proposer divides the money as (1-d, d). Accordingly, different modes of the ultimatum game based on Nash Equilibria are as follows:

1. The proposer makes a fair offer; the responder only accepts fair offers.
2. The proposer makes an unfair offer; the responder would only accept that unfair offer.
3. The proposer makes an unfair offer; the responder can accept any unfair offer.

Backward induction technique determines the optimal strategy of the player who the make last move in the game. Following the prediction of the perfect sub game Nash equilibrium (PSNE), And according to the rational solution, the proposer should offer the least amount to the responder and he accepts it, because based on the economics literature, more delete is preferred to less. The experience of empirical research and facts observed in different societies has shown that people's behaviors are different from the behaviors of a player described in the game theory. In other words, based on the utility function, people consider not only their self-interests, but also the influence of choices on the utility of other people. According to the above

studies, the Nash equilibrium is not established, and the strategy of the players is a function of their individual and social conditions in different conditions of the ultimatum game. Generally, the proposer offers about 35–50% of the total amount and the responder rejects offers which are less than 30%. The reason for this can be explained by the concept of sensitivity to equality between the two players.

3 Methodology and Data Collection

Prior to commencing the study, ethical clearance was sought from the local ethics committee. 1Participants were asked to fill out and sign the consent form before the experiment. Sixty-four students were recruited from the pool of economics undergraduate students at the University of Tabriz and the interactions were anonymous. It should be noted that none of the students were familiar with the ultimatum game and the rules governing it, as well as the social orientation questionnaire. This study was conducted in two stages. In the first stage, after explaining the triple-dominance measure, the participants were asked to answer the questions to find out their SVO in the hypothetical conditions and their information was then recorded. They were also asked to cooperate in the second stage of the study two weeks later. The reason for conducting the study in two stages was to avoid letting players remember their social orientation choices in the first stage, i.e., for example, if a person introduced him/herself as a proponent of equality, she/he was more likely to follow his/her past choice when she/he wanted to make a real choice.

In the second stage, the proposers and responders were randomly assigned, the rules of the game were explained to both groups separately, and their questions were answered. The proposers were first asked to divide an uncertain amount of money between themselves and the responders who did not know them; then, their division offers were recorded. Next, they were given IRR 200,000 (approximately 5 dollars) and asked to allocate a share of it to another person sitting in the next room. That division offer was calculated in percentage and stated to the responders. At the end of the experiment, eligible participants were compensated for their time and they received a gift card for lab visit as well as the payoff from the bargaining game. All data were entered into SPSS (version 25.0) and the normality test was performed for response variables of the percentage of the total amount divided by the proposer in cases of being either aware or not aware of the total amount. Since the normal distribution was rejected, Wilcoxon and Chi-square non-parametric tests were inevitably used.

4 Results

The Fig. 2 shows the proposers' offers in two real conditions of being aware and not aware of the amount of money.

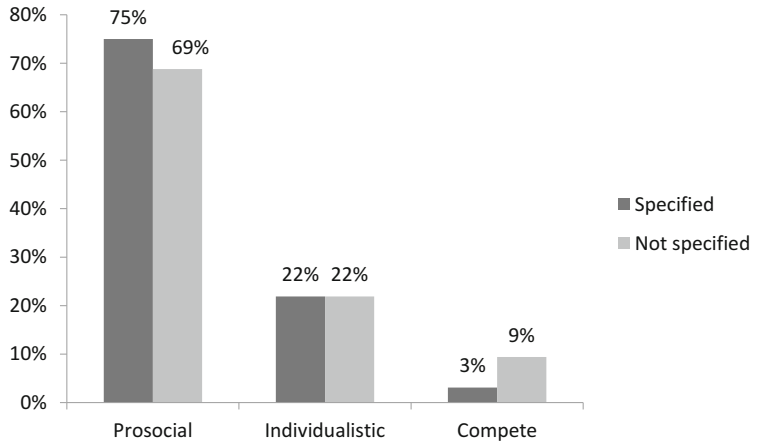

Fig. 2 Proposers social value orientations in real conditions. (Source: Authors own study)

As can be seen in Fig. 2, most of the proposers chose the equality strategy, indicating the significance of fairness among the students of the Faculty of Economics, University of Tabriz. This is in line with previous findings on the fair division offers by the majority of the proposers. The following analyses were done to answer the research questions.

To answer the first question, the hypothesis of the difference in the proposer's behavior was examined. For this purpose, the proposer's strategy was first investigated in hypothetical and real conditions when she/he was not aware of the total amount of money. Results of Chi-square test with $\chi^2 = 10.028$, $df = 4$, $p_{\text{value}} = 0.040 < 0.05$ indicated that the null hypothesis was rejected, assuming that when the proposer was not aware of the total amount, there was no significant difference between division offers in the real and hypothetical conditions at the significance level of 0.05. In other words, the proposer's strategy differed in the hypothetical and real conditions when she/he was not aware of the total amount.

Then, the proposer's strategy was investigated in hypothetical and real conditions when she/he was aware of the total amount of money. Results of Chi-square test with $\chi^2 = 32.886$, $df = 4$, $p_{\text{value}} = 0.000 < 0.05$ indicated that the null hypothesis was rejected, assuming that when the proposer was aware of the total amount, there was no significant difference between division offers in the real and hypothetical conditions at the significance level of 0.05. In other words, the proposer's strategy differed in the hypothetical and real conditions when she/he was aware of the total amount. The results represented that their SVOs and actions in real and hypothetical conditions were different and can lead to different decisions by them.

The next question of the study examined the proposer's strategy in real condition whether she/he was aware or unaware of the total amount, for which the Wilcoxon test was used. According to the results of the Wilcoxon test with $Z = -2.090$ and $P_{\text{value}} = 0.037 < 0.05$, the null hypothesis was rejected at the significance level of 0.05, indicating that that the proposer's strategy was different whether she/he was

Table 1 Results obtained from testing the hypotheses

Conditions for testing the hypothesis	Statistics	*df*	$p_{-\text{value}}$
Hypothetical and real conditions—Unaware of the total amount	$\chi^2 = 10.028$	4	0.040
Hypothetical and real conditions—Aware of the total amount	$\chi^2 = 32.886$	4	0.000
Real condition—Aware and unaware of the total amount	Wilcoxon $Z = -2.090$	–	0.037

Source: Authors' own study

aware or unaware of the total amount. In other words, the proposer's strategy and social behavior were a function of the total amount of money.

The responders' behavior and strategy of accepting or not accepting the offered amount was another question that was examined using Fisher's exact test.

According to the test results ($P_{\text{value}} = 0.625 > 0.05$), the null hypothesis was not rejected at the significance level of 0.05, indicating that the responder's strategy when she/he was aware of the total amount was not different from his/her strategy when she/he was not aware of that, and the criterion for their decision on whether or not to accept was a function of the amount allocated by the proposers. The summary of the test results of the hypotheses is shown in Table 1.

5 Discussion and Conclusion

Perfect rationality is one of the most important and fundamental principles of classical and neoclassical economic theories. According to this principle, people in any situation choose the option that best suits them based on their self-interests, regardless of environmental factors. However, based on new findings in the field of laboratory economics, human decisions make sense in the social structure and these decisions are the result of not only economic components, but also social considerations and individual characteristics that have received less attention in Orthodox economics.

In this study, the participants' decisions were examined in hypothetical and real conditions using the ultimatum game. To the best of our knowledge, this study was conducted for the first time in Iran, because the researchers did not find any relevant literature in this regard. Also, according to the participants, none of them had the experience of participating in such a test.

The first research question was about the compatibility of the proposer's behavior and strategy on how to divide the money into hypothetical and real conditions. This question was tested in two states of whether the amount of money was specified or not. The test results showed that people behaved differently based on their SVOs in hypothetical and real conditions. In other words, people had hypothetical bias.

Regarding the second research question that whether the proposers' offers under real conditions can be a function of the total amount of money or not, the results of

data analysis showed that this variable was important and effective. In other words, the proposer's behavior and SVO were a function of the total amount of money divided.

The behavior of responders, whether being aware or not of the total amount of money, was not significant. The criterion for accepting or rejecting the offers was the amount of money offered by the proposers. In general, it can be concluded that the decision-making process is very complex and factors such as personality traits as well as environmental variables play a significant role in this process.

It should be noted that, in addition to the advantages of experimental and laboratory economics, such as direct testing of economic behavior, economic efficiency of instruments, and reliability of tests, some of the limitations of this method should also be considered. For example, people who are tested know that they are being monitored and all their actions are being recorded, so they may exhibit false behaviors or even answer the questions incorrectly.

Therefore, researchers in this field should be careful in generalizing the laboratory results to real conditions. In other words, those who participate in the study may not show their real behavior according to some considerations, so the researcher should ask the participants to express their real and desired behaviors by creating the necessary grounds for them.

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Cooperation in Three-Players Sequential Games: A Pilot Experiment

Stefano Pagliarani

Abstract Cooperation has been the focus of many experimental articles in economics, due to its importance in evolutionary and social issues. The existing studies mostly focus on sequential games with two players, or on simultaneous games with more than two players. Little attention has been devoted to the study of sequential games with more than two players. The pilot experiment presented here aims at exploring this untouched area, focusing on a simple cooperation game with three players in a sequential setting. The results show that, contrary to theoretical predictions, players are willing to cooperate in a substantial way, even without individual incentives to do so. Moreover, indirect reciprocity assumes some significance, even if its effects cannot be fully determined from the gathered data. Though these results do not allow to draw any clear-cut conclusion by themselves, they could represent a good starting point for future research on this topic.

Keywords Cooperation · Reciprocity · Game theory · Experimental economics

1 Introduction

Cooperation is a basic human interaction, with fundamental implications in social and evolutionary terms. In many real-life situations, individuals face choices that make cooperation more efficient as compared to defection, but without any private incentive to behave kindly towards others (Kollock 1998). This kind of situation, modelled in the so-called Prisoner's dilemma (Dixit et al. 2010), has been widely studied by the experimental literature, which has mostly shown how individuals tend not to follow theoretical predictions and to behave cooperatively to a certain extent. The main studies about experimental tests of the Prisoner's dilemma include Kreps et al. (1982), Andreoni and Miller (1993) and Cooper et al. (1996): all of them show

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how a basic[1] play of such a game makes individuals more cooperative than what the theory predicts.

The standard form of the Prisoner's dilemma includes two players and a simultaneous choice. Sequential versions of this game have been the core of Clark and Sefton (2001) and Ahn et al. (2006). They show how cooperation can still be sustained, even though incentives do not change as compared to the simultaneous version of the game. Bilateral exchanges with a similar structure have also been analyzed by Lensberg and Van der Heijden (1998), who show how the willingness to be cooperative is affected by information on the previous behaviour of the receivers of cooperation.

Simultaneous cooperation games with more than two players have been studied by mainly in terms of public goods games (experimentally studied, among others, by Fischbacher et al. (2001)), who again show a substantial failure of the theoretical predictions for this kind of games. Little attention has been devoted up to now to sequential cooperation games with more than two players. In fact, in real-life situations, players are usually more than two—actually almost infinite, when it comes to the possible interactions of a single individual—and interactions are sequential, though not iterated. Nevertheless, only a few existing studies take into account the level of cooperation in sequential games with more than two players.

The first is Van der Heijden et al. (1998a), which shows that in iterated versions of a simple overlapping generations game (with the possibility of choosing how to allocate consumption among different periods of one's lifetime) leads the player to a substantial level of cooperation, even in absence of individual incentives to behave kindly towards others. The second is Offerman et al. (2001), who shows that a significant share of players chooses a cooperative option, when faced with the possibility of a deception alternative—again, without having personal incentives to behave cooperatively towards others. In this article, it is also shown that unconditional strategies (such as cooperating or defecting in any case, irrespectively of what others do) tend to be followed quite significantly by players in these kinds of games.

These articles, though relevant in the study of the topic of cooperation, lack some important features. The study by Van der Heijden et al. (1998a) is based on an overlapping generations model and studies transfers among players, but is not 'simple' enough to allow to conclude what is the pure level of cooperation that can be sustained among players. In fact, in this game can transfer part of their endowment in a sequential setting, the interaction is repeated, which is a feature not necessarily present in real-life situations. Offerman et al. (2001) is more focused on the issue of cooperation when the game is sequential and interactions are not repeated, but in the setting of their game, the authors only allow for binary choices between full cooperation and no cooperation at all. This does not allow to conclude what is the level of cooperation that agents are willing to sustain when able to choose it in a continuous set of choices.

[1] 'Basic' here meaning that it is without iterations and without any additional feature, such as communication or some type of institution.

For these reasons, the game proposed here has some different features which can allow for a better understanding of this issue. In this respect, it resembles the experimental structure of Van der Heijden et al. (1998b), who study the amount of cooperation and the existence of reciprocity in a pension game. The structure differs in some aspects: a lower number of players for each group, and the possibility of ending up with no payoff. Moreover, the game proposed here presents a 'circular' structure which is absent in Van der Heijden et al. (1998b), and which may affect the experimental results.

The aim of both these experiments is to address an issue that has been studied extensively in theoretical terms, but which does not have similar coverage in experimental terms (Lucas 1986), which is the role of intergenerational transfers and how trust can affect them. The theoretical basis for intergenerational transfers has been framed by Samuelson (1958), in which the basic Overlapping Generations (OLG) model was considered. This model has been largely used to analyze different pension schemes, as well as to compare different forms of intergenerational transfers (Champ and Freeman 2001) and the effects of monetary institutions on them (Balasko and Shell 1980).

From the results of the pilot experiment presented here, it can be seen how a significant (although not fully efficient) level of cooperation can be achieved in an intertemporal setting. Moreover, indirect reciprocity appears to be relevant to some extent. The article proceeds as follows: Sect. 2 is devoted to the theoretical analysis of the model on which the experiments are based on, Sect. 3 presents the experimental design, after which Sect. 4 is devoted to the analysis of the results, Sect. 5 concludes. The appendix includes the experimental instructions for the test presented in Sect. 3.

2 The Basic Model

The Overlapping Generations model (OLG) was first described by Samuelson (1958). It has then been used widely to describe economies in which agents have finite lives which overlap with one another, while the economy as a whole is infinite. One of its main functions is to assess the impact of pension schemes on the efficiency of the economy and on individual choices of consumption (Fig. 1). In the most simplified version of the model, agents live for two periods in the economy: Young (Y) and Old (O). Each generation of agents has an overlapping with another: at every time t, the economy is composed of a generation which is Young and a generation which is Old. Agents are willing to maximize their lifetime utility by smoothing consumption between the two periods of life, trading goods with other agents from different generations.

In theory, in such a framework intergenerational transfers are not possible, as each individual does not have any incentive to trust others and trade goods when Young, as she has no guarantee that someone else will trade with her when she is Old

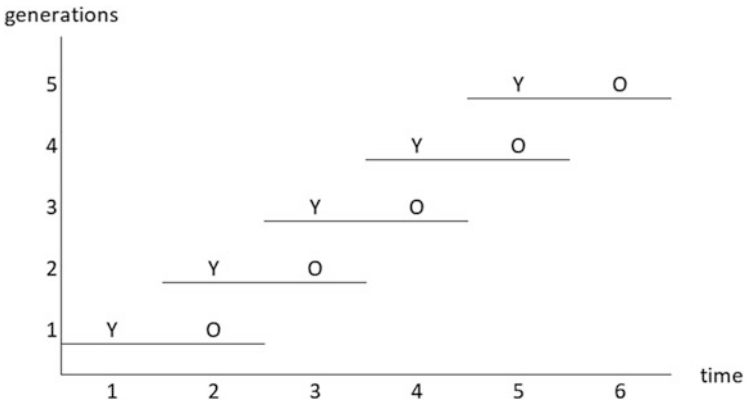

Fig. 1 The structure of the OLG model. (Source: Developed by the author)

(Balasko and Shell 1980). To allow for trade, guarantees such as money should be introduced in the economy (Balasko and Shell 1981).

In terms of cooperation, the most basic version of the OLG model has each agent to decide how much to pass to an Old agent when Young, and to receive something from a Young agent when Old. This simplified version of the model resembles a basic pension system, in which one pays contributions when in her working age in order to receive a pension when retired. In the absence of a punishing government, incentives for cooperation are lacking: for each agent, it is better not to pass anything, as there is no certainty about what will be received in the future. At the same time, cooperation would lead to higher payoffs for everyone, given that by trading among generations everyone's utility would be increased by the smoothed consumption.

The situation for each agent resembles a sequential version of the Prisoner's dilemma, in which one has to decide whether or not to cooperate not knowing whether the other player (which is the agent in the subsequent generation) will cooperate as well. Moreover, as the lifetime of the agent in the economy does not allow for iteration of choices, there is no possibility of building a reputation or punishing the defective behaviour of other agents.

The existence of trust among players is also affected by the impossibility of directly reciprocating one's kindness: each agent contributes to the preceding one, but receives her 'pension' from the subsequent one. Reciprocity can only be indirect: Even though it has been claimed that this should not be detrimental to cooperation levels (Rand and Nowak 2013), it has been shown that even direct reciprocity is not significantly sustained if not properly incentivized at the individual level (Clark and Sefton 2001).

The pilot experiment described below is loosely based on the OLG model, with a few adjustments needed to be able to run the test in the laboratory. In this game, the

setting is framed in order to have subjects playing a simple pension game, in which they 'contribute today to be paid tomorrow'.[2] Even though such a setting may be too simplified to draw any significant conclusion about real-world pension schemes (or other real-life situations), it still allows to make some claims about cooperation in an intertemporal setting, which is something that the existing literature lacks as such.

3 Experimental Setting

The experimental setting aims at answering two main questions. The first one is whether or not players do cooperate in an intertemporal setting. Payoffs are designed as to make cooperation Pareto-superior to defection, but without any personal incentive to choose it (in a Prisoner dilemma-like situation). Therefore, there should be no cooperation observed: nobody has any interest in being kind to others, even though if everyone behaves cooperatively there would be a higher payoff for all the players.

The second question addressed by the experiment is whether indirect reciprocity plays a role in shaping individual choices. Though what other players do should be of no interest, especially if actions do not directly affect one's payoff, knowing that someone else has been kind to others may lead in turn to be more cooperative towards him. Together with the level of cooperation, the effect of indirect reciprocity is the focus of the pilot experiment.

3.1 Laboratory Setup

In this experiment, participants are divided into groups of three players, without knowing who the members of the group are. Members of each group are then ordered in a sequence, and labelled as Player 1, Player 2 and Player 3. Each group then plays the same game, without any interaction among groups. In each group, players are endowed with 10 Monetary Units (referred to as MU from now on). Players can decide whether to pass a share of their endowment or not to other players, with each transfer of money being multiplied by the experimenter in order to make cooperation convenient: the coefficient by which each sum transferred is multiplied is 1.5. Player 1 can put a share of her endowment in a fund. The sum in the fund (equal to the share passed times the coefficient) is then received by Player 3. Player 2 can then choose the share of her endowment to be passed to Player 1; Player 3 does the same with Player 2. This structure allows to have a circular setting

[2]This follows the basic structure of a simple pension scheme, in which an individual pays a contribution when Young in order to receive the pension when Old.

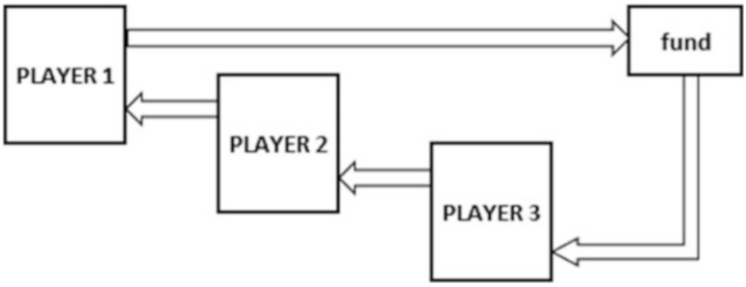

Fig. 2 The structure of the game (author). (Source: Developed by the author)

in which money can be transferred among players, but still maintaining a sequential structure in the game (Fig. 2).

It can be seen that, due to the coefficient which multiplies any amount of the endowment which is transferred, cooperation leads to higher payoffs for each player. At the same time, as players have to decide how much to pass before knowing whether they will receive something (Player 3 has no knowledge of an eventual sum of money existing in the fund), they do not have any incentive to be cooperative: being selfish is a dominant strategy for everyone.

In addition, Player 2 and 3 have the information about the choice made by the previous player in the sequence. Strictly speaking, this knowledge is of no interest, as each player's payoffs are determined by what the following—and not the preceding—player does. Nevertheless, giving players this information allows to check for the role played by indirect reciprocity.

4 Results

The relevant results of this pilot experiment are the level of cooperation sustained by players and the eventual existence of indirect reciprocity as a significant factor affecting contributions. Both aspects show a shift from theoretical predictions. The pilot experiment was conducted with 38 students from the University of Milan (one additional experimenter played as well, in order to complete the existing groups). The experiment was programmed and conducted with the experiment software z-Tree (Fischbacher 2007).

As for cooperation (Table 1), almost every player decided to pass at least some part of her endowment in the game. Subjects who took part in the game as Player 1 passed on average 3.75 MU, with a minimum of 2 and a maximum of 7. Player 2s were on average more generous, with a mean contribution of 3.85 MU; in this case, the minimum was 0 and the maximum was 6. Player 3s were the most selfish in the game: average contributions were 3.08 MU, with a minimum of 0 and a maximum of 7. In general, almost all the participants in the experiment showed a relevant degree

Table 1 The data on cooperation

	n	Average	Min	Max
Player 1	12	3.75	2	7
Player 2	13	3.85	0	6
Player 3	13	3.08	0	7

Source: Developed by the author

Table 2 The OLS for indirect reciprocity

Model 1: OLS, using observations 1–13			
Dependent variable: ContributionPlayer2			
ContributionPlayer1	Coefficient	Standard error	*p*-value
	0.168539	0.425505	0.7004
Dependent variable: ContributionPlayer3			
ContributionPlayer2	Coefficient	Standard error	*p*-value
	0.555351	0.238397	0.0399**

** indicates 95% significance
Source: Developed by the author

of cooperation, given that the endowment was 10 MU: All the types of players passed on average more than 30% of it.

In terms of reciprocity, the contributions of each player were linearly regressed with the ones of the players that followed in the sequence. The resulting coefficient is positive and with a value of 0.41 (significant at the 90% level). When the regression is divided between kinds of players, the results are mixed—see Table 2—and need some further considerations.

It can be seen that only one of the two coefficients is significant: the one which correlates the contribution of Player 3 with the one of Player 2. The coefficient is significant at the 95% level, and with a magnitude of more than half a point. This result is interesting in terms of defining indirect reciprocity and shows a significant relation (not necessarily causal, though) between the two variables. At the same time, nevertheless, the coefficient of the correlation between the contribution of Player 2 and the one of Player 1 is not significant; moreover, it has a magnitude much closer to zero than before.

It can be said that Player 1 does not directly pass anything to someone before (she puts money in a fund, which is later received by Player 3), and therefore that Player 2s may not be willing to reciprocate a behaviour that is different from theirs. Moreover, being Player 2s in the middle of the sequence, their choice—and therefore the second coefficient, the significant one—can be seen as the most representative in terms of intertemporal choice.

The difference between the coefficients can also be explained by the difference in general levels of contributions between the types of players. By running a non-parametric test for the difference between the level of contributions (Table 3), it can be seen that Player 2s were the most generous. The higher selfishness observed in Player 3s can be attributed to the fact that this particular player does not have any followers in the sequence: this means that nobody in the game observes her

Table 3 The non-parametric test for the levels of contribution

Test for difference between
ContributionPlayer1 and ContributionPlayer2
Number of differences: $n = 9$
Number of cases with ContributionPlayer1>ContributionPlayer2: $w = 4$ (44.44%)
ContributionPlayer2 and ContributionPlayer3
Number of differences: $n = 12$
Number of cases with ContributionPlayer2>ContributionPlayer3: $w = 10$ (83.33%)

Source: Developed by the author

contributions, and therefore she cannot be judged by someone else's evaluation. This may have led participants playing as Player 3 to be less cooperative than the others.

When compared to the result of the existing literature, the findings of this pilot experiment show two main tendencies. The first is relative to cooperation, which—although far from the most efficient level—is also significantly far from the theoretical predictions, more than in previous experiments with a similar structure (such as Van der Heijden et al. 1998b). This may be due to the non-binary nature of the available alternatives, which allow to choose how much to cooperate. The second result, the one related to reciprocity, shows that indeed it appears to be present to some extent. This confirms the existing claims about the existence of it in shaping individual cooperative choices, and it appears to be more relevant than in Van der Heijden et al. (1998b), where almost no evidence of reciprocity appeared to exist.

Nevertheless, it should also be said that the results of the regression between the levels of contribution show that reciprocity does not seem to be too strong a factor. It cannot be strictly concluded that there is a significant effect of indirect reciprocity for all the players in the game. In order to assess its impact, it may be useful to run a more solid test to check for its significance.

5 Conclusions

The results of this pilot experiment are generally mixed. As a pilot experiment, it is not possible to derive any clear-cut conclusion from it as such, but the results allow to claim that variations of the game proposed here can be developed and tested in the laboratory. On one hand, the level of cooperation achieved by players is far from the theoretical predictions. Instead of being fully selfish, as the optimal strategy would indicate, players have been significantly cooperative with each other. In such an OLG setting, with no repetition of the game and without any form of the institution against other's defection, these results can be a starting point for future research on the topic of intertemporal cooperation. Different treatments can be applied, and the game as such can also be run again: possibilities include longer sequences of players,

the removal of the fund (and simply having a line of players without circularity), or the presence of different institutions present in the game.

In terms of the effect of indirect reciprocity, results are more mixed. In fact, the two regressions between the contribution levels of different players show different magnitudes and do not share the same significance level (one of the two is not significant at all). From these results, it can be concluded that indirect reciprocity does not appear to have a significant effect on individual choices. At the same time, given the existing literature on the same topic (such as, for instance, Nowak and Sigmund (1998) and Leimar and Hammerstein (2001)), it may be safer to say that this pilot experiment lacks a sufficient structure to make strong claims about indirect reciprocity. Also on this, a few developments are possible, in order to better assess the real impact of reciprocity on individual behaviour.

Acknowledgements This article is based on an experiment that was run for my master's final dissertation: I would like to thank prof. Antonio Filippin for his supervision. I also thank the participants of the 31st EBES Conference for their comments on this article.

Appendix: Experimental Instructions

In this experiment, you will be divided into groups of three players. In every group, the components will be ordered in a sequence and labelled as Player 1, Player 2, and Player 3. Each group is independent from all the others. Each player will be endowed with 10 Monetary Units. You can see the structure of the game in the picture [Fig. 2 is shown]. You will play the game only once.

The choice for Player 1 in each sequence will be how much of her endowment to put in a fund, which will multiply the sum by a factor of 1.5. The amount of the fund will then be received by the last player in the sequence of the group, namely Player 3. The choice for Player 2 and Player 3 in each sequence will be how much of their endowment to pass to the player who is before them in the sequence (so Player 2 passes it to Player 1, and receives it from Player 3), knowing that any amount passed is multiplied by a factor of 1.5. You will also see if the previous player in the sequence has passed some money, or put some money in the fund (if Player 1), and eventually how much. The payoff of Player 1 in each sequence will be equal to the amount she does not put in the fund, plus the money eventually received from Player 2. The payoff of Player 2 will be equal to the amount not passed to Player 1, plus the amount eventually received from Player 3. The payoff of Player 3 will be equal to the amount which she does not pass to Player 2, plus the amount money eventually present in the fund.

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Part III
Eurasian Economic Perspectives: Public Economics

Manifestations of Subnational Fiscal Federalism in Lithuanian Local Self-governments

Dalia Rudytė, Solveiga Skunčikienė, and Inga Maksvytienė

Abstract The manifestations of fiscal federalism are analyzed at the subnational level in order to enhance the fiscal capability of municipalities. However, the municipalities usually lack the incentive to compete when providing packages of public services to the public as the revenue of municipalities is restricted by national level laws and remains highly dependent on government grants. The aim of this article is to determine the manifestations of the theory of fiscal federalism when assessing the fiscal capability of municipalities. The analysis of Lithuanian municipalities' data for the five-year period reveals the municipal level situation. Research methods include the analysis of legislation and statistical data, content analysis, and cluster analysis. It has been found that there is no clear agreement at the interinstitutional level (from the highest to municipal level). Fiscal competition among the municipalities leads to a more efficient distribution of funds which can also have a positive impact on regional economic growth in the long term. Insufficient data at self-government level is a precondition for further separation among municipalities as rich municipalities keep getting richer while economically weak municipalities keep getting poorer.

Keywords Fiscal federalism · Municipal function · Subnational level

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1 Introduction

In the recent period, a decentralization trend has shown up in most of the world's countries that manifest independently both of federal or unitary type and of the economic development of a country. It is noted that although in the twentieth century public governments of a large number of countries played a crucial role in all public administration matters, this started to change in the second half of the century. Fiscal decentralization is one of those processes which are developed with the aim to improve the functioning of the public sector. Decentralization of the public sector influences economic efficiency by facilitating the provision of such public services that best meet the needs of residents.

Scientific novelty and relevance of this article are reflected by the fact that although the scientific literature devotes considerable attention to the topic of fiscal decentralization, there is still a lack of studies that analyze the issue of the fiscal capability of municipalities to provide public services and especially so in Lithuania.

The theory of fiscal decentralization is analyzed by several researchers such as Tanzi (1996), Bird et al. (2003), Weingast (2014), Shah (2016), Sorens (2017). The topic of fiscal decentralization in Lithuania is examined by Baltušnikienė and Astrauskas (2009), Davulis et al. (2013), Čeponytė (2015), Slavinskaitė (2017), and Rudytė et al. (2018). The aforementioned studies analyze the definition of fiscal decentralization, the manifestation of theories of fiscal federalism, advantages and disadvantages of decentralisation as well as assess the level of fiscal decentralisation that is related to the realization of local taxes' concept. The theory of fiscal federalism considers the changes in the motivation of public policy makers and the thereof resulting government failure: moral hazard and lobbying. It is important to assess the probability of independent competition among the municipalities, even when all funding factors are favorable.

The aim of this article is to determine the manifestations of the theory of fiscal federalism when solving the problems related to the fiscal capability of municipalities to provide public services. Object of the research is the manifestation of subnational fiscal federalism in Lithuanian local self-government. The research aims to identify how the theories of fiscal federalism manifest in Lithuanian municipalities when providing public services and whether the conditions are ensured for the competition among municipalities, which enables to provide a higher quantity and a higher level of quality of public services.

The specific feature of this article is the division of Lithuanian municipalities into four clusters according to economic and social indicators—a decision that allows to perform statistically reasoned comparison of differences between separate clusters of municipalities and the municipalities of the respective cluster. Other research methods used are the following: systemic, comparative, and logical analysis of literature; analysis of legislation and statistical data; content analysis. Research spans the period of 2013–2017.

Necessary data to conduct the research was gathered from the databases of the Lithuanian Department of Statistics and of the Ministry of Finance of the Republic of

Lithuania. Certain data fragmentation was found during the initial collection of data; therefore it was also necessary to communicate directly with the administration's representatives of separate municipalities.

The article consists of five sections. Scientific relevance of the topic, research aim and methods are presented in the first section. Fiscal federalism theories and their manifestations at the subnational level are analyzed in the second section. Research methodology is presented in the third section. Results of the analysis of the municipal level situation in Lithuania during the five-year period are presented in the fourth section. The summary of the main findings is presented in the fifth section.

2 Theoretical Background: Review of Theories of Fiscal Federalism and Their Manifestations at Subnational Level

Rudytė et al. (2018), Sorens (2017), Slavinskaitė (2017), Čeponytė (2015), Ligthart and Oudheusden (2015), Weingast (2014), Moges (2013), Chandra (2015), Prakash (2012), Slukhai (2003), Baltušnikienė and Astrauskas (2009), Martınez-Vazquez (2008), Ebel and Yilmaz (1999), Mello (1999), Tanzi (1996) analyze the theories of fiscal federalism and have different views on fiscal federalism according to time periods and schools, yet they unanimously agree on the need to increase fiscal decentralization in self-government in conformity with the theories of fiscal federalism. Federalism is equated as one of the most important government models though its research at the financial level has begun only recently. It is directly related to the division of governmental functions and financial relations among levels of government. In recent years fiscal federalism has attained acknowledgment and led to an increasing debate in the literature. According to Ligthart and Oudheusden (2015) and Bird et al. (2003), it can be stated that the recognition of fiscal federalism could be related to the perception that because local government is more attuned to the preferences and needs of local residents, it can better understand what public services are required and thus better satisfy the demand for such services. Appropriate allocation of public expenditure ensures not only the efficiency of the public sector but also promotes economic growth.

Slavinskaitė (2017) and Čeponytė (2015) suggest to divide the federalism theories into two periods: first generation from 1950 to 1990 and second generation from 1991 to now. The first generation of theories of fiscal federalism is associated with more effective provision of public services and the strengthening of local government's responsibility. The second-generation theories are still new and not yet fully formed; therefore, are less formalized. Even though Chandra (2015) approaches the problem of fiscal federalism from a different perspective, it does not challenge but complements the former. Second-generation theory is an ongoing effort to build a theory in response to the fiscal challenges faced by a number of countries. According

to Weingast (2014), these three conditions of effective functioning are characteristic of any theory of fiscal federalism:

- Explicit authorization to produce expenditures while being distanced from all other levels of government.
- Authorization to accumulate sufficient revenue sources to implement functional activities.
- An equalization of budget revenue and expenditure imbalance.

Rudytė et al. (2018), Sorens (2017), Ligthart and Oudheusden (2015), and Bird et al. (2003) agree that at the core of fiscal federalism lies the fact that local governments should be autonomous in their spending decisions and, accordingly, should have the authority to determine and raise their revenues by themselves. Ligthart and Oudheusden (2015) and Bird et al. (2003) accentuate four key components of fiscal federalism: revenue assignment to local governments, expenditure responsibility of local governments, transfers to subnational governments and subnational borrowing. The competition assumptions described in the economic theory can be converged upon the conclusion that fiscal competition among the municipalities leads to a more efficient distribution of funds, which can also have a positive impact on regional economic growth in the long term. However, the municipalities usually do not have competitive capabilities in the fiscal area. The democracy that exists in municipalities encourages to provide more efficient packages of public services while not increasing the taxation of residents in the municipality. It, therefore, follows that the municipalities remain heavily dependent on government grants because the local administration does not influence the municipal budget revenue from local taxes and tolls. Usually the collection of municipal tax revenue depends on national laws instead of local government decisions (Baltušnikienė and Astrauskas 2009). The principles of fiscal federalism should be equally applied to both federal and unitary states, whereas decentralization and subsidiarity remain on the basis of fiscal federalism—they demonstrate the distribution of responsibility for the provision of public services at the subnational level where it can happen the most efficiently. Ligthart and Oudheusden (2015) determine two models of fiscal federalism; a greater share of own-generated revenue in municipal budgets is common to the American type model, whereas the German type model is characterized by the greater share of grants from the central budget. The German type model is found in Lithuania‘s subnational level as Lithuanian municipalities receive up to 70% of their revenue from the state budget for the performance of independent and mandated self-government functions. Such received funds are defined as grants. There are general grants—when the municipal administration can use the funds at their own discretion to carry out any of the functional goals, and specific grants—when funds are transferred to the municipal budget in order to complete a specific goal which is appointed by the grant-giver (Freire and Garzón 2014).

Local government could implement anti-cyclical fiscal policy by increasing its debt, however, the possibilities of borrowing are usually restricted for the local governments (by both the state laws and the lesser financial market‘s trust in these

particular local players which in turn rise the borrowing rates), whereas the central government can borrow on much more favorable terms. The local government's possibilities of borrowing are further restricted by the mobility of production factors. It is stated that the increasing local debt can lead to the transfer of production factors into the other regions as well as to the limitation of the indebted region's economic growth opportunities (Čeponytė 2015). Problems of the commons, capacity constraints and externalities are encountered during the decentralization process. All of them decrease the possible fiscal decentralization advantages. However, if necessary measures were taken against them, countries would possibly experience substantial benefits associated with fiscal decentralization. Furthermore, those economic sectors that are related to the process of fiscal decentralization would experience gains as well, increasing the rate of adoption of fiscal decentralization in return (Moges 2013). The results of Moges' research confirm that the application of fiscal policy measures can be used to address the issue of poverty and enable the balanced development of regions as well as to support the effective use of public resources. Many studies (Baltušnikienė and Astrauskas 2009; Martınez-Vazquez 2008; Tanzi 1996) agree on the need to grant subnational governments a significant level of tax autonomy, recognizing, however, that full funding of subnational government from autonomous tax sources is generally not feasible. Normally subnational governments are required to plan in advance how the funding ought to be divided as there is a constant lack of such funding thus making hard budget constraints a necessity. There are subnational governments, which generate enough revenue for the state to not subsidize their activities, whereas poorer subnational governments rely on government grants to equilibrate structural inequalities as their own revenue is not enough. According to Gnangnon and Brun (2020), the increase of fiscal capability is especially relevant in the less economically developed countries and their municipalities. The tax systems of countries with high fiscal capabilities could be an example for such countries which seek to make tax system reforms at national and local government levels.

Scholars who study fiscal federalism agree that it is one of the most important areas in the public finance sector. Shah (2016) describes fiscal federalism as the financial relationship between local and central governments that include not only the acquisition of revenue and redistribution of expenditure but also the division of responsibility for the provision of public services. It could be considered that fiscal federalism is a certain viewpoint that manifests in the application of principles of federalism to financial decisions of local and central governments. A finance system that supports, coordinates, and encourages the cooperation between local and central governments is created in the country in order to improve citizen welfare (Shah 2016).

According to Shah (2016), an analysis of theories of fiscal federalism shows that there is no revenue distribution model that is universal and applicable to the municipalities of all countries. Although the revenue sources of local budgets of separate countries are similar, there are many differences that are determined by different budget systems, historical development, economic development level and existing policies. To determine what revenue distribution model should be selected

by a country, account should be taken of such factors as structure of the budget system, scope of individual and mandated municipal functions, autonomy level of decision-making, the cultural context of the country, historical experiences and the administrative capacity of local government (Shah 2016).

3 Methodology

To achieve the aim of the research, a period of 2013–2017 is selected for analysis. It should be noted that municipal-level data exhibits fragmentary qualities. It is also worth noting that the lack of municipal-level data reveals the subjectivity on which national and subnational funding decisions are based. The evaluation of a single country is common in other similar types of research (Mangioni 2016; Nordström and Värja 2016; Costa et al. 2015; Jenčová et al. 2013; Raju 2012; Jurak and Pinterič 2012; Rathelot and Sillard 2008; Hájek and Olej 2007; Zafra-Gómez et al. 2009), as the selection of several countries can lead to differences in municipality-defining standard acts which vary from country to country. The research aims to evaluate the conditions for the effective functioning of the model of fiscal federalism as determined by Weingast (2014). The first condition is conveyed through the laws at the national level. Content analysis used for laws' analysis allows us to assess the municipal functions which are independent and mandated (see Table 1).

We can assume that recognition of the local self-government as being of a lowest territorial level is the result of democratic and decentralization processes which corresponds to the aspect of fiscal federalism at the subnational level. Local self-government and democracy can be defined as a strategic partnership in the

Table 1 Functional distribution of Lithuanian municipalities by the freedom of decision-making

Independent municipal functions	State-mandated municipal functions
Forty-six regulated functions (there were 43 in 2010).	Thirty-seven regulated state functions (there were 35 in 2010).
Municipalities shall exercise these functions in accordance with the competence granted by the constitution and laws, obligations to its community and for the interests thereof. When implementing the said functions, municipalities shall enjoy the freedom of initiative of decisions, their adoption and enforcement, and shall be responsible for the fulfilment of the said functions; when implementing these functions, activities of municipalities shall be bound by the requirements and order laid down by law.	These shall be state functions delegated to municipalities, taking into consideration interests of the population. When implementing the said functions, municipalities shall have the freedom of adoption of decisions, as prescribed by the law. Activities of municipalities carried out when implementing the above-mentioned functions shall be restricted by decisions of state institutions and/or officials. In certain cases, the state functions may be delegated for implementation to municipalities on the basis of contracts. A municipality may conclude such a contract only if the municipal council gives its consent. Usually, such functions shall be short-term or seasonal.

Source: Parliament of the Republic of Lithuania (1994)

Table 2 Revenue sources of Lithuanian municipalities

Revenue sources in municipalities	Description of revenue source
Tax revenue	Revenue generated from taxes, such as Income tax of individuals, Property tax, Land tax.
Funds from municipal property	Municipalities control state-given property in their territories the use of which can be taxed.
Revenue from collected fines	Revenue generated from administrative offences, e.g. parking fees.
Revenue from local taxes	Municipality can collect local and state taxes. Local taxes go into the municipal budget, state taxes go into state budget.
Revenue from services provided in budgetary institutions	Taxed building works permits.
Revenue from municipal fund balance in current accounts	Additional and exceeding the planned budget revenue generated during the implementation of the budget, saved funds (expenditure) also remain in the municipalities.
Revenue from rent	Revenue generated from municipality-owned property or land.
State budget grants	Funds for mandated functions from the state budget or state funds awarded to municipalities as a specific grant.
Loans	Borrowing of municipalities is restricted by established limits, 15% from generated revenue. A higher borrowing limit is intended for Vilnius municipality.
Other income	EU funding for the realization of projects, other irregular and unintended income during the current budgetary year.

Source: Parliament of the Republic of Lithuania (1994)

municipality in the case of municipality lacking funds and thus transferring the provision of public services to private, non-governmental and social organizations as well as to public and private partnership (PPP). In most Lithuanian municipalities the provision of public services is transferred to the lowest governance level by the decision of administration or council and it can be defined as a decentralization process in the local self-government. The rights of municipal capital belong to the council of the municipality. According to the nature of activities, the functions of municipalities are divided into those of local government, public administration, and provision of public services.

To perform all municipal functions the appropriate financial resources are required which municipalities could have in their disposition so we can assume that the level of self-government of Lithuanian municipalities directly depends on the financial potential under their control. Looking from the perspective of the theory of fiscal federalism it is noticeable that there are not many autonomous fiscal functions in the Lithuanian municipalities—these are the establishment and approval of municipal budget; the establishment of local fees; the administration, control and disposal of proprietary municipal land and other property. During the calendar year, the municipal financial resources are accounted for in the autonomous municipal budget. The municipality can form the financial resources using various revenue

Table 3 Functional and economic classification of Lithuanian municipalities' expenditure

Functional classification	Economic classification
01. General state services	2.1. Wages and social insurance
02. Defense	2.2. Expenditure for the acquisition of commodities and services
03. Public order and public safety	2.3. Interest
04. Economy	2.4. Subsidy
05. Environmental protection	2.5. Grants
06. Housing and utilities	2.6. Deposits to European Union budget
07. Health protection	2.7. Social benefits (allowance)
08. Recreation, culture and religion	2.8. Other expenditures
09. Education	2.9. Funding from European Union, other financial support and general sponsorship
10. Social security	

Source: Parliament of the Republic of Lithuania (2017)

sources: tax and non-tax municipal revenue as well as government or other fund grants (see Table 2).

Although it is possible to classify municipal expenditure by using various factors, it is usually classified using functional and economic expenditure classification (Morrell and Kopanyi 2014). Ten main functions are identified which correspond to the main functions of the state (see Table 3). Functional classification is usually difficult to apply to the analysis of functional multiple activities of separate-sector departments because the accounting of financial resources and public services usually differs between departments and municipalities. There also are inaccuracies in the data entry process, which emerge when the municipality employees change, as well as the fragmentation of municipal-level data. There is a lack of both accuracy and continuation of data accounting. The possible explanation for all of this is that the analysis of municipal-level data is less popular than that of the county-level data. There are 10 counties in Lithuania, which consist of 6 to 10 geographically closely located municipalities. Counties organize the municipalities solely on geographical basis without any regard to each of the municipalities' economic capability. Therefore, the county rates matter little to a single municipality—rich municipalities keep getting richer while economically weak municipalities keep getting poorer. To solve the problem a more exhaustive analysis of municipal level revenue and expenditure is required which would converge on each of the function's qualitative rate that reflects the demand for public-services expenditure. The at-risk-of-poverty rates that are presented at the county level in the same social security sector do not represent the particular municipality's situation. At-risk-of-poverty rates at the municipal level are not kept count of in Lithuania.

Economical expenditure classification is usually applied in municipalities as such classification is designated by the Ministry of Finance. However, this classification does not provide enough information at the local self-government level, because it is not possible to separate institutional expenditure from public services expenditure. If

the information about the expenditure is more detailed in municipalities of major cities, then the information of smaller municipalities is less informative. Expenditure of administration and services are usually summed up due to their small separate amounts—here a subjective human factor is in play as there is no exact methodology on to how to do it. Each accountant who works in the municipality does it in accord with his perception and competence. The clustering method is used for the research as cluster analysis includes several different algorithms and methods, under which similar objects are divided into appropriate categories (Škuflić et al. 2018; Kozlovskij 2018). Cluster analysis can be a useful tool for arranging observations into groups that can be further analyzed when there is an unknown number or type of group profiles. There are discussions that although now municipalities are larger than previous districts and it could help distributing resources equally as well as enhance equivalent development, the new system also faces several problems (Brauska 2013). The research uses a hierarchical clustering method which consists of dividing the analyzed elements so that the differences in clusters are minimal and the differences between clusters are the largest (Beržinskienė and Stoškus 2006). The Gaussian mixture model is a probabilistic approach to clustering where each cluster is described by its centroid (mean), covariance and the size of the cluster (weight). The relevance of the applied clustering method is emphasized by the fact that the municipalities vary from each other by economic and social rates, and thus the use of cluster analysis allows to present a statistically-reasoned comparison of differences between separate clusters of municipalities and the municipalities of the respective cluster (Zanda et al. 2008; Vanags et al. 2002).

4 Results of the Research

Due to large differences among the Lithuanian municipalities it was decided to establish clusters of municipalities. Only those contextual indicators that show correlating dependence are used to analyze the municipalities. As a result, the municipalities are divided into four clusters. These are major cities (6), resorts (4), predominantly urban (12) and predominantly rural (38). The municipalities' division into clusters allows to spot the existing differences between the clusters more correctly as well as to compare the indicator results inside the clusters. Average indicator values from the period of 2013–2017 are used (see Table 4). The data of municipalities was collected from the Lithuanian Department of Statistics (2020). The inaccuracies in factors were amended by direct cooperation with municipal administrations.

The municipalities' own revenue (see Table 5) consists of personal income tax, local taxes, dividend revenue, interest and revenue from municipal property. The average, maximum and minimal values are singled out in each of the four Lithuanian municipalities' clusters. The differences in tax revenue are large in all of the clusters although the values of Major cities especially stand out as there is the largest concentration of both the residents and the built-up areas. There are municipalities

Table 4 The municipalities' distribution into clusters using contextual indicators from the period of 2013–2017

Indicators	Cluster 1 (6) Major cites	Cluster 2 (12) Resorts	Cluster 3 (38) Predominantly urban	Cluster 4 (4) Predominantly rural	In total, nationally (60)
Population	205,723	45,313	27,025	10,710	47,465
The population of the retirement age (63–79+)	19.34	17.79	21.8	20.8	20.7
Population density	1526.4	64.1	21.1	74.3	183.8
Tourists	0.9	0.4	0.3	20.5	1.7
Wage index	103.5	103.4	103.8	111.6	104.2
Average housing size | m^2	59.9	73.4	71.7	69.1	70.7
Life expectancy	77.3	75.3	74.1	76.6	74.9
Average price, Eur/m^2 (residential apartments real estate average sale price)	765.2	467	278.3	1241.5	429
Built-up area (% over National Total)	2.8	2.2	1.5	0.4	1.7
Roads (% over National Total)	0.3	2.1	1.9	0.3	1.7
Value-added cost of production per capita	8868.7	4851.8	2794.3	5896.6	4020.1
Population (15. . . + . . .63)	65.89	67.31	64.46	65.70	65.26
Employed population in thousands	50.27	45.74	41.83	53.81	44.26
Share of children population (0–19 years)	19.6	20.5	19.9	18	20
Agricultural land (% over Total area)	20.6	51.9	59.4	18.2	51.3
Forested land (% over Total area)	22	35.2	31.6	65.8	33.6
Roads (% over Total area)	3.1	1.6	1.1	1.2	1.4

(continued)

Table 4 (continued)

Indicators	Cluster 1 (6) Major cites	Cluster 2 (12) Resorts	Cluster 3 (38) Predominantly urban	Cluster 4 (4) Predominantly rural	In total, nationally (60)
Waters (% over Total area)	3.3	1.4	1.4	0.6	1.6
Total area (hectares)	9276.12	98,087.54	117,732.69	16,108.59	96,183.06
Agricultural land (hectares)	1975.93	53,705.34	69,523.93	3434.66	55,199.46
Forested land (hectares)	2655.15	33,844.38	37,813.04	10,923.24	31,710.87
Roads (hectares)	208.26	1291.22	1223.59	186.74	1066.46
Built-up area (hectares)	3652.22	2912.14	1903.47	528.73	2188.43
Waters (hectares)	208.67	1399.15	1708.49	107.95	1389.93
Other land (in hectares)	575.86	4935.29	5560.16	927.28	4627.89
Land drained (hectares)	486.44	35,791.81	55,855.95	1079.76	654.42
Irrigated land (hectares)	0.02	45.26	52,4894	0,2850	42.32
Buildings in total	42,471.16	51,186.25	43,477.15	8144.0	42,562.83

Source: Lithuanian Department of Statistics (2020)

in all of the clusters that do not generate revenue from dividends and the interest revenue also composes only a very small part of the generated revenue. Major Lithuanian cities and resort municipalities collect exceptionally more local taxes. However, there are some resort municipalities that do not generate revenue from the property which proves that most of the property is privatized.

The municipalities receive grants to perform government-mandated functions (see Table 6), the biggest of which accounts for half of the municipal budget expenditure and is for the function of Education. Till the year of 2017, those were the funds for "pupil's basket" and starting from 2018 the funds for the whole classroom were allocated. The number of children is the largest in the major cities thus the most funds fall to them. The state carries out relatively low investments in Lithuanian resort municipalities and major cities. As it can be observed from the distribution of minimal values, the absorption of EU funds is rather active in municipalities and it is also not even because some municipalities in the five-year period either have already spent the funds or have not received them yet. It should also be noticed that most funds from the state budget are subsidized to major Lithuanian cities in which there are plenty of various project-based activities

Table 5 Municipal budget revenue for independent function during the period of 2013–2017, in thousands of euros

Cluster	Number of municipalities	Mean	GPM revenue	State fees	Fines and forfeiture	From goods and services	Local fees	Revenue from dividends	Revenue from interests and deposits	Revenue from sales of long-term tangible and intangible assets
1	6	Avg.	97943.07	204	556.4	8384.91	4683.5	2645.4	42.18	2842.38
		Max	257655.9	603.3	2035	21805.2	9757.8	7069.4	185	8880.5
		Min	20,824	32	71.9	1367.4	323.8	0	3.1	146.3
2	12	Avg.	18573.48	69.86	41.45	1277.63	554.96	75.56	3.08	108.49
		Max	40936.6	174.8	93.8	2511.6	2947.6	538.3	6.3	217.2
		Min	6709	12.3	13.9	557.3	3.7	0	0.8	19.1
3	38	Avg.	11503.66	40.48	23.17	708.57	518.52	22.34	1.72	83.03
		Max	20473.7	70.4	54	1427.5	1334.7	258.4	5.1	585.6
		Min	3412.7	13.9	7	178.2	2.9	0	0.4	5.9
4	4	Avg.	6465.03	27.23	34.13	598.55	1687.63	5.1	3.03	140.7
		Max	9056.5	55.5	91.1	1087.8	2284.1	11.1	9.8	449.2
		Min	2121.6	10.3	10.4	217	447.9	0	0.3	0

Source: Authors' own study

Table 6 Municipal budget revenue for an intended purpose during the period of 2013–2017, in thousands of euros

Cluster	Number of municipalities	Mean	Revenue for state mandated functions	Pupil's basket	Revenue for investment projects	Revenue from other grants from state budget	European Union financial support funds	
							current	capital
1	6	Avg.	5230.53	44411.5	5087.52	11274.13	391.47	5535.5
		Max	11431.7	117571.1	11361.4	36868.8	665	13,745
		Min	1893.1	12,376	1679.7	3879.2	81.5	317.9
2	12	Avg.	2211.65	8985.27	2884.98	1711.02	279.22	1096.32
		Max	3682.1	17822.1	13033.4	2912.2	955	3174.9
		Min	1017.9	3130.3	603.4	513.8	0	0
3	38	Avg.	2054.19	5511.63	1808.56	1809.07	184.09	586.38
		Max	3947.3	10603.9	3762	5272	981.1	3257.2
		Min	668.4	1600.4	362.6	325.6	0	0
4	4	Avg.	548.03	2078.8	1218.4	1412.85	129.08	110.25
		Max	958.7	3730.7	1938.3	2766.9	303.6	192.7
		Min	230.6	325.5	315.1	113.7	1.7	0

Source: Authors' own study

Table 7 Land tax (of natural persons) in the clusters during the period of 2013–2017, in thousands of euros

Cluster	Number of municipalities	Mean	Revenue	Revenue per capita	Tax rate	Estimated tax base
1	6	Avg.	529.39	8.57	0.75	364154673.6
		Max	1853.1	49.48	1.7	1,796,786,851
		Min	0.1	0.03	0	797802.95
2	12	Avg.	439.55	11.99	1.37	140581561.6
		Max	2128.4	49.48	2.31	1,796,786,851
		Min	0.1	0.03	0	797802.95
3	38	Avg.	670.75	20.19	2.44	190405865.1
		Max	15535.9	512.77	64.19	3,522,896,663
		Min	0,1	0,032289	0	797802.95
4	4	Avg.	569.61	9.66	0.75	419449117.4
		Max	1853.1	49.48	1.17	1,796,786,851
		Min	0.1	0.03	0	13021214.07

Source: Authors' own study

regarding health, prevention, and culture. The activity of non-governmental organizations that are active in cities is also subsidized by the government if the activity contributes to the performance of state functions. By contrast, this part is poorly financed in resort municipalities as the initiative of the private sector there is more pronounced. A small part of grants for other grants is given to both rural and urban Lithuanian municipalities.

The municipal budget also receives land and property taxes of both natural and legal persons. The analysis concerning municipal land tax rates (see Table 7) reveals that while the municipal land tax rates are the same for both legal and natural persons, the applicable tax rate differs in land use.

The property tax rate in Lithuania is a fixed amount derived from the value of the taxed property (see Table 8). It should be noted that property tax was paid exclusively by legal persons during the period of analysis. The highest concentration of immovable property is in major Lithuanian cities and the value of which is also much higher than that of similar property objects located in rural or urban municipalities. Therefore, the revenue from property tax is the lowest in rural municipalities.

The municipalities use borrowed funds which are also attributed to municipal revenue at the point they are received. However, the borrowing for municipalities is regulated by laws and depends directly on budget revenue. Borrowed funds compose a relatively small part of municipal revenue and are not further analyzed in the article. The laws prescribe that municipality's loans and interest as well as sum of deposits related to loans cannot exceed 15% of confirmed yearly municipal budget revenue during a calendar year. Only Vilnius municipality has an exclusive right to borrow more than that in order to maintain and expand the capital city. Cheap borrowing and perspectives of financial aid encourage fiscal irresponsibility so the central government restricts borrowing for municipalities.

Table 8 Property tax (of legal persons) in the clusters during the period of 2013–2017, in thousands of euros

Cluster	Number of municipalities	Mean	Revenue	Tax rate	Revenue per capita	Estimated tax base
1	6	Avg.	11257.83	1.49	43.35	761482.11
		Max	36852.4	1.57	67.58	2512663.64
		Min	1207.8	1.37	22.88	80,520
2	12	Avg.	951.05	1.45	22.09	62733.29
		Max	1717.3	1.67	48.63	106671.43
		Min	94.1	1.2	4.91	7841.67
3	38	Avg.	370.11	1.41	15.23	27505.35
		Max	1302.7	2.33	118.91	90886.05
		Min	34.4	0.3	2.73	5722.5
4	4	Avg.	710	1.4	90.34	49690.78
		Max	1131	1.5	208.43	75,400
		Min	143.9	1.33	33.83	10792.5

Source: Authors' own study

Municipal budget expenditure is distributed by functional state classification (see Table 9). Expenditure analysis shows that the highest expenditure is in the field of Education—especially in major cities and resort municipalities. The expenditure that is much lower in rural and urban municipalities implies the lower number of students and educational institutions. The number of school-aged children in rural Lithuanian municipalities keeps dropping so the number of educational institutions gets inevitably reduced as well. Meanwhile, though the number of children is also decreasing in major Lithuanian cities it does not do so as significantly. Social security expenditure shows that the expenditure is higher in major cities and resort municipalities than in municipalities of predominantly rural and urban territories in Lithuania. The gap between urban and rural municipalities is not very significant. The same can be said for other fields of expenditure, except for Health protection and Defense expenditure as they compose a very small part of the municipal expenditure and thus are not analyzed in the article.

The minimal values of General state services expenditure match in major cities and resorts as well as in rural and urban territories. This shows that the clustered municipalities remain similar within the meaning of expenditure and that such comparison could help to better detect the manifestations of subnational federalism in self-government. Expenditure difference in clusters for Economy and Housing and utilities functions are also small both among the clusters and within them.

Table 9 Municipal expenditure during the period of 2013–2017, in thousands of euros

Mean	01. General state services	02. Defense	03. Public order and public safety	04. Economy	05. Environmental protection	06. Housing and utilities	07. Health protection	08. Recreation, culture and religion	09. Education	10. Social security
1										
Avg.	14188.0	61.96	601.55	13962.56	2966.84	9881.46	1535.87	4425.93	58548.1	13380.4
Max	74024.5	209.4	3614.3	52282.1	8994.24	67355.4	7131.1	9292.29	249,576.	59,935
Min	1480.3	21.4	3.9	970.2	125.93	130.6	91.4	1038.75	1843.2	275.3
2										
Avg.	4194.55	26.56	473.09	3616.69	1046.49	1628.25	375.26	1765.69	15152.1	4197.93
Max	13213.8	53.3	840.8	15708.8	4405.1	8091.5	1696.6	4469.16	60203.3	10483.8
Min	1092.1	13.8	26.9	683.5	40.34	185	50.9	375.58	1843.2	275.3
3										
Avg.	3852.89	25.14	491.42	3227.47	886.18	1325.93	326.06	1536.75	13025.6	3877.13
Max	14188.0	61.96	840.8	13962.56	2966.84	9881.46	1535.87	4425.93	58548.1	13380.4
Min	1092.1	13.8	90.5	683.5	40.34	185	30.5	306.45	3234	719.7
4										
Avg.	8297.11	46.87	410.84	11865.44	2259.09	4644.97	875.79	4189.29	38006.9	8709.44
Max	31,815	123	2137.5	44,528	7493.34	13609.5	3687.7	9292.29	146,722	32399.3
Min	1495.7	21.4	3.9	970.2	125.93	130.6	91.4	1038.75	1843.2	275.3

Source: Authors' own study

5 Conclusions

Main principles of subnational fiscal federalism are the following: Autonomy—small units have a comparatively strong degree of autonomy, superposition—central government has a decisive say in law-making and forms the overall fiscal state policy, cooperation—central and local government authorities divide the spheres of competence. The researchers of fiscal federalism unanimously agree upon the division of tax-levying powers among specific government levels and suggest creating a structure of public finances where each government level would have enough revenue sources to perform their functions and would not diminish the efforts of local government to mobilize financial resources.

Fiscal competition among the municipalities results in more efficient distribution of funds which has a positive effect on regional economic growth in the long term. However, the municipalities usually lack the incentive to compete for the collection of tax revenue as the municipalities remain heavily dependent on state grants. Municipal budget revenue from local taxes and fees remains dependent on restrictive state laws. Municipal borrowing is limited because of fiscal irresponsibility. Income tax of individuals which generates the most tax revenue in the municipal budget is redistributed at the national level, i.e. is taken from some municipalities some and given to other municipalities—that is defined as the adjustment of structural irregularities.

The analysis concerning municipal level indicators shows that a clear agreement at the interinstitutional level does not exist. Interpretation of laws, presentation of required data as well as differences in the preparation of necessary reports which appear due to subjective interpretation of human factors prevent us from finding homogenous indicators in all of municipalities. Therefore, a demand for better coordination and regular control of factual data presentation at all institutional levels is created. Regional statistics are characterized by fragmentation and inaccuracies due to the lack of general system of data collection. Regular errors in accounting of physical objects and the lost opportunities to correct such errors due to the change of municipal workers indicate that a singular accounting methodology does not exist in the municipalities.

Central government lacks a deeper concern about regions leaving it to the authority of state-subordinate departments. Meanwhile, the departments do not create tools for the control of regional statistics and do not ensure the homogenous presentation of such statistics at the local self-government level. The sectors which have no connection with final qualitative indicators become a prerequisite for the creation of subjective decision policy. Most of the sectors lack the complexity in the provision of public services. The absence of homogenous system results in confusion when trying to coordinate the public services with services provided by the private sector or in the transfer of public services to the private sector. It was observed that the supply of public services depends more on other factors than on the demand for such services. Insufficient data at the self-government level causes further separation among municipalities as rich municipalities keep getting richer while economically weak municipalities keep getting poorer.

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Economic Policy Response to the COVID-19 Crisis: The Case of Poland

Konrad Sobanski

Abstract The aim of this paper is to examine the economic policy response to the COVID-19 crisis in Poland. The paper investigates the rationale for the economic policy tools implemented, their costs, and potential consequences for the Polish economy. The analysis concentrates on the initial phase of the crisis (March–April 2020). The study proves that the scope of economic policy adjustments in Poland might be viewed as relatively wide. Monetary policy tools and fiscal packages implemented induce profound consequences for the Polish economy. The total new financing needed by the government for anti-crisis measures results in a significant increase in the public debt ratio, from 44% in 2019 to 51.5% in 2020, and in a state budget deficit of 7.6% of GDP in 2020. Although the projected debt ratio is still below the 55% alert threshold prescribed by the Polish legislation, policy makers should consider risk factors. First, under an extended lockdown scenario financing needs might be larger than initially estimated. Second, if the Polish zloty depreciates due to external pressures, the debt ratio increases even more as 30% of the Polish public debt is denominated in foreign currencies. Financing the fiscal packages is not possible without the support of the central bank (NBP). The scope of the quantitative easing policy required is comparable in relative terms to programmes implemented in the United States after 2009. Therefore, economic agents should expect an unprecedented increase in the NBP balance sheet and money in circulation. This should have an impact on price levels in Poland, at least in the long term. The worst-case scenario is stagflation, characterised by sluggish economic growth and rising inflation.

Keywords Economic policy · COVID-19 crisis · Monetary tools · Fiscal tools

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1 Introduction

The outbreak of the COVID-19 pandemic led to an unprecedented global economic crisis. The uniqueness of the current crisis from the perspective of the last few decades results from the fact that it has its direct causes in the area of health and not in the area of economic behaviour, and as such, it is beyond the direct control of policy makers (at least not in the short-run). As a result of the pandemic, the economic activity has been largely reduced in most of the industries and countries, most significantly during the lockdown period (March–April 2020). While the unprecedented restrictions on human activity resulting from the recommendations of epidemiologists have already been progressively reduced in many countries, there is still a serious risk that they may be re-established during the next wave of the pandemic. In this extremely unpredictable environment policy makers both in developed and developing countries decided to quickly make use of both standard and non-standard economic tools on a large scale to counteract the observed and forecast contraction in economic activity and increased risk for economic agents. It must be stressed however that the effectiveness of all these anti-crisis policies depends to the largest extent on the epidemic situation.

The paper examines the economic policy response to the COVID-19 crisis in Poland. It investigates the rationale for the economic policy tools implemented, their costs, and potential consequences for the Polish economy. The analysis concentrates on the initial phase of the crisis (March–April 2020) during which significant adjustments in the economic policy in Poland were introduced. We conduct an empirical research using data on Poland's fiscal and monetary policy. The data are from the National Bank of Poland, the Polish government, the International Monetary Fund (World Economic Outlook), CEIC (ISI Emerging Markets), CEIDG (Central Registration and Information on Business), and Fitch Ratings.

The paper investigates the economic policy response to the COVID-19 crisis in Poland at least for two reasons. First, being an emerging economy, Poland decided to implement measures that were so far rather restricted for developed economies such as the United States, United Kingdom, or Japan. Second, the scope of economic policy adjustments in Poland might be viewed as relatively wide as compared to the extent of the epidemic prevailing in this country.

The structure of the paper is as follows. The second section presents manifestations of the COVID-19 economic crisis by looking at the financial market and real economy in Poland. It also provides short- and mid-term economic forecasts for Poland as compared to the world economy. The third section depicts monetary policy and fiscal policy responses to the crisis in Poland, their mechanisms, and consequences. Conclusions are presented in the final section.

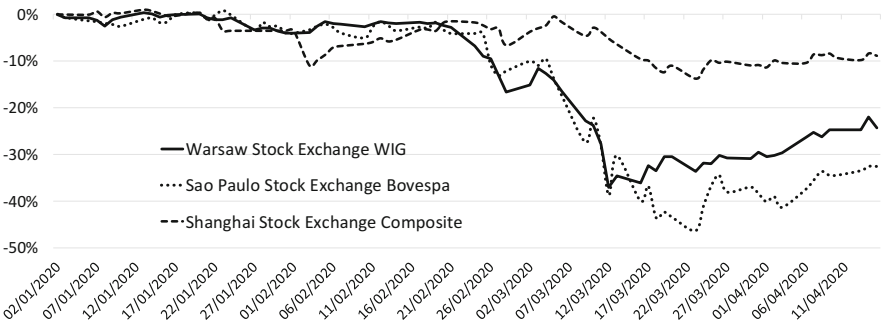

Fig. 1 Change in emerging stock market indices in 2020. (Source: Own compilation based on CEIC data (ISI Emerging Markets). Other remarks: The figure depicts the percentage change in emerging stock market indices in 2020 (up to the mid of April). % year-to-date changes as compared to the index level on 02 January 2020)

2 The COVID-19 Crisis Manifestations and Economic Forecasts

The COVID-19 economic crisis has many manifestations both in financial markets and the real economy in Poland. Baker et al. (2020) indicate that no previous infectious disease outbreak has impacted the capital market as largely as the COVID-19 crisis. Analysing the performance of the Warsaw Stock Exchange, one can see a clear decline in the broad market index (WIG). In the mid of March 2020, it is declining 37% as compared to the beginning of the year (see Fig. 1). Such a situation was not uncommon across the globe, especially in emerging markets. However, there are stock markets like China that declined to a lower extent (e.g. by approximately 15% in the case of the Shanghai Stock Exchange Composite Index). On the other hand, some markets declined even sharper—for example a fall in the Brazilian stock index Bovespa amounted to approximately 45%.[1,2]

Many worrying signs in the initial phase of the crisis are also seen in the real economy.[3] Taking into account the number of business suspensions of sole proprietors, the data are indicating unfavourable trends in Poland justifying the fear that

[1]Significant slumps in stock markets were observed also in developed countries. Andersen et al. (2020) indicate that stock market indices in Sweden and Denmark followed almost the same trajectory throughout the crisis, decreasing by 25% and 30%, respectively (comparing the mid of March 2020 with the year beginning). Many other asset classes behaved similarly to equity in the initial phase of the crisis. However, Demir et al. (2020) show that cryptocurrencies started to become a hedge against the crisis as the effect of COVID-19 deepened (as a positive relationship with the number of reported COVID-19 cases and deaths started to prevail).

[2]Zaremba et al. (2020) indicate that in the period January–April 2020 stock market volatility across the globe increased significantly as a result of government interventions (such as information campaigns and public event cancellations).

[3]The literature indicates both unidirectional and bidirectional causality between development of stock market and economic growth (see Pradhan 2018).

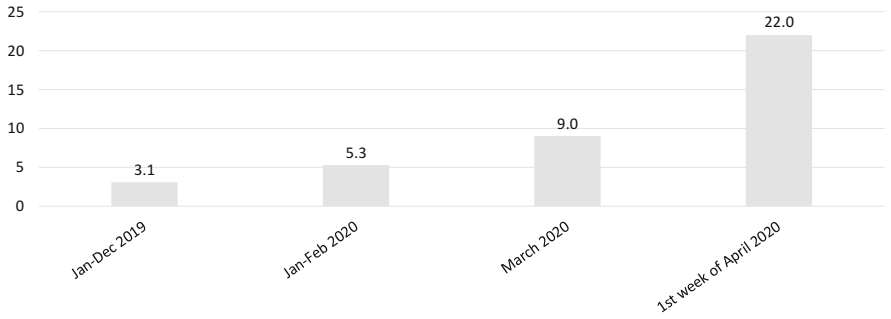

Fig. 2 Business suspensions of sole proprietorships in Poland in the years 2019–2020. (Source: Own compilation based on CEIDG (Central Registration and Information on Business). Other remarks: The figure depicts the average number of business suspensions of sole proprietorships per week (in thousand))

businesses will be going bankrupt and closing. Number of suspensions (calculated as an average per week) increases from 3100 in 2019 to 9000 in March and skyrockets to 22,000 in the first week of April of 2020 (see Fig. 2). Among the most severely hit industries are education and training services, hotels and restaurants, minor services, culture, and sports.[4]

As a result of the COVID-19 crisis outbreak, there are very unfavourable economic growth forecast for the global economy, including Poland. In April 2020 the International Monetary Fund (IMF) published new forecasts for the world (see IMF 2020). It expects global growth to fall to −3% in 2020. It is a much larger economic slump than during the global financial crisis of 2009. However, what is worth noting, the IMF expects advanced economies to be hit harder than developing countries.[5] The institution forecasts a 6.1% decline for advanced economies and just a 1% decrease for developing countries.

The macroeconomic outlook for Poland is in general pessimistic, but in relative terms better than for advanced economies. For example Fitch Ratings (2020) forecasts a decline of slightly over 0.5% for the Polish GDP for 2020. Nevertheless, it should be stressed that forecasts for Poland are very differentiated, which is not surprising taking into account the uncertainty level resulting from the global pandemic.[6] On the negative side for Poland and other developing economies, the IMF expects unprecedented reversals in capital flows and currency pressures. On the

[4]Tourism is one of the most affected industries across the globe by the COVID-19 pandemic, amongst other due to travel bans and border closures. Negative effects of pandemics for tourism industry were observed by Karabulut et al. (2020) for pandemics occurring in the period of 1996–2018. They indicate that pandemics decrease tourist arrivals, but this effect exists only for low-income economies.

[5]However, there are economists expecting the opposite (see Loayza and Pennings 2020).

[6]The NBP forecasts a recession of −5.4% for 2020 (NBP 2020).

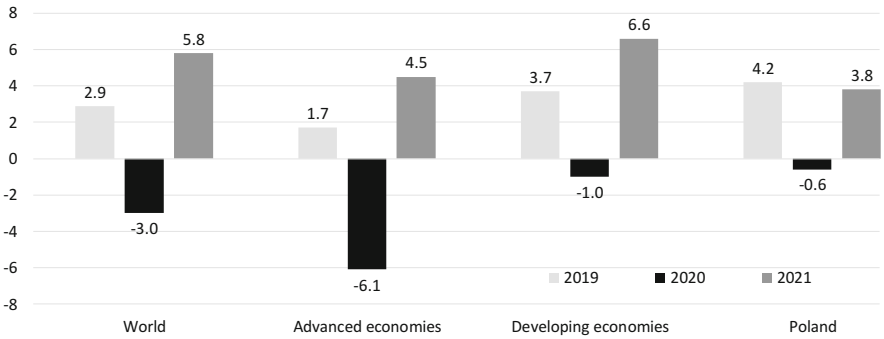

Fig. 3 Economic growth in the global economy and Poland for the years 2019–2021. (Source: Own compilation based on IMF (2020), and Fitch Ratings (2020). Other remarks: The figure depicts the real GDP growth data (annual percentage change, in %) issued by the IMF and Fitch Ratings in April 2020. Forecasts for 2020–2021, realised data for 2019)

positive side, there are wide expectations that GDP will dynamically rebound in 2021 (see Fig. 3).

3 Monetary Policy and Fiscal Policy Responses to the Crisis in Poland

In the very unfavourable macroeconomic conditions induced by the COVID-19 crisis, policy makers in Poland decided to quickly adjust the economic policy, both in the monetary and fiscal areas.[7] The paper starts the analysis with a reaction of monetary authorities, i.e. the National Bank of Poland (NBP). It has implemented both standard and non-standard monetary policy tools in response to the COVID-19 crisis. With regard to standard tools, the NBP decided to decrease the reference interest rate, surprisingly quickly, twice, from the pre-crisis level of 1.5% to 1% in the mid of March and to 0.5% at the beginning of April. This move has been quickly transmitted to the interbank market—the benchmark Warsaw Interbank Offered Rate (WIBOR) decreased by app. 100 basis points (see Fig. 4).[8]

[7]Similarly, governments and central banks around the world have implemented unprecedented fiscal and monetary packages to counteract the COVID-19 economic crisis (see Reuters 2020). Elgin et al. (2020) show correlations of population age, health sector and economic characteristics with stimulus packages announced by governments. They specifically indicate that the extent of the stimulus is more pronounced in countries where the median age is higher, the number of hospital beds per-capita is lower and GDP per-capita is higher.

[8]Effectiveness of monetary policy and interest rate pass-through in emerging countries have been highly debated in the literature. For instance, Avci and Yucel (2017) indicate that policy-led rate changes are fully transmitted to market rates in Turkey within eight months. They also stress that the interest rate pass-through effect depends on several factors, including competition in the banking

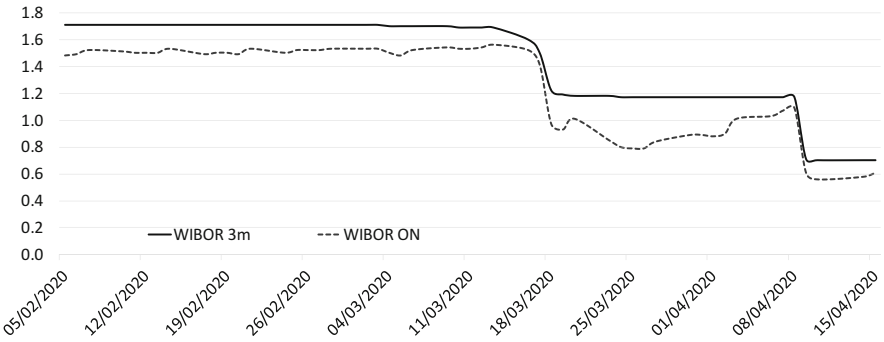

Fig. 4 Interbank interest rates in Poland in 2020. (Source: Own compilation based on NBP data (National Bank of Poland), and CEIC data (ISI Emerging Markets). Other remarks: The figure depicts the WIBOR rate for the following maturities: three months (WIBOR 3m) and overnight (WIBOR ON) in February–April 2020 (in %))

The aim of this decision by the NBP seems clear.[9] In the face of contracting economic activity, the policy makers want to revive investment demand across companies and also hope for an intertemporal effect (in other words, the monetary authorities want to convince individual economic agents to move consumption from future periods to earlier ones). However, there are significant issues with such an approach. First, the decrease in the benchmark WIBOR rate observed under the current macroeconomic circumstances is expected anyway to be outperformed by a huge increase in risk premium demanded by banks on loans provided to individuals and companies. Second, the decision by the NBP to lower interest rates might be regarded as premature. Consequently, the NBP does not have a large room for manoeuvre for the future with regard to interest rate policy (As the short-term monetary policy interest rates are already close to zero-bound). Last but not least, there is also a negative influence of dropping interest rates on the profitability of the banking sector, and thus its liquidity and willingness to lend.

Taking into account this downside consequence, the NBP decided to simultaneously support the liquidity of banks by other standard monetary tools such as a drop in cash reserve requirement ratio by 3 p.p. to 0.5% (see Fig. 5) and a direct liquidity support for the banking sector for an estimated amount of 70 billion PLN (3.2% of GDP) in the form of repo transactions and low-cost financing to banks for new loans to businesses.[10]

sector, exchange rate flexibility, inflation, regulatory quality, GDP growth, monetary growth, industrial growth, and capital inflows.

[9]The decision on the level of interest rate in Poland is restricted for the Monetary Policy Council, a body of the National Bank of Poland.

[10]Broll et al. (2018) prove that imposing a more stringent capital requirement to the bank has the desired effect that limits the bank's incentive to take on excessive risk, given that the bank's smooth ambiguity preferences exhibit non-increasing absolute ambiguity aversion.

Fig. 5 Cash reserve requirement ratio in Poland in 2020. (Source: Own compilation based on NBP data (National Bank of Poland). Other remarks: The figure depicts cash reserve requirement (in %) for banks in February and March of 2020. By reducing the reserve requirement, the NBP is conducting an expansionary monetary policy)

On top of this, probably expecting that standard tools are not sufficient, the NBP decided for the first time in the history of Poland to implement a quantitative easing (QE) policy, widely applied in advanced economies after the global financial crisis of 2009. The monetary authorities have declared they will purchase government bonds in secondary markets unconditionally, i.e. irrespective of market conditions prevailing. It might be viewed as a verbal manifestation of so-called 'whatever it takes policy' already implemented in the past e.g. by the Federal Reserve Bank in the United States. Market expectations are that the NBP will purchase Treasury bonds for up to 200 billion PLN (approximately 50 billion EUR or 9% of GDP).

The unprecedented decision to implement the QE policy in Poland (officially called 'structural open market policy') might be analysed from the perspective of various streams in the economics theory. In a monetarist view (Friedmanian view) an increase in the balance sheet of the central bank leads to an increase in the broad money and results in inflation. However, it is empirically proven that the correlation between the money supply and inflation is weak in the short-run. This was observed after 2009 in the United States, United Kingdom, Eurozone, and Japan. Consequently, a conclusion might be drawn that policy makers in Poland believe rather in a New Keynesian view, in which any increase in reserves of the central bank directly provides the banking sector with funds and boosts credit and economic activity (see Bordo and Rockoff 2013; Carter and Mendes 2020; Dellas and Tavlas 2016; Fiebiger and Lavoie 2020; Kapetanios et al. 2012; Lavoie and Fiebiger 2018; Schenkelberg and Watzka 2013).

The direct reason for the QE policy implemented in Poland is however the willingness of monetary authorities to support the government by securing liquidity for the Treasury bond market. This seems unequivocal, if one takes into account that the government is planning to largely increase public debt to finance new fiscal packages. The fiscal policy response to the COVID-19 crisis is analysed further.

The Polish government announced a fiscal package of 212 billion PLN (app. 50 billion EUR or 9.6% of GDP). The stabilisation package, officially called an

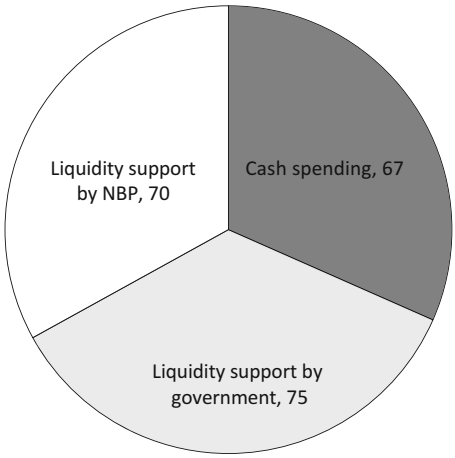

Fig. 6 Components of the Anti-crisis shield 1.0 in Poland. (Source: Own compilation based on SRP (2020). Other remarks: The figure depicts amounts in billion PLN)

Anti-crisis shield 1.0 and effective from 1 April 2020, might be divided into three elements (see Fig. 6):

- Cash fiscal spending
- Liquidity support by government
- Other liquidity support

The cash fiscal spending element amounts to 67 billion PLN (3% of GDP) and constitutes a direct public outlay on salaries of employees in businesses during the lockdown period (up to 40% of salary is covered), on social security contributions and taxes for businesses, infrastructural investment, and health sector spending.[11] The liquidity support by the government of 75 billion PLN (3.4% of GDP) is realised by deferring social contributions and taxes for businesses, providing loans for micro firms (5 thousand PLN for each company) and other loans by government institutions. The other liquidity support amounts to 70 billion PLN (3.2% of GDP). Although it is included as part of the government Anti-crisis shield 1.0, it should be stressed that this component is actually a monetary, not fiscal policy tool, and has already been discussed earlier in this section.

The fiscal package might be viewed as relatively large (app. 9.6% of GDP), but there are many issues with its practical application. Entrepreneurs are indicating the complexity of this regulation, and multiple excluding conditions resulting in a large group of companies being not eligible for the support.

For this reason, the Polish government has announced the second fiscal package (Anti-crisis shield 2.0). It directly addresses the liquidity problem during the lockdown and downturn periods. Under the programme the government provides loans

[11]Public infrastructural investment is widely considered effective in increasing economic growth. Bayraktar (2019) proves that the impact of public investment on economic growth is much larger for middle- and high-income countries than for poorer economies. She also indicates that a higher volatility of public investment might, however, lower growth rates significantly.

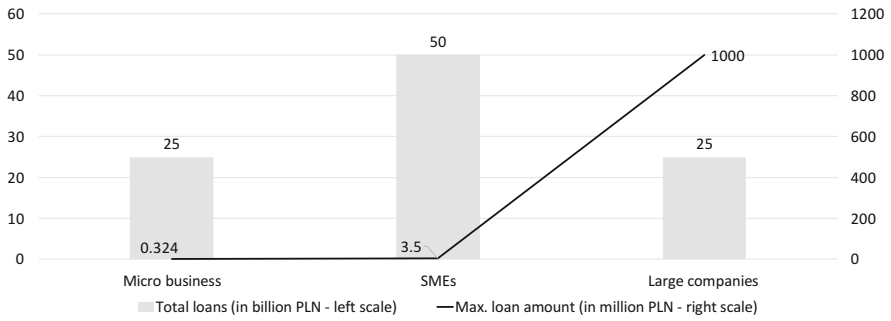

Fig. 7 Structure of the Anti-crisis shield 2.0 in Poland. (Source: own compilation based on SRP (2020). Other remarks: The figure depicts total amounts of loans (in billion PLN) and maximum amounts of an individual loan (in million PLN) provided to micro, SMEs, and large businesses)

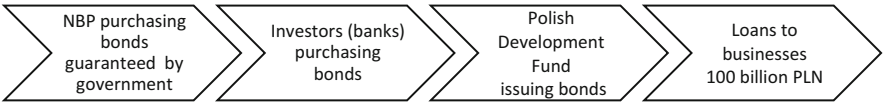

Fig. 8 Financing mechanism for the Anti-crisis shield 2.0 in Poland. (Source: Own compilation based on SRP (2020). Other remarks: The figure depicts the mechanism of providing debt financing for the amount of 100 billion PLN by direct investors (banks) and the ultimate one (the NBP))

to businesses for the total amount of 100 billion PLN (25 billion EUR or 4.5% of GDP). Majority of the support (50 billion PLN) is prescribed for the small and medium-sized enterprises (SMEs), but also micro and large enterprises are eligible (see Szymanski 2020). There are ceilings prescribed on the amount of individual loans. For instance, the max. loan to be provided to a small- or medium-size enterprise is 3.5 million PLN (see Fig. 7).

The key point of the Anti-crisis shield 2.0 is that up to 75% of the loan is to be written off if the business continues operations and maintains the number of employees throughout the crisis. Consequently, the final long-term public cost amounts up to 75 billion PLN. However, the short-term financing needs are larger (100 billion PLN or 4.5% of GDP), and constitute a real challenge for fiscal policy makers in Poland. This challenge could not be undertaken without the support of the quantitative easing monetary policy. The financing mechanism of the Anti-crisis shield 2.0 is based on the intervention by the National Bank of Poland. Although bonds for a total amount of 100 billion PLN are issued to private investors (mostly banks) by the Polish Development Fund, a governmental institution, but ultimately they are repurchased from private investors by the NBP (see Fig. 8).

4 Conclusion

The paper examines the economic policy response to the COVID-19 crisis that broke out in Poland in March 2020. New monetary policy tools and fiscal packages implemented induce profound consequences and serious risks for the Polish economy. Total new financing needed by the government for both Anti-Crisis Shields amounts to 167 billion PLN (or 7.6% of GDP), if taking into account the 100 billion PLN financing required for the Anti-crisis shield 2.0 and 67 billion PLN to finance the cash component of the Anti-crisis shield 1.0. If raising of such a large amount of new financing is feasible, Poland is to face a huge increase in public debt, from app. 44% in 2019 to 51.5% in 2020, and a public budget deficit of 7.6% of GDP in 2020, assuming the government follows the EU methodology for measuring public debt (see Fig. 9 in Appendix).

The positive side is that the forecast level of public debt is still below the threshold of 55% prescribed by the Polish legislation. If the public debt crosses the threshold, the government is required to eliminate the budget deficit in the coming year, which is extremely hard in crisis times. However, policy makers in Poland should not be too optimistic as there are many risk factors for the public debt ratio. First, under an extended lockdown scenario financing needs might be in fact larger than initially expected, and consequently, the QE policy ought to be widened. Second, if the Polish zloty depreciates due to external pressures, the public debt ratio will anyway increase (As 30% of the Polish public debt is denominated in foreign currencies). Third, it is certain that the beginning-year forecast for public budget revenues of 435 billion PLN in 2020 will not be realised as tax revenues are expected to drop during the crisis time. As a result financing needs for 2020 might be even larger than 7.6% of GDP mentioned above.

There are also profound implications for monetary authorities. It is clear that financing of the two fiscal packages amounting to 7.6% of GDP is not possible without the NBP support in the form of quantitative easing policy. The purchases of Treasury bonds by the National Bank of Poland for app. 167 billion PLN (7.6% GDP) are on a relative basis almost of the same size as the quantitative easing policy implemented in the United States after 2009 (that constituted 9% of GDP). Consequently, policy makers ought to expect an unprecedented increase in the NBP balance sheet. Total assets of the central bank are expected to rise by more than 30% (to 694 billion PLN from the pre-crisis level of 527 billion PLN) and money in circulation might increase by up to 70% (to 405 billion PLN from the pre-crisis level of 238 billion PLN). This should have an impact on the price level in Poland, at least in the long term. The worst-case scenario is stagflation, characterised by sluggish economic growth and rising inflation.

Appendix

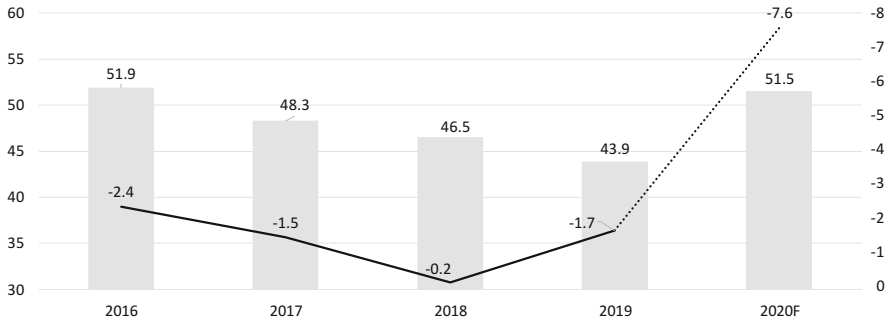

Fig. 9 Public debt and public budget balance in Poland in the years 2016–2020 (% of GDP). (Source: Own compilation based on CEIC data (ISI Emerging Markets). Other remarks: The figure depicts public debt (left scale) and public budget balance (right scale) as % of GDP. Forecasts (own compilation) for 2020, realised data for 2016–2019)

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Part IV
Eurasian Economic Perspectives: Regional Studies

Malaysia–Japan Defense Industry Collaboration Prospects: Rejuvenation of the Look East Policy (LEP)

Chinnasamy Nambi Agamudai Malarvizhi, Shamima Raihan Manzoor, and Sreenivasan Jayashree

Abstract Due to the increasing tension in global politics and economy and the consequent need for a strong base of defense, there is a requirement to reduce the technological gap in defense manufacturing between developed and developing countries through steady remedial collaboration strategies that are viable in geopolitical terms. This paper intends to shed light on this matter by synthesizing several defense sector collaborative activities that have taken place lately between Japan and Malaysia and can be well understood as an outcome of the "Look East Policy" (LEP) of Malaysia. As a conceptual study, it examines the essential motives of defense cooperation amongst Japan and Malaysia to work jointly in order to achieve stability and respectful co-existence in the Indo-Pacific zone while abiding by the principles of law. The paper also highlights the possibilities and current developments of the said collaboration by recognizing the shifting dynamics that have brought a qualitative change in the strategic partnership between Malaysia and Japan in the defense industry. This study is significant not only due to its reflection on the longstanding security relationship between Japan and Malaysia but also because these two nations share similar concerns on the defense matter for ensuring the greater welfare of citizens.

Keywords Malaysia · Japan relations · Look East Policy · Defense collaboration · Defense manufacturing

1 Introduction

Malaysia and Japan have generally enjoyed a cordial relationship since the establishment of formal diplomatic ties six decades ago, with the last three being commonly heralded by scholars and observers alike as a "special relationship"

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(Shaharuddin 2012; Furuoka 2007) based on "economic" and more recently, "strategic" partnership (Parameswaran 2015). According to Meng (2017), the special bond between the two countries has been essentially anchored on Malaysia's Look East Policy (LEP), which forms the basis of their relatively productive and meaningful bilateral interactions, especially in the socioeconomic, cultural, as well as politico-diplomatic and security dimensions over the decades.

Overall, scholars and observers unanimously agree that the launching of the LEP signaled Malaysia's newfound "love affair" with Japan (Khadijah 2003) and very quickly became the cornerstone of the comprehensive and unique relationship between the two nations is likely to last long (Furuoka 2007; Saravanamuttu 2010). From Malaysia's perspective, the LEP had certainly benefitted the country especially in its quest to position itself among the world's fastest-growing economies, and towards becoming a developed nation as envisioned by Vision 2020.[1]

Furuoka et al. (2007) and Furuoka (2003) have thoroughly discussed the foreign aid policy concerns of Japan, particularly the Official Development Assistance (ODA) program of Japan to Malaysia, which is significant and central for Malaysia's advancement. Malaysia is the fourth-largest nation of all recipients within this program. Japan being Malaysia's largest trading partner, its financial support has helped Malaysians in many aspects. These incorporate job opportunities, technology transfer locations, and investments exceeding USD 3.314 billion between 1995–2000 (Khalid et al. 2013).

Like it continues till 2020 and perhaps will be so in the future, Malaysia–Japan relations had been of prime importance for Mahathir Mohamad during his previous term of office as the prime minister of Malaysia under the LEP (Hamid 2018). In 2015, Malaysia and Japan signed on a strategic partnership that included a strong emphasis on security, which contained an improved application of engagements like martial exercises as well as Japan assisting Malaysia in enhancing their skills by further progressed transfers of defense technology, machinery, and the related knowledge as well as capacity building (Hamid 2018). The Japanese government has been highly appreciative of the "Look East" policy, taking it as a foundation for special relations between Japan and Malaysia (Furuoka et al. 2007).

This article assesses the said Look East Policy as a contemporary trend in and prospect for their bilateral ties by identifying the changing dynamics that have brought a qualitative shift in the Malaysia–Japan relationship in the defense sector, which is moving towards a strategic partnership. Therefore, the current study extends the outcomes associated with the ongoing relationships between Japan and Malaysia particularly for the defense sector as a legacy of LEP. Thus it also contributes to the transnational collaboration literature at large.

[1]Vision 2020 or *Wawasan* 2020 (in Bahasa Malaysia) is a national ideal of Malaysia introduced in 1991 by the former Prime Minister of Malaysia, Mahathir Mohamad. It sets a goal for Malaysia to achieve as self-sufficient developed nation by the year 2020 and identifies nine challenges to overcome for this. The challenges are related to strong nation-building and its socioeconomic progress.

The following sections (one, two, and three) give an overview of the defense industries of both Japan and Malaysia and highlight their defense market. Section Four subsequently presents the assessments of LEP with regards to Malaysia–Japan defense collaboration, and finally, Section Five draws the conclusion thereon.

2 Overview of Malaysia's Defense Industry and the Companies Involved

Malaysia's defense industry offers infinite prospects in technological development, skills development, and export as it includes the manufacturing of useful products in aerospace, naval, defense, automotive as well as Information & Communication Technology. The country's defense sector remains primarily focused on the maintenance, repair, and overhaul (MRO) services segment. However, more substantial government support for the development of local manufacturers' capabilities in recent years—coupled with growing domestic and regional demand for military equipment—has resulted in the establishment and expansion of production lines for items such as armored vehicles, unmanned aerial vehicles (UAVs), patrol craft, communications systems, and small arms and ammunition (Gopalsamy 2018). At present, the sector remains small and underdeveloped by international standards. despite Malaysia's vision to be a regional hub for both defense manufacturing and MRO services.

National Aerospace and Defense Industries (NADI) is a key player in Malaysia's defense sector, comprising a good number of subsidiaries. DRB-Hicom Defense Technologies (known as Deftech) is another prominent participant in Malaysia's local defense industry, manufacturing military vehicles and associated equipment, as well as providing MRO services. Its primary customer is the Malaysian armed forces, but Deftech has been looking to expand its presence in the broader region in recent years. Several multinational companies are present in the Malaysian defense market. Airbus, for example, is active in the country through its subsidiary, Sepang Aircraft Engineering, which provides aircraft maintenance services. Airbus Helicopters also provide in-country MRO in Malaysia. The "Eighth Malaysia Plan Mid-Term Report" stressed the significance of offset arrangement as a tactic to attain the transfer of technology to develop the local technology base, provide training and promote the by-products of the local industry (Government of Malaysia 2018). To benefit from technology transfer and attract foreign investment into the defense sector, the government of Malaysia has set up a defense technology park and established a new framework for offsets.

Presently, to bolster Malaysia's export advantages of the defense industry, commerce is short on critical mass to boost diversification of markets and consumers. For the expansion of the industry of security, a reasonably big principal investment is necessary. A strategic work distribution approach can lessen the weight of big

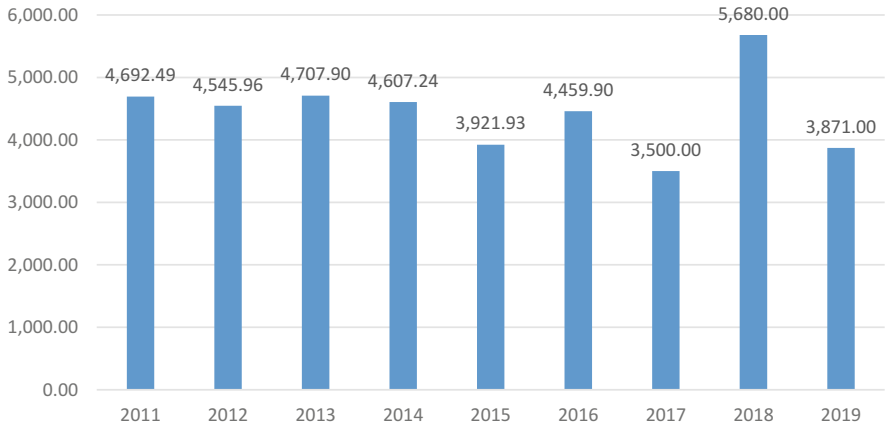

Fig. 1 A comparative picture of Malaysia's budget plans (in million USD). (Data source: *Malaysia Defence Industry* 2020)

investments on the selected prime suppliers and decrease the significant capital investment. Malaysia's defense 2019 budget was the lowest after 2017, with an allocation of only US$3.87 billion and a reduction of 40 percent from its allocated budget in 2018. A comparative picture of the country's budget plans for the years 2011–2019 is shown below (Fig. 1). The budget represents a series of military and other "non-essential" spending cuts in the country, as the government pursues a process of fiscal consolidation aimed at eliminating the country's budget deficit and reducing sovereign debts. The overall budget deficit for 2018 was 3.7 percent of GDP and the government aimed to reduce this to 3.4 percent in 2019 and 3.0 percent by 2020.

During 2017, the air force has received MYR4.6bn for procurement, though this was enough only to cover the ongoing MD530G light scout helicopter acquisition program, as well as upgrades of Hawk trainers, Hercules Airlifters and Nuri Helicopters. The navy's overall budget has been cut by around 25% in 2017, and was, in terms of equipment, only also cover existing programs—namely for the continued procurement of vessels under the "15 to 5" plan and the refit of submarines. The army was received the largest share of the budget for 2017, though overall funding for the service has also been cut down to MYR5.4bn. Again, this will primarily cover already-running procurement plans—with an unusually large allocation directed towards the AV8 Gempita 8X8 "armored fighting vehicles" (AFVs) program (Government of Malaysia 2018).

Initially belonged to the government, Malaysian defense industries became privatized during the privatization policy of the former Prime Minister Mahathir Mohamad. The said industries are such as Air Force Aerospace Inspection Repair and Overhaul Depot became (AIROD), Naval Dockyard became Boustead Naval Shipyard, and Army Ammunition Depot became SME Ordnance Sdn Bhd. Unlike

other companies, Deftech was founded solely as a defense company with the help of its parent company's (DRB-Hicom Bhd) investment and assets (Gopalsamy 2018).

Malaysia's government has been actively engaging and marketing the Malaysian Defense Industry through showcases such as the "Langkawi International Maritime and Aerospace" (LIMA) as one of the largest defense and civil exhibitions in the Asia Pacific, regularly attracting the global maritime and aerospace industry (*Malaysia Defence Industry* 2020). The country's defense expenditure is expected to register a "Compound Annual Growth Rate" (CAGR) of 1.61% over the forecast period and reach a value of US$3.7 billion in 2024 Malaysia (Government of Malaysia 2018). This is due to the military's modernization projects, the nation's investment in the "United Nations" (UN) peacekeeping missions, and regional debates with neighboring nations. For example, based on ResearchAndMarkets.com (2019) report, Brunei over Limbang, Louisa, and Mariveles, Indonesia over Ambalat, the Philippines over Ardasier and Erica, and Thailand over Ko Kra and Ko Losin, were the major drivers deciding Malaysia's defense expenditure. Thus it is understandable and expected that the Malaysian Ministry of Defense's (MinDef) focus is increasingly on the strengthening of coastal, maritime, and air space defense, as well as counterterrorism and cybersecurity capabilities. In this regard, most new procurements need to be made from abroad, as Malaysian manufacturers lack the ability to produce technologically advanced equipment within these segments.

3 Overview of Japan's Defense Industry and Market

The Japanese defense sector is anticipated to witness progress in the upcoming years as a result of numerous contracts being acquired from the USA for the improvement of the defense industry. Japan has reinforced its defense competencies at an accelerated pace. Japan's defense budget for 2017 was the sixth highest in the world (47.2 billion US dollars) that year. The defense budget for the 2018 fiscal year of Japan was 46.61 billion US dollars. However, an impending economic slowdown caused by the country's plummeting exports, the brief trade war between the US and China, and the COVID-19 outbreak, is apprehended "to deleteriously affect the defense expenditure of the country during the forecast period" (Mordor Intelligence 2020: para 5). Japan's defense budget plans for the past and future years are illustrated in Fig. 2.

Japan's defense expenditure by organizations during 2019 (Fig. 3) depicts that it has the highest expenditure for ground self-defense force. The Japanese defense industry is highly sophisticated but operates with significant input from the US. Major US defense contractors including Lockheed Martin, Honeywell, Boeing, Raytheon, United Technologies, and Northrop Grumman have longstanding relationships with Japanese manufacturers for the licensed, domestic production of US defense technologies to be fitted into indigenous hardware. The local industry is largely self-sufficient in areas such as shipbuilding, except for some of the Japan Maritime Self-Defense Force's (JMSDF) most advanced systems which are

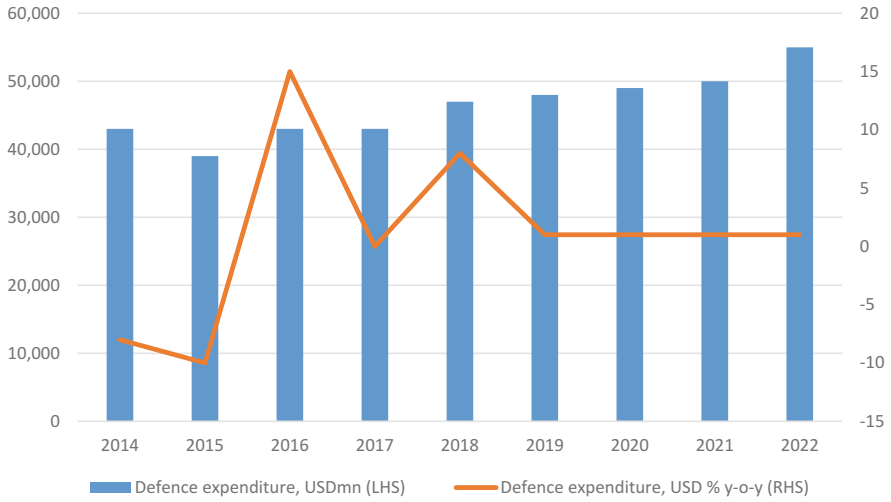

Fig. 2 Japan's defense budget plans (2014–2022). (Data source: *Malaysia Defence Industry* 2020)

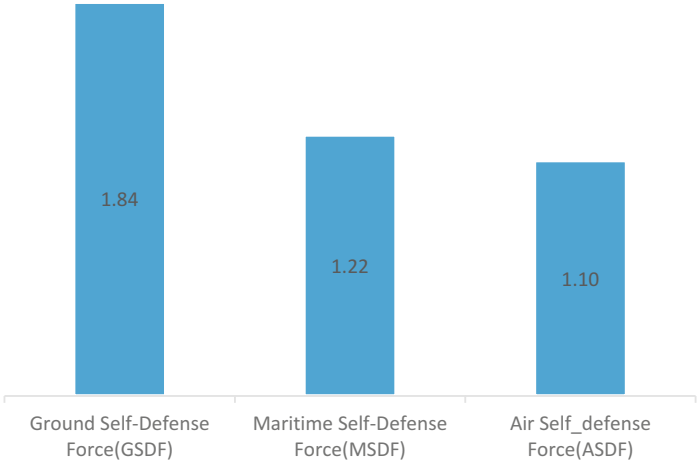

Fig. 3 Japan's defense expenditure in 2019 (in Trillion Japanese Yen). (Data source: Mordor Intelligence 2020)

American. Strong post-World War II (WWII) ties have placed the US companies at the forefront of Japanese demand for any products and technologies the domestic industry is unable to provide. In October 2015, the Japanese Ministry of Defense (MoD)'s Acquisition, Technology and Logistics Agency (ATLA) planned to develop local defense capabilities via collaboration and international sales. Furthermore, Japan also holds defense exhibitions (namely the Maritime/Air Systems & Technologies [MAST] conference) to augment the domestic industry's connections

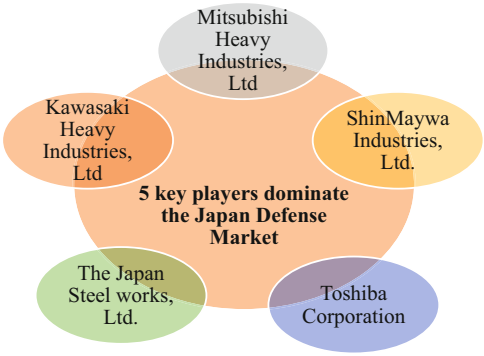

Fig. 4 Japan's defense market scenario. (Data source: Mordor Intelligence 2020)

to global industry leaders, policymakers, and authorities (Government of Japan 2018).

In the time of forecasting, different competitors may possess a significant share of the market, like ShinMaywa Industries, Kawasaki Heavy Industries, Japan Steel Works Ltd, Mitsubishi Heavy Industries Ltd., and Toshiba Corp. Corporations are delivering numerous initiatives as well as introducing new products, which has enabled them to reinforce their position in the industry. Shinmaywa Industries Ltd revealed in 2018 that it had signed a memorandum of understanding for the production of US-2 amphibious aircraft with Mahindra Defense. Figure 4 shows the five key competitors in Japan's defense industry.

In the year 2018, Japan's military expenditure was 2.6% of its GDP, which was equivalent to $46.6 billion. Also in that year, the cabinet of the Japanese PM declared that for the coming 5 years, they had approved a proposal to expend approximately $242.7 billion on defense. To perform short take-offs as well as vertical landing (STOVL) Lockheed Martin F-35B Lightning II Joint Strike Fighter to be operated, the Japan Maritime Self-defense Force's (JMSDF's) two Izumo-class helicopter carriers were transformed into multirole aircraft carriers, which was also highlighted the government's defense policy. In addition to that, great importance has been given by the new National Defense Program Guidelines (NDPGs) and the associated Mid-term Defense Plan (MTDP) to three new defense areas in the nation, namely, cyber, space, and electronic warfare (EW).

The Japanese government has been seeking to bolster Japanese arms exports in recent years, encouraging Japanese firms to seek customers abroad. For example, Kawasaki Heavy Industries was present at the ILA 2018 air show, hosted in Germany, where two of its P-1 maritime patrol aircraft were on display. The 2019 defense budget of Japan is estimated at $48.4 billion. It includes a "two-pronged strategy" to support its forces: "short-term measures that include upgrading electronic warfare and missile capabilities and medium-term efforts that include the R&D of hypersonic weapons" (Government of Japan 2018).

4 Assessment of Look East Policy for Japan–Malaysia Defense Collaboration

The Look East Policy of Malaysia is crucial to the overall industrialization and modernization framework of the country. The regular investments of Japan in Malaysia have improved the country in many ways throughout multiple decades, particularly industrial development, the growth of human capital, and the mutual power balance between Malaysia and Japan (Khalid et al. 2013). Japan and Malaysia have traditionally maintained resilient links and connections amongst themselves at all social stages. It has become a yearly practice for Malaysian prime ministers as well as other prominent ministers to perform official visits to Japan. Government institutes, like The Japanese Chamber of Trade and Industry (JACTIM), the Japan External Trade Organization (JETRO), Malaysia's Ministry of International Trade and Industry (MITI), and Malaysian Investment Development Authority (MIDA), put in the effort to encourage commercial affairs amongst the nations. In addition to that, the business community holds regular meetings via "Malaysia–Japan Economic Association" (MAJECA) along with its counterpart recognized as "Japan–Malaysia Economic Association" (JAMECA). At the community level, solid connections are tangible in the LEP program as well as the formation of the Japan Graduates' Association of Malaysia and other Japanese clubs.

Zainuddin (2015: 7) opines that interpersonal network support as well as present initiatives and schemes introduced by the government ought to bring the two nations (i.e., Japan and Malaysia) closer and strengthen their bond. She adds that the intimacy level would be heavily dependent on the recognition of these steps taken by the government. A strong liaison between Japan and Malaysia could be "advantageous for both nations in case of power battles in the region for economic, military control and international economic uncertainties."

It was during Mahathir Mohamad's first tenure as the Prime Minister of Malaysia (1981–2003) when he directed the "Look East" policy, on the ground of the economic ties with Japan and designating that country as a "model for economic development" (Pollmann 2018). After coming back to the position again, Mahathir visited Japan in June 2018 on his first trip overseas and asserted his intention to revive the Look East Policy, saying, "I would like to continue efforts to learn much from Japan and realize sustainable growth by following Japanese labor ethics and their working attitude" (Ishige 2018: para 4).

According to Meng (2017), the LEP was launched by the Mahathir administration as a response to several external and domestic impetuses, including the proposal by the JAMECA and the MAJECA to promote robust bilateral economic relations between the two countries, with a view of transforming what were initially cordial ties to becoming a "special relationship". From the Malaysian viewpoint, the LEP was multi-purpose; namely to reduce Malaysia's economic dependency on the West, to emulate Japan's "developmental state" model as well as Japanese work culture and ethics, to attract Japanese investments, and to facilitate Malaysia's drive towards heavy industrialization, among others (Lim 1994). Conversely, Japan views the LEP

as an avenue to recalibrate their Oriental identity and expand its reach to the Asia Pacific, following decades of pro-West external orientation and dependency (Saravanamuttu 2010).

Indeed, bilateral trade between Japan and Malaysia gained tremendous momentum following the LEP, increasing almost two-and-a-half fold from an "annual average value of USD8.08 billion during 1986–1990" to "USD18.79 billion during 1991–1995" and then surging to USD24.26 billion in the next five years (Rahman et al. 2008: 33). the volume of Malaysia–Japan bilateral trade, especially in terms of exports, has been "trending upward" since the signing of the Malaysia–Japan Economic Partnership Agreement (MJEPA) in May 2005, and its subsequent implementation a year later (MOFA 2006; Rahman et al. 2008; Shaharuddin 2012).

Since the overriding goal of the LEP was to transform Malaysia into an industrial nation with the assistance of Japan, one of the key strategies was to encourage renowned Japanese multinational corporations to form joint-ventures with their Malaysian counterparts. Meng (2017) has mentioned that the number of Japanese corporations investing and establishing joint-ventures in Malaysia increased exponentially, with as many as 1400 Japanese companies operating in the whole of Malaysia by 2002, including the likes of Japanese household names, such as Sony, Matsushita-Panasonic, Sanyo, Sharp, Hitachi, Mitsubishi Electric and Mitsui, which have long-term commitments in Malaysia.

What was perhaps ground-breaking regarding the upgraded partnership was their pledge to advance defense and maritime cooperation, where Malaysia and Japan agreed to initiate negotiations on a possible framework for the transfer of defense equipment and technology, a first for Japan with any ASEAN member-state (Kameda 2015; Parameswaran 2015). Lately, Malaysia–Japan's recent agreement to transfer defense technologies related to aircraft, vessels, and radars to Malaysia marks their bilateral relationship since Japan's defense industries provide "such equipment to a limited number of countries and strategic partners, which include Malaysia." Malaysia also planned a program "to equip the Royal Malaysian Air Force with new maritime patrol aircraft" (Hamid 2018).

There is a clear consensus for Malaysia's security and defense forces to be "better resourced, equipped and maintained" (Noor 2019). The prospect of the LEP regarding Malaysia–Japan defense collaboration is also clear from the several actions as follows:

1. In April 2018, Malaysia and Japan signed a defense trade deal, as was announced during a joint statement at Defense Services Asia 2018, hosted in Kuala Lumpur (Government of Japan 2018).
2. On September 11, 2018, Japan and Malaysia signed a memorandum of understanding (MoU) "to intensify defense and security cooperation" and thus also "to further boost their security ties" (Hamid 2018).
3. Mahathir Mohamad's keynote address to the Nikkei Conference (or 25th International Conference on the Future of Asia) also reaffirms the said Japan–Malaysia ties in various sectors including defense technology (Bernama 2019a, May 31).

5 Conclusion

In the year 2015, Malaysia and Japan signed on a strategic partnership that included a strong emphasis on security, which contained an improved application of engagements like martial exercises as well as Japan assisting Malaysia in enhancing their skills by further advanced transfers of defense technology, machinery and other types of knowledge as well as capacity building. However, it is a fact that Malaysia's current prioritization alters beyond the way it prioritizes dealing with these security issues. Spectators will too be observing to perceive the manner as well as the degree to which Malaysia continues its responsibility as a contributor to security. Along with that, Malaysia's Government's vision is to make its move in this sector not only in terms of reviewing major procurements but also reducing waste and redundancy.

Malaysia also recognizes Japan's longstanding significance as a security partner in areas ranging from defense equipment to peacekeeping (Hamid 2018). It intends to move ahead of the past proposal such as the Zone of Peace, Freedom and Neutrality (ZOPFAN) to keep the region free from external powers (Parameswaran 2018). Malaysia has realized that a more profound relationship is necessary, taking into account the availability of a civil and commercial supply network with the presence of Japanese companies in Malaysia (Bernama 2019b, September 19). Among other things due to resource constraints, entrenched domestic attitudes, global economic uncertainty, deepening geopolitical complexity, as well as rapidly evolving technological challenges, Malaysia–Japan defense collaboration from LEP can surely pave the way to deal with these issues through generating new approaches in the future.

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The Relationship Between R&D Expenditures and Youth Unemployment in the European Union Countries: A Comparison of the Old and New Member States

Betül Gür

Abstract The purpose of this study is to analyze the relationship between Research and Development (R&D) expenditures and youth unemployment. The analysis covers the European Union (EU) member states. Unemployment is one of the major problems of the EU. The study attempts to reveal the effect of ever-increasing R&D expenditures today, when the fourth Industrial Revolution is happening, on the unemployment problem especially faced by young people in these countries. The member countries of the EU were compared after being divided into two groups as the old and new member states. The countries that established the European Union in the years before the collapse of the Soviet Union and the countries that became members over time were classified as "old member states," and the countries that declared their independence after the collapse of the Soviet Union and later became members of the EU were classified as "new member states." The reason for this was the presence of various structural differences between these two groups. Panel cointegration analysis was implemented as the research methodology. The analysis covers the period 2000–2018. The annual data obtained from Eurostat were utilized in the study. As a result of the analysis, it was determined that R&D expenditures reduced youth unemployment by 5.6% for older members and had a 4.1% decreasing effect for new member states.

Keywords R&D expenditures · Youth unemployment · The European Union · Panel cointegration

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1 Introduction

In order to catch up with today's ever-advancing technology, it is necessary to develop existing technological systems or to make different inventions with appropriate research techniques. R&D activities represent almost a struggle for existence for companies in today's brutal and fiercely competitive environment. R&D activities, which are indispensable for the industrialized countries, provide strong, stable, efficient, social, and economic development by improving countries' capabilities to produce the technology of their own (Annoni et al. 2016). R&D activities, one of the prerequisites of economic development, increase the competitiveness of both countries and companies. To be able to compete with developed countries and have a say in the global markets, it is required to establish an economic system based on innovation that attaches importance to R&D and innovation activities (Fagerberg and Srholec 2008).

Global competition forces countries to cooperate, especially socio-economically. This necessity imposes the process for countries to act and make decisions in unison primarily regionally and then worldwide. The emergence of the EU, its enlargement process and decision-making mechanism, objectives, and strategies entirely stemmed from this need. The main purpose of the Union is to create synergy by establishing partnerships in all areas of socio-economic life and, with this power, to ensure an improvement in the living standards of the people living in the member countries (Annoni et al. 2016). Therefore, it is a known fact that the global competitiveness of developing countries, in particular, will rise if they increase their R&D expenditures, and subsequently, significant improvements will be achieved in their foreign trade sectors. Positive developments in foreign trade will positively affect economic growth in the medium and long term (Halpern and Muraközy 2011). R&D investments enable the use of high technology in production, creating an increasing effect on global competition. Having realized that the Union has neglected the last of the Trade Policy, Competitive Policy, and Technological Policy that constitutes the basis of its industrial policy, the EU has started to focus on the steps towards developing its Technology Policy in order to increase its competitive power in recent years (Mosconi 2015).

The increase in R&D investments will contribute positively to the innovation process, making it possible for businesses to increase their success rates. Thus, the companies that raise their profit shares will scale up their businesses and contribute to the increase in employment opportunities and thereby to the reduction of unemployment rates.

In addition to the economic impacts of youth unemployment, failure to integrate young people into the labor market as a result of youth unemployment poses a threat to the countries' expectations of future development and welfare (O'Higgins 2012). The young labor force with potential production power is an essential resource in the development of countries. If this resource is transformed into a qualified workforce that meets the needs of the labor market, it is a value that will create an advantage for the societies. Otherwise, this situation might become the source of socio-economic

problems (Weishaupt and Lack 2011). Therefore, youth unemployment must be recognized as a global problem, as in the case of general unemployment, and measures must be taken to solve youth unemployment (Jensen et al. 2003; Mosher and Trubek 2003). The young people who are either unemployed, stop looking for a job, get discouraged, or work under bad labor conditions, have significant costs in terms of themselves, their families, society, and the economy. The economic and social effects of these costs on people are the most notable feature that differentiates unemployment from other economic problems (Goetschy 1999). Youth unemployment has been a social and economic problem facing the countries whose labor markets significantly weakened after the collapse in world markets in 2008, and requiring the most urgent solution. During the said recession period, the rapid increase in youth unemployment in particular turned policy groups' attention to this issue (Caporale and Gil-Alana 2014). Therefore, the EU embarked on a quest to find solutions, especially to the problem of youth unemployment, and officially started to prepare various strategy documents.

This study aims to reveal the relationship between R&D expenditures and youth unemployment in the old and new member states of the European Union for the 2000–2018 annual data through panel cointegration analysis. Therefore, a comparative analysis of the implications of the EU information society strategies on the youth unemployment rate is discussed in terms of the old and new member states. There are many articles in the literature investigating the relationship between R&D expenditures and employment in terms of the EU. However, in this study, the subject matter was approached from a more specific perspective; instead of employment, the youth unemployment variable was chosen. Besides, in the literature, the EU was generally considered as a whole, or the comparisons were made between member states based on different criteria such as geographical location or difference in development. In this study, on the other hand, the dissolution of the Soviet Union in 1989 was taken as the criterion. After the collapse of the Soviet Union, many Eastern European countries gained their independence. These countries have started to become members of the EU since 2004 within the framework of the EU's Eastern Enlargement policy. Although these countries have participated in the EU harmonization process, they still have some structural differences. Therefore, in this study, the countries that became members of the EU after 2004 and about which sufficient data could be collected on the variables were grouped as "new member states," and those who became members from the EU's establishment to the said date as "old member states." With this study, the comparison of the relationship between R&D expenditures and youth unemployment, based on the EU's Eastern Enlargement policy in terms of the old and new member states, will contribute to a relatively limited number of researches in the literature.

2 The Information Society Strategies of the EU Countries: R&D Expenditures

With the aim of further uprising their social, political, and economic knowledge and to accelerate the transition to the information society, the EU states deemed it necessary to focus on the concept of "digitalization" which makes the most significant contribution especially to the increase, realization, and effective use of this knowledge and increases the interaction at a high level (Karnitis and Karnitis 2017). Within this context, the need for the EU to create strategies, action plans, and programs arose for the unification of national efforts in the area of information technologies, which were progressing disconnectedly, and the creation of both early and more effective solutions by ensuring coordination in implementation. Accordingly, "eEurope Initiative" (1999) and "The Lisbon Strategy by the European Union" (2000), "eEurope 2005" (2002), and "2010: Information Society Strategy for Growth and Employment" (2005) initiatives were implemented before, respectively (De Bruijn and Lagendijk 2005; De Propris 2007). As a continuation of all these initiatives, the "Digital Agenda for Europe" Initiative was launched by the European Commission in 2010. The Digital Agenda for Europe is one of the seven flagship initiatives of the "Europe 2020 Strategy" launched on March 3, 2010, with the aim of putting forward the EU's new economic transformation strategy and its targets for 2020. This strategy is a significant milestone to come out of the crisis and to be able to fight against future challenges (Nam and Wamser 2011; Wamser et al. 2013). As stated in the study of Dima and Möller (2018), the Europe 2020 Strategy covers seven flagship initiatives under three priority areas:

A. Smart Growth

   1. Digital Agenda for Europe
   2. Innovation Union
   3. Youth on the Move

B. Sustainable Growth

   1. Resource Efficient Europe
   2. An Industrial Policy for the Globalization Era

C. Inclusive Growth

   1. An Agenda for New Skills and Jobs
   2. The European Platform Against Poverty

Another reason for governments to make innovations in the public sector and improve their innovation systems is that innovation has become an essential tool in reducing inequalities. The fact that member countries have different labor markets creates problems, and it is observed that there is no equality in the income distribution of the people living in member countries due to these problems. Besides, unemployment appears as a major problem in some of the member countries. The European Union member states carry on works to eliminate the inequality status by

Table 1 The ratio of R&D expenditures to GDP in the EU countries

Geo\Time	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU (28 countries)	1.92	1.96	2	2.01	2.02	2.03	2.04	2.07	2.12
EU (27 countries)	1.97	2.02	2.08	2.08	2.1	2.12	2.11	2.15	2.19
Euro area (19 countries)	2	2.04	2.1	2.1	2.13	2.14	2.13	2.17	2.22
Belgium	2.06	2.17	2.28	2.33	2.37	2.43	2.52	2.66	2.76
Bulgaria	0.57	0.53	0.6	0.64	0.79	0.95	0.77	0.74	0.75
Czechia	1.34	1.56	1.78	1.9	1.97	1.93	1.68	1.79	1.93
Denmark	2.92	2.94	2.98	2.97	2.91	3.06	3.09	3.05	3.03
Germany	2.73	2.81	2.88	2.84	2.88	2.93	2.94	3.07	3.13
Estonia	1.57	2.28	2.11	1.71	1.42	1.46	1.25	1.28	1.4
Ireland	1.59	1.56	1.56	1.57	1.5	1.19	1.19	1.23	1.15
Greece	0.6	0.67	0.7	0.81	0.83	0.96	0.99	1.13	1.18
Spain	1.36	1.33	1.3	1.28	1.24	1.22	1.19	1.21	1.24
France	2.18	2.19	2.23	2.24	2.23	2.27	2.22	2.21	2.2
Croatia	0.74	0.75	0.75	0.81	0.78	0.84	0.86	0.86	0.97
Italy	1.22	1.2	1.26	1.3	1.34	1.34	1.37	1.37	1.39
Latvia	0.61	0.7	0.66	0.61	0.69	0.62	0.44	0.51	0.64
Lithuania	0.79	0.91	0.9	0.95	1.03	1.04	0.84	0.9	0.88
Luxembourg	1.5	1.46	1.27	1.3	1.26	1.27	1.26	1.27	1.21
Hungary	1.14	1.19	1.26	1.39	1.35	1.35	1.19	1.33	1.53
Malta	0.61	0.67	0.83	0.77	0.71	0.74	0.57	0.58	0.55
Netherlands	1.7	1.88	1.92	1.93	1.98	1.98	2	1.98	2.16
Austria	2.73	2.67	2.91	2.95	3.08	3.05	3.12	3.05	3.17
Poland	0.72	0.75	0.88	0.87	0.94	1	0.96	1.03	1.21
Portugal	1.54	1.46	1.38	1.32	1.29	1.24	1.28	1.32	1.35
Romania	0.46	0.5	0.48	0.39	0.38	0.49	0.48	0.5	0.51
Slovenia	2.05	2.41	2.56	2.56	2.37	2.2	2.01	1.87	1.95
Slovakia	0.61	0.66	0.8	0.82	0.88	1.16	0.79	0.89	0.84
Finland	3.71	3.62	3.4	3.27	3.15	2.87	2.72	2.73	2.75
Sweden	3.17	3.19	3.24	3.27	3.11	3.23	3.25	3.37	3.31
United Kingdom	1.65	1.65	1.58	1.62	1.64	1.65	1.66	1.65	1.71
Cyprus	0.44	0.45	0.44	0.49	0.51	0.48	0.52	0.55	0.55

Source: Eurostat (2019)

regulating their labor markets with innovations in the public sector and trying to integrate their policies across Europe. While some of these studies are related to increasing employment and improving working conditions, some of them are related to ensuring the social security of employees (Kiselakova et al. 2018).

Looking at the R&D intensity data of the EU countries, it was observed that there had been an increase after the global crisis. It was seen that Cyprus, Sweden, Austria, Denmark, and Germany had high rates for the year 2018. The countries with low R&D intensity were identified as Romania, Latvia, Malta, and Lithuania (Table 1).

3 Youth Unemployment Outlook in the EU Countries

The population between the ages of 15–24, which is accepted as young by various international organizations, especially the International Labor Organization (ILO), is faced with several problems in terms of employment. Increasing access to education, lack of experience, insufficiency of vocational training, economic crises, high level of population growth and the accompanying increase in the labor force participation rate of young people, inadequate employment policies, (negative) discriminatory wage policies against young people, and structural reasons are the major causes of youth unemployment. The issues other than the increased participation rate of the youth in education, one of the mentioned causes, can be solved with certain policies. However, since resolution policies cannot always produce quick results, young adults are the most adversely affected by the current global unemployment (Bruno et al. 2014). The unemployment problem prevents individuals from participating in production and economic activities in their youth, which is their most productive age, and thereby, drives young people to despair psychologically and also causes them to lose income. The factors that accelerate youth unemployment are a lack of new job opportunities, failure to establish a healthy relationship between education and employment, and failure of the qualifications of the youth to meet the needs of the labor market (Goetschy 1999; Dietrich and Möller 2015).

During the last 20 years, the young population has increased by 139 million people worldwide, while the young labor force has shrunk by 35 million. The youth labor force participation rate has also decreased from 55% to 45% over the last 20 years. According to the International Labor Organization estimates for 2019, the unemployment rate worldwide is 5.8%, whereas the youth unemployment rate is 13.1%. As in the world, in the European Union countries, youth unemployment rates are twice the level of the overall unemployment rates. Particularly in emerging and developing countries, more than two out of every five young workers are either unemployed or poor (Even though they are employed), which is a striking fact that affects all societies.

The EU, which started as an economic unification movement, has gained a political and social meaning beyond the economic dimension today. Strengthening its political unity aspect with the Treaty of Maastricht, the EU has become an important regional power in the world as a union with 28 members. Striving to integrate social and economic policies, the European Union adopts predominantly social policies in the areas of job creation, improving working conditions, and fair and equal income distribution (De Lange and Wolbers 2014). European countries are geographically and politically close to each other, and their economies are interconnected and integrated. However, national policies have significant cross-border effects on neighboring countries. For the sake of preventing disagreements that might arise between countries and ensuring efficiency, joint economic actions are carried out at the European Union level (Arpaia and Curci 2010).

Although there are significant differences between European countries, the problem of unemployment and temporary employment are highly prevalent among

young people (Blanchard 2006). The consequences of the economic recession caused by the global economic crisis (such as high unemployment rates and long-term unemployment) have been more effective on young people in the labor markets of the EU countries compared to other segments of the population (Choudhry et al. 2012). In accordance with the objectives of the European Union 2020 vision, its economic targets, under the main headings, are as follows (European Commission 2010):

- Increasing the rate of population between the ages of 20–64 in employment from 69% to 75%.
- Achieving the goal of allocating 3% of the EU's GDP to R&D, and providing the necessary conditions for the private sector to invest in R&D.
- In the field of climate change and energy, cutting greenhouse gas emissions by 20% or (if conditions are favorable) even 30% compared to 1990 levels, improving the share of renewable energy to 20%, and increasing energy efficiency by 20%.
- In the field of education, reducing school dropout rates from 15% to below 10%, and increasing the rate of 30–34-year-old young people completing tertiary education from 31% to 40%.
- Lifting 20 million people out of poverty, and reducing the number of people in the EU living below the national poverty line by 25%.

For 2018, the countries with high youth unemployment rates were Greece, Spain, and Italy. The countries with low youth unemployment rates were identified as Germany, Czechia, and the Netherlands (Table 2).

4 Theoretical Framework and Literature Review

Joseph Schumpeter (1934) was the first scholar to mention the concept of innovation in the literature. He examined the impacts of innovation on companies, markets, country economies, economic development, and economic growth. He revealed that innovation was a significant factor in the development process of capitalism as an economic system. He described it as the main driving force of the capitalist system. He named this process "creative destruction." He studied types of innovation, such as new products, new production methods, new markets, new supply channels, and creating new market structures. Similarly, the OECD (1997) made a classification as the product, process, marketing, and organizational innovation. Regardless of the type of innovation, R&D expenditures were considered as innovation input.

Technological development is situated at the center of Romer's (1986, 1987, 1990) endogenous technological change model based on R&D, human capital, and knowledge. Technological development depends on both R&D expenditures of the private sector based on the profitability of companies and R&D expenditures to be made by the state.

Table 2 Youth unemployment rates for the EU countries (%)

Geo\Time	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU (28 countries)	21.4	21.8	23.3	23.8	22.2	20.4	18.7	16.9	15.2
EU (27 countries)	21.8	21.9	23.8	24.5	23.5	21.8	20.1	18	16.1
Euro area (19 countries)	21.5	21.4	23.6	24.4	23.7	22.3	20.9	18.8	16.9
Belgium	22.4	18.7	19.8	23.7	23.2	22.1	20.1	19.3	15.8
Bulgaria	21.9	25	28.1	28.4	23.8	21.6	17.2	12.9	12.7
Czechia	18.3	18.1	19.5	18.9	15.9	12.6	10.5	7.9	6.7
Denmark	15.5	16.3	15.7	14.8	14.2	12.1	12.2	12.4	10.5
Germany	9.8	8.5	8	7.8	7.7	7.2	7.1	6.8	6.2
Estonia	32.9	22.4	20.9	18.7	15	13.1	13.4	12.1	11.9
Ireland	28.1	29.6	30.8	26.7	23.4	20.2	16.8	14.4	13.8
Greece	33	44.7	55.3	58.3	52.4	49.8	47.3	43.6	39.9
Spain	41.5	46.2	52.9	55.5	53.2	48.3	44.4	38.6	34.3
France	23.3	22.6	24.4	24.9	24.2	24.7	24.6	22.3	20.8
Croatia	32.3	36.6	42.2	49.9	44.9	42.3	31.8	27.2	23.3
Italy	27.9	29.2	35.3	40	42.7	40.3	37.8	34.7	32.2
Latvia	36.2	31	28.5	23.2	19.6	16.3	17.3	17	12.2
Lithuania	35.7	32.6	26.7	21.9	19.3	16.3	14.5	13.3	11.1
Luxembourg	15.8	16.4	18	16.9	22.3	16.6	19.1	15.5	14.1
Hungary	26.4	26	28.2	26.6	20.4	17.3	12.9	10.7	10.2
Malta	13.2	13.3	13.8	12.7	11.7	11.6	10.7	10.6	9.1
Netherlands	11.1	10	11.7	13.2	12.7	11.3	10.8	8.9	7.2
Austria	9.5	8.9	9.4	9.7	10.3	10.6	11.2	9.8	9.4
Poland	23.7	25.8	26.5	27.3	23.9	20.8	17.7	14.8	11.7
Portugal	28.2	30.2	38	38.1	34.7	32	28.2	23.8	20.3
Romania	22.1	23.9	22.6	23.7	24	21.7	20.6	18.3	16.2
Slovenia	14.7	15.7	20.6	21.6	20.2	16.3	15.2	11.2	8.8
Slovakia	33.9	33.7	34	33.7	29.7	26.5	22.2	18.9	14.9
Finland	21.4	20.1	19	19.9	20.5	22.4	20.1	20.1	17
Sweden	24.8	22.8	23.7	23.6	22.9	20.4	18.9	17.8	17.4
Cyprus	16.6	22.4	27.7	38.9	36	32.8	29.1	24.7	20.2
United Kingdom	19.9	21.3	21.2	20.7	17	14.6	13	12.1	11.3

Source: Eurostat (2019)

Therefore, in the theoretical framework, R&D expenditures are recognized as an input that enables innovation and technological development. It is one of the variables regarded as an innovation indicator in the empirical studies in the literature. The relationship between R&D expenditures and unemployment is generally evaluated within the scope of the relationship between the concepts of innovation and employment, both in theory and in the literature. In general, the positive effects of innovation on employment, through economic growth and creating welfare, are discussed. Empirical studies might occasionally present conclusions indicating that it creates a negative impact due to the countries studied or various conjunctural

developments, or that there is no statistically significant relationship between these concepts. Empirical studies might occasionally present conclusions indicating that it creates a negative impact or that there is no statistically significant relationship between these concepts, due to the countries studied or various conjunctural developments.

As previously mentioned, in empirical studies, analyses have been made mostly within the scope of the concepts of innovation and employment/unemployment, R&D, and unemployment. This study analyzed the relationship between R&D expenditures considered as innovation input and youth unemployment as a more specific concept rather than employment.

According to Oberdabernig (2016) and Vivarelli (2015), product innovation increases consumer demand; thus, new companies are established, or new sectors emerge in order to meet the growing demand. Consequently, new job opportunities are created. According to Dachs (2018), process innovation is usually achieved with the same level of output and less capital and/or labor as it will increase productivity. The studies conducted by Matuzeviciute et al. (2017), Coad and Rao (2007), and Greenan and Guellec (2000) also support these views. An increase or decrease in unemployment is associated with the type of innovation emerging as a result of R&D activities. Accordingly, they argue that process innovation will lead to technological unemployment and that the demand for new machinery, the expansion of investments, and similar factors will reduce unemployment. Krousie (2018), in her study on the USA in the period 2002–2013, concluded that R&D expenditures reduced unemployment. In their study for the period 1993–2010, Goos et al. (2014) show the positive effect of technological progress on employment in 16 European countries. Bogliacino and Vivarelli (2012), in their studies covering the years 1996–2005 for 25 European countries, revealed that the increase in R&D expenditures increased employment. Similarly Piva and Vivarelli (2018) show the positive effect of R&D expenditures on employment the 1998–2011 period for 11 European countries, According to Matuzeviciute et al.'s (2017) research covering 25 European countries for the period 2010–2012, technological innovations emerging as a result of R&D expenditures have no impact on unemployment. A similar result can be seen in a study conducted by Aguilera and Ramos Barrera (2016) for 7 Latin American countries covering the period 1996–2011.

5 Econometric Analysis

5.1 Methodology

In order to perform the analyses, cross-sectional dependence and homogeneity tests were employed. As the first-generation unit root tests, Maddala and Wu (1999), Im et al. (2003), and Choi (2001) tests were executed. As the second-generation unit root test, the CADF test was used to examine the stationarity. To find out the long-run relationships between the variables, the LM Bootstrap Panel Cointegration test

of Westerlund and Edgerton (2007) was employed. Then, the long-run coefficients were estimated using the FMOLS method. Finally, causality analysis was performed through Dumitrescu and Hurlin (2012) test method.

5.2 Description of the Data

As mentioned earlier, the countries included in the Soviet Bloc but gained their independence after the collapse of the Soviet Union, and have become members of the EU since 2004 were accepted as "new" member states, and those who became members before this date and of course the founding member states were regarded as "old" member states. In the selection of countries, special attention was paid to the fact that they had sufficient data. As the sample of the study: Germany, France, the United Kingdom, Belgium, Denmark, the Netherlands, Luxembourg, Austria, Ireland, and Finland were examined as the old member states group, and Slovenia, Slovakia, Romania, Hungary, Lithuania, Latvia, Croatia, Estonia, Bulgaria, and the Republic of Cyprus were examined as the new member states group. The dependent and independent variables discussed for both country groups are given in Table 3.

The data used were generated using the annual data of 2010–2018 obtained from the database https://ec.europa.eu/eurostat/data/database

5.3 Cross-Sectional Dependence and Homogeneity Tests

In order to determine the cross-sectional dependence between the series, the LM CD test by Pesaran (2004) and the bias-adjusted LM test by Pesaran et al. (2008), i.e., the LM adj test were utilized. Table 4 shows the results of these tests. As a result of the tests, the probability values were below 1% and 5%; therefore, it was concluded that the null hypothesis (there is no cross-sectional dependence) was rejected, and there was cross-sectional dependence between the series. Besides, cointegration coefficients were tested in terms of homogeneity through Pesaran and Yamagata's (2008) delta tilde and adjusted delta tilde tests. The test results are displayed in Table 4. (see for similar study Gür 2020).

Since the probability values of the test results were less than 1% and 5%, the null hypothesis (The slope coefficients are homogeneous) was rejected, and the cointegration coefficients were determined to be heterogeneous.

Table 3 Description of the variables used in the analysis

Variable	Indication	Description
R&D expenditure to GDP (%)	R&D	Independent variable
Youth unemployment rate (%)	YUR	Dependent variable

Table 4 Cross-sectional dependence and homogeneity test results

Old member states		
Cross-sectional dependence test (H_0: No cross-sectional dependence)		
Test	Test statistics	p-value
LM (Breusch and Pagan 1980)	45.366	0.000
LM_{adj} (Pesaran et al. 2008)	42.963	0.009
LM CD (Pesaran 2004)	40.551	0.000
Homogeneity test (H_0: Slope coefficients are homogeneous)		
Test	Test statistics	p-value
Delta_tilde	9.621	0.000
Delta_tilde_adj	9.774	0.002
New member states		
Cross-sectional dependence test (H_0: No cross-sectional dependence)		
Test	Test statistics	p-value
LM (Breusch and Pagan 1980)	39.453	0.012
LM_{adj} (Pesaran et al. 2008)	35.674	0.000
LM CD (Pesaran 2004)	34.022	0.000
Homogeneity test (H_0: Slope coefficients are homogeneous)		
Test	Test statistics	p-value
Delta_tilde	8.903	0.000
Delta_tilde_adj	8.741	0.000

5.4 First and Second-Generation Unit Root Test Results

First-generation unit root tests are classified into two types as homogeneous and heterogeneous models. Since the coefficients were specified as heterogeneous, Maddala and Wu (1999), Choi (2001), Im et al. (2003) first-generation unit root tests were applied.

As can be seen in Table 5, in their level values, every variable has a unit root. On the other hand, the first-order difference series do not contain unit roots. Therefore, it is observed that all variables are I (1), in other words, they are stationary for the first-order difference. First-generation unit root tests are based on the assumption that the cross-sectional units forming the panel are independent and that all the cross-sectional units are equally affected by a shock occurring to one of the units forming the panel. However, it would be more logical to suppose that a shock coming to a cross-sectional unit would affect the other units in the panel at different levels. To resolve this deficiency, second-generation unit root tests that analyze stationarity considering the dependence between cross-sectional units have been developed. If the existence of cross-sectional dependence in the panel data set is rejected, the first-generation unit root tests can be used. Nevertheless, if there is cross-sectional dependence in the panel data, applying the second-generation unit root tests ensure to have a more consistent, efficient, and powerful estimation. In the study, second-generation unit root tests were used since cross-sectional dependence was verified.

Table 5 First-generation unit root test results

Variables	Old member states					
	Maddala & Wu Test		Im, Pesaran, & Shin Test		Choi Test	
	Level	First difference	Level	First difference	Level	First difference
	Trend + constant	Constant	Trend + constant	Constant	Trend + constant	Constant
R&D	0.132	0.002[a]	0.145	0.014[a]	0.152	0.001[a]
YUR	0.125	0.000[a]	0.131	0.000[a]	0.148	0.000[a]
Variables	New member states					
	Maddala & Wu Test		Im, Pesaran, & Shin Test		Choi Test	
	Level	First difference	Level	First difference	Level	First difference
	Trend + constant	Constant	Trend + constant	Constant	Trend + constant	Constant
R&D	0.124	0.000[a]	0.138	0.000[a]	0.143	0.001[a]
YUR	0.109	0.000[a]	0.112	0.000[a]	0.114	0.000[a]

[a]Stationary variable for 0.05, Probability (p) values are given in the table. The zero hypotheses of the tests were designated as "there is a unit root." The optimal lag length was determined using the Schwarz information criterion

Table 6 Second-generation panel CADF unit root test results

Old member states				
Variables	Level		First difference	
	Constant	Constant + Trend	Constant	Constant + Trend
R&D	−1.132	−1.124	−9.742[a]	−9.821[a]
YUR	−1.105	−1.081	−9.860[a]	−9.883[a]
New member states				
Variables	Level		First difference	
	Constant	Constant + Trend	Constant	Constant + Trend
R&D	−1.117	−1.198	−8.742[a]	−8.755[a]
YUR	−1.046	−1.153	−8.645[a]	−8.906[a]

[a]For 1% and 5%, H_0 is rejected, stationary variable

CADF, one of the second-generation unit root tests, was applied. The results of the CADF test developed by Pesaran (2007) are given in Table 6.

When performing the CADF tests, the maximum lag length was taken as 2. The optimal lag length was designated with respect to the Schwarz information criterion. The results revealed the rejection of the null hypothesis at the significance levels of 1% and 5%. According to the results of the unit root test, the series were not stationary at the level. To put it another way, it was found that the series had unit roots, and the variables were stationary at the level of I(1).

5.5 Panel Cointegration Test

In order to discover the long-run relationships between the variables in this research, Westerlund and Edgerton's (2007) LM bootstrap panel cointegration test was executed. The test takes into account the dependence between the cross-sectional units. Besides, it can be seen that the test provides reliable results in small samples. In the test, the H0 hypothesis cannot be rejected, showing that there is a cointegration relationship for all cross-sections.

Bootstrap probability values were collected from a distribution of 10,000 repetitions. Asymptotic probability values were taken from the (standard) normal distribution. The results showed the existence of a cointegration relationship between the series for the group of countries ($p > 0.05$). Then, it could be said that the series moved together in the long term. After proving that the series were cointegrated, the model coefficients could be estimated using the cointegration estimators. The first-order differences of the variables were taken, and the model's long-run coefficients were estimated using the FMOLS method (Table 7).

5.6 Long-Run Cointegration Coefficients Estimation

The long-run cointegration coefficients of the research were analyzed via the FMOLS method. By taking into account the contemporaneous correlations between error terms in the equations of the variables, the FMOLS approach removes second-order bias effects. Diagnostic problems faced with conventional estimators are fixed by the FMOLS estimators. FMOLS is an estimator built by overcoming the auto-correlation problem of OLS.(see for similar study Gür 2020).

The R&D intensity is statistically significant for all countries toward reducing youth unemployment. It is seen to be effective in reducing the youth unemployment

Table 7 Westerlund and Edgerton (2007) LM bootstrap cointegration test results

LM_N^+	Old member states					
	Constant			Constant + Trend		
	Statistic	Asymptotic p-value	Bootstrap p-value	Statistic	Asymptotic p-value	Bootstrap p-value
	0.862	0.178	0.445	1.473	0.192	0.467
LM_N^+	New member states					
	Constant			Constant + Trend		
	Statistic	Asymptotic p-value	Bootstrap p-value	Statistic	Asymptotic p-value	Bootstrap p-value
	0.989	0.163	0.396	1.261	0.147	0.395

Note: The bootstrap probability values were taken from a distribution of 10,000 iterations. The asymptotic probability values were obtained from the standard normal distribution. The lag value was taken as 1

Table 8 FMOLS long-run cointegration coefficients

Old member states		New member states	
Countries	D(R&D)	Countries	D(R&D)
Belgium	−0.039[a]	Estonia	−0.025[a]
Denmark	−0.037[a]	GASC	−0.027[a]
Germany	−0.091[a]	Latvia	−0.021[a]
Ireland	−0.039[a]	Lithuania	−0.051[a]
France	−0.041[a]	Slovenia	−0.061[a]
Luxembourg	−0.072[a]	Slovakia	−0.043[a]
Netherlands	−0.039[a]	Bulgaria	−0.052[a]
Austria	−0.062[a]	Croatia	−0.044[a]
Finland	−0.092[a]	Hungary	−0.063[a]
United Kingdom	−0.072[a]	Romania	−0.047[a]
Panel	−0.056[a]	Panel	−0.041[a]

[a]Statistically significant variable for 0.05; the Newey-West method was used to try to overcome the autocorrelation and heteroscedasticity problems in the estimations

rate by 5.6% panel-wide for the old member states. It is effective in reducing the youth unemployment rate by 4.1% panel-wide for the new member states. When looking closer, the coefficient size is higher for the old member states. In the group of the new member states, R&D has a smaller impact on reducing youth unemployment. Thus, its reducing effect on youth unemployment is larger for the old member states, which are also in the category of developed countries (Table 8).

5.7 Causality Analysis

The causality test to be applied varies depending on the presence or absence of a cointegration relation between the panel series. All panel causality tests produce estimates under the assumption of horizontal cross-sectional independence. Through the Dumitrescu and Hurlin (2012) test, both horizontal cross-sectional dependence and cross-sectional independence can be estimated, and effective results can be obtained. The Dumitrescu and Hurlin (2012) test bear a resemblance to the Granger causality test for heterogeneous panels. This test signifies the average of individual Wald tests calculated for horizontal cross-section units within the Granger causality test. This test takes into account both heterogeneity and cross-sectional dependence. Another characteristic of the Dumitrescu & Hurlin test is that it functions both in the presence and absence of a cointegrated relationship. In the panel causality test, three different statistical values are computed.

As can be seen in Table 9, one-way causality was discovered between the R&D and YUR variables. The variable R&D is the Granger cause of the variable YUR, but YUR is not the Granger cause of the variable R&D (R&D → YUR).

Table 9 Dumitrescu and Hurlin (2012) test results

Old member states			
Null hypothesis	Test	Statistical values	p
The variable R&D is not the Granger cause of the variable YUR	*Whnc*	7.832	0.000[a]
	Zhnc	7.541	0.001[a]
	Ztild	7.389	0.000[a]
The variable YUR is not the Granger cause of the variable R&D	*Whnc*	1.554	0.372
	Zhnc	1.403	0.297
	Ztild	1.267	0.263
New member states			
Null hypothesis	Test	Statistical values	p
The variable R&D is not the Granger cause of the variable YUR	*Whnc*	6.352	0.000[a]
	Zhnc	6.201	0.000[a]
	Ztild	6.099	0.000[a]
The variable YUR is not the Granger cause of the variable R&D	*Whnc*	0.914	0.241
	Zhnc	0.872	0.196
	Ztild	0.803	0.115

Note: Whnc: Wald Homogenous Non-Causality; Zhnc: Aysmptotic Homogenous Non-Causality; Ztild: Aysmptotic Homogenous NonCausality
[a]Statistically significant variable at 0.05 level

6 Conclusion

Europe is experiencing a new structural change over time, influenced by globalization and technological changes. It is observed that the welfare statuses of the countries in Europe are increasingly changing, especially with the effects of this progress. As a result of globalization, the EU countries are altering the policies they apply in order to achieve economic, political, and social balance. While arising competitiveness also affects the employment, economic, and political statuses of the countries, Europe views the utilization of information technologies and the expansion of information management as a way out, especially to be able to raise the living standards, to provide more effective answers to consumer needs, and to deal with global and environmental problems. Therefore, it is thought that radical innovations currently encountered spread new knowledge more quickly with the help of actors and technologies.

Youth unemployment is one of the most serious problems of almost all countries, both developing and developed. The exclusion of young people from employment brings along several problems, including economic, social, and psychological. Therefore, preventing youth unemployment will produce effective results in solving these problems and will make positive contributions to the economic growth of countries. Today, when global competition is at the forefront, countries aim to make positive contributions to their economic growth and development processes by gaining a competitive superiority. In this regard, they tend to increase the amount

of resources used in R&D activities with the intention of creating technological innovations by following policies based on science and technology.

There are many reasons for youth unemployment, on the macro and micro scale. In this study to determine the effect of increasing R&D expenditures on youth unemployment, the data of 28 EU countries and Turkey for the period 2000–2018 were examined through panel cointegration and panel causality analyses.

According to the results of the analysis, the R&D intensity is statistically significant in all countries toward reducing youth unemployment; while, panel-wide, a 1% increase in the R&D intensity reduces youth unemployment by 5.6% for the old member states, it has a reducing effect of 4.1% for the new member states. Herein, it can be concluded that, as optimistic view advocates argue, increased R&D spending creates new employment areas through technological developments, and young people are positively affected by this situation. However, this positive effect differs in the countries subject to the analysis. When the countries are reviewed one by one, it is observed that the decrease in the youth unemployment rate as a result of R&D expenditures is higher in countries with high development levels. Since the majority of the new member countries are developing countries, they need different economic decisions and policies to reduce youth unemployment. At this point, it can be said that increasing R&D expenditures alone will not be sufficient to prevent youth unemployment, and the reasons that negatively affect the employment of young people should be specifically investigated based on individual countries and solutions should be developed accordingly. Although policies adopted against the unemployment problem vary from country to country, various alternative solutions should be tried such as creating mostly new job opportunities with the policies implemented, improving the quality of the workforce, and following policies intended for the regulation of the labor market.

For the developed policies and strategies to be efficient, studies should be more detailed, and a long-term program should be prepared. According to the results of these programs, efficient policies and strategies should be identified, and the deficiencies noticed by the member states should be resolved. Successful policies and practices determined by benchmarking studies should also be adapted by member states. Consequently, it will be possible for the European Union to close the gap between itself and its competitors and reach its target faster.

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Autonomous Vehicles Adoption as a Facilitator of Driving and Usage Patterns' Change

Klara Ljubi and Aleš Groznik

Abstract Autonomous vehicles (AV) will shift from a mere means of transport towards becoming a diverse environment where different activities could be carried out. This would lead to a change in driving and usage patterns. Since these patterns are a novel field that is scarcely covered in the current literature, the purpose of this paper is to explore the changes in a generation of millennials, as their interaction with smart technologies is incomparable to any previous generation, suggesting them as early AV adopters. The paper focuses on the perceptions of millennials regarding in-vehicle time usage and situations when AV could be sent somewhere to conduct something instead of an individual. The data is collected with a survey questionnaire and analyzed with descriptive statistics. Furthermore, millennials are divided into groups according to technology enthusiasm, and t-test is performed to observe the differences between technologically more and technologically less enthusiastic individuals. Millennials are shown to have a more positive perceptions of activities that could already be carried out in conventional vehicles, while opinions on those specific to AV are more neutral. In addition, no significant differences are observed between technologically more and technologically less enthusiastic individuals were observed, indicating that technology enthusiasm has little effect on AV-specific activities. This could be due to the fact that individuals still have vague perceptions of them; however, additional research would be needed for a deeper understanding.

Keywords Smart mobility · Future transport · Autonomous vehicles · Driving patterns · Usage patterns · In-vehicle time

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1 Introduction

AV or self-driving vehicles are vehicles in which operation does not require direct driver input to control the steering, acceleration, and braking (Fleetwood 2017). AV will require changes in public economies as well as affect the innovation and investment strategies (Benevolo et al. 2016; Noy and Givoni 2018). One of the significant AV adoption factors is the perceived benefits of AV adoption (Manfreda et al. 2021). Related to this, AV are expected to improve traffic flow (Papadoulis et al. 2019) and safety (Wadud et al. 2016), reduce congestion (Wadud et al. 2016) and demand for parking (Millard-Ball 2019). Besides that, the efficiency of the users is expected to increase as AV will offer new ways of spending in-vehicle time or the time when AV will do something instead of a person (Bansal et al. 2016). When compared to conventional vehicles, the latter are primarily considered as a means of transport from point A to point B while AV would introduce new ways of understanding mobility and spending time. Those who are nowadays vehicle drivers would be able to engage in other activities rather than driving once AV become commercially used.

Skeete (2018) already emphasized a lack of non-technologically oriented studies in the area of AV; however, perceptions of individuals regarding driving and usage patterns of AV are of equal importance in order to achieve widespread adoption of this new technology. Thus, the purpose of our research is to examine the views on efficient in-vehicle time usage that will transform the vehicles from a mere means of transport to the diverse environment where several activities could be conducted while driving. With these, the paper contributes to a more individual-related aspect of AV adoption rather than technology-related. Moreover, it focuses on the perceptions of millennials regarding in-vehicle time usage and situations when AV could be sent somewhere to conduct something instead of an individual that is scarcely covered in the current literature. The paper is divided into four parts. Firstly, the literature review briefly introduces the relevant concepts and research questions are set. This is followed by the presentation of the research methodology. Further, the results and discussion specify our main findings and, lastly, concluding remarks are outlined.

2 Literature Review

Ubiquitous digital transformation or digitalization has reshaped global economies, business processes, and business models, brought an extinction of some of the business models as well as the development of new ones. Digital transformation as "the changes that the digital technology causes or influences in all aspects of human life" (Stolterman and Fors 2004, p. 689) or "the use of new digital technologies that enables major business improvements and influences all aspects of consumers' life" (Reis et al. 2018, p. 418) is introducing new ways of spending time and conducting

business (Berman 2012; Loebbecke and Picot 2015) which are the changes that lead us towards a paradigm shift in transportation.

Even though digital transformation depends on information and communication technology, technology is still merely an enabler or a precondition for utilizing the full benefits. The technology becomes valuable only when it is upgraded by the right processes and skills as well as supported and accepted by potential users (Ismagilova et al. 2019; Peng et al. 2017) and co-integrated with and into the local community (Mittal and Sethi 2018). It results in improving the quality of life from social, technical, and economic aspects in smart cities.

The adoption of technologies related to phenomena stemming from digital transformation have been successfully explained by the technology adoption model (TAM) despite being developed by Fred D. Davis already in 1989 before the dispersion of digital transformation (Davis 1989). For example, Kelana et al. (2017) confirmed the TAM on the example of e-payment adoption by millennials by adding gender as a moderating variable. Originally, TAM builds upon two constructs. First, perceived usefulness states that potential users' belief that the new technology will increase their performance is reflected in the adoption of new technologies. Second, perceived ease of use represents potential users' belief that the use of the system does not require much effort (Davis 1989). Further, the extensions and modifications of TAM lead to new models' propositions, e.g., unified theory of acceptance, and use of technology model (UTAUT) (Venkatesh et al. 2003), UTAUT 2 model (Venkatesh et al. 2012), car technology acceptance model (CTAM), considering different factors the authors found as influential. Similarly, we took the models from the literature as a foundation of our research taking into account that willingness to adopt new technologies positively influences AV adoption (Manfreda et al. 2021). We adapted the models to suit the nature of our study in order to explain the adoption of new technology, i.e., AV, among millennials.

Millennials as a young generation between 20 and 30 years old are taken as our focus research group since they are liberal, opened to change, born into a setting of digital technologies as well as social media (Taylor and Keeter 2010). Their interaction with smart technologies is incomparable to any previous generation (Au-Yong-Oliveira et al. 2018). To understand the attitude towards new technologies, millennials were already engaged in several examples related to digital transformation, e.g., AV (Shabanpour et al. 2018), e-payment (Kelana et al. 2017), social media marketing communication (Duffett and Wakeham 2016), libraries and bookstores (Jones 2008). Considering the characteristics of millennials and the fact they will represent near-future workforce with increasing purchasing power suggests them as early AV adopters and, therefore, justifies the choice of a sample for our research.

AV or self-driving vehicles could be characterized as vehicles that are operating without direct input from the driver for steering, acceleration, and braking and designed so that the driver is not expected to constantly monitor the roadway when operating in self-driving mode (Fleetwood 2017). As such, they represent an important component of smart cities that would bring improved quality of life to their citizens from economic, social, and technical aspects, and deliver the products

of the higher level of innovation and quality (Ismagilova et al. 2019; Peng et al. 2017) as well as improve sustainability, livability, and well-being (Yigitcanlar et al. 2018). The smart infrastructure in smart cities is enabled and supported by the dispersion of information and communication technology, its surrounding network the Internet of Things, that offers real-time data transmission, and artificial intelligence (Appio et al. 2019; Ardolino et al. 2017; Eldrandaly et al. 2019;).

Smart mobility as one component of smart cities is introducing a paradigm shift in transportation leading it to become more intelligent, interconnected, and efficient. Different intelligent analytic tools are flooding the market in order to support its development (Lee et al. 2014). However, smart mobility has been under-researched phenomenon, but its potential benefits aroused interest among researchers (Ismagilova et al. 2019) as well as policymakers and investors around the world (Benevolo et al. 2016; Noy and Givoni 2018). Further, the Ministry of Urban Development (2015) states that a smart city infrastructure should include diverse means of transport making AV a necessary component of smart mobility in order to increase the diversity of smart mobility together with other modern means of transport, e.g., shared mobility and autonomous public transport, offering a reduction in a need for parking space and vehicle ownership (Jadaan et al. 2017; Pettigrew et al. 2019; Zhou et al. 2020). AV are expected to improve safety and reduce accidents, improve energy efficiency, reduce environmental impact, road congestion, and demand for parking and offer better time efficiency to passengers (Jadaan et al. 2017; Millard-Ball 2019; Stager et al. 2018; Wadud et al. 2016). However, these benefits are subject to the level of AV adoption which depends on several factors. Human-related factors are among the most important decisive factors that could lead to the adoption or rejection of a new technology. Accordingly, Osswald et al. (2012) emphasized the importance of knowing the factors that influence the behavior regarding the adoption of new technologies in order to successfully support decision-making processes and lower adoption barriers.

Research to date has shown a positive relationship between the attitude towards technology and perceived adoption and benefits of AV (Acheampong and Cugurullo 2019; Haboucha et al. 2017; Lee and Mirman 2018). Further, perceived safety, perceived concerns, and perceived benefits were confirmed as the most influential factors for AV adoption (Manfreda et al. 2021). AV could serve the elderly, the immobile, and children by reducing their dependence on third parties who take care of their transportation (Lee and Mirman 2018; Whittle et al. 2019; Yang and Coughlin 2014). In addition, assistive systems that are implemented in the AV are also useful for everyday driving and only assist the drivers who are otherwise capable of driving alone. J. H. Lee et al. (2014) reported a growing number of real-time intelligent analytical tools supporting integrated services in the city of San Francisco. Further, similar systems could suggest more optimal driving, predict situations, adjust speed, or choose less trafficked roads (Bansal et al. 2016; Kyriakidis et al. 2015; Schoettle and Michael 2015).

Either these assistive technologies or fully AV, both will change driving and usage patterns related to everyday driving. An increased number of interconnected technologies in cities will allow the citizens to more efficiently use their existing time

as well as embrace new ways of spending free time or in-vehicle time (Bansal et al. 2016; Lee and Mirman 2018; Schoettle and Michael 2015; Zmud et al. 2016). The citizens could be picked up and dropped off at their desired destinations and, accordingly, save time and money associated with parking space searching (Haboucha et al. 2017; Kaltenhäuser et al. 2020). Besides AV primarily used for private driving (Kaltenhäuser et al. 2020), they could be incorporated into public transport that would result in vehicle ownership reduction (Jadaan et al. 2017; Pettigrew et al. 2019). Further, AV would introduce changes in the design of intersections, e.g., no more conventional signals, road lanes, e.g., narrower lanes and consequently more lanes, and pick up and drop off points (Narayan et al. 2020).

Next, assistive technologies that are being installed either in conventional vehicles or AV are affecting driving patterns and allowing them to change. Assistive technologies in non-fully AV are only assisting or helping the drivers with their driving. Among these, we find, e.g., parking assistance, lane-keeping assist, lane change assist, emergency braking, and blind-spot detection (Tennant et al. 2019). In AV, similar technologies are being installed and developed to the level where they do not require any driver control. Therefore, the drivers will be able to multitask in AV as they already can in some other means of transport, e.g., train or bus, as suggested by Malokin et al. (2019). Kim et al. (2020) reviewed driving changes resulting from AV adoption focusing on everyday activities, e.g., grocery store or restaurant location choice.

Another perspective is the changes related to vehicle usage in terms of in-vehicle time usage. Malokin et al. (2019) in their research revealed many papers where it has been argued that in-vehicle or travel time is wasted and inefficiently used which could be changed with the introduction of AV. Lee et al. (2019) emphasized that exactly those benefits of AV that are unique to them compared to conventional vehicles are particularly persuasive for potential users. As efficient in-vehicle time usage and the activities that could be performed while driving are areas that have been scarcely researched by now, it is of our interest to explore how will the driving and usage patterns change with regard to efficient in-vehicle time usage, i.e., which activities are future AV users willing to engage in when driving in AV and which are the activities that AV would perform instead of them.

3 Research Questions and Methodology

Understanding the AV driving and usage patterns and perceptions regarding AV in-vehicle time spending can make an important contribution to theory as well as practice. Literature review suggests that not only technology-related aspects are of consideration when dealing with AV adoption, but human-related aspects are of equal if not higher importance in the transport industry and mobility sector shifts. Combining literature review, our previous research, and observations, our aim is to further examine the attitude of millennials towards AV. Accordingly, our research questions could be stated as follows:

- Q1. Which are the in-vehicle activities that will millennials engage in AV?
- Q2. Which activities will AV conduct instead of millennials?
- Q3. Do the differences between technologically more and less enthusiastic millennials regarding in-vehicle activities exist?

In-vehicle activities are extracted from the literature review. We looked at the activities that are performed in the vehicle while driving as well as the activities that could be performed in a situation when AV completes an activity instead of a person since these are the two perspectives in which AV is facilitating driving and usage patterns' changes. Even though AV performance is getting closer to human-driven vehicles (Jadaan et al. 2017; Pettigrew et al. 2019), AV are not yet at a level of development that they could be widely used on public roads; however, their adoption has long-term implications (Hulse et al. 2018) making their development a continuing process. Further, assistive technologies that are becoming a part of conventional vehicles are affecting driving and usage patterns already in a short term. Therefore, we planned to provide insights into the activities that millennials would engage in when driving in AV. Our intention is to look at the perceptions from the perspective of three groups, i.e., technologically more enthusiastic, neutral, and technologically less enthusiastic millennials. Determining the existence of differences between the groups would allow for understanding whether different approaches are required to address different groups. In addition, the information would be valuable for policymakers and car manufacturers who are designing strategies and investment policies.

The research is based on a web-administered questionnaire that was distributed to a sample of Slovenian millennials. Besides the questions related to reasons for AV usage and in-vehicle activities that were measured on a Likert scale from 1 as "strongly disagree" to 5 as "strongly agree," the questionnaire consisted of other AV-related aspects and perceptions regarding semi- and fully AV including privacy issues, security, safety, and efficiency as well as demographics.

Slovenian millennials between 20 and 30 years old were invited to complete an online questionnaire between May and July 2019. Among 408 individuals, 277 completed questionnaires were valid with all the necessary data. Table 1 summarizes a profile of the respondents. Around two-thirds of our sample were females and around one-third were males. At the time of the questionnaire distribution, most of the participants were obtaining a bachelor's degree or, put differently, possessing secondary or lower education. Only 5.9% of the participants specified that they neither drive once per week whereas most of them were possessing a driver's license. The type of settlement was diverse.

Our further interest was the daily habits of millennials and their preferred means of transport or mobility. The results are evident from Table 2. Walking is the most commonly used means of "transport" (transport in parentheses as walking might not be primarily considered as transport) for more than half of the respondents, followed by personal car and public transport.

In order to examine the excitement on different levels of automation, we analyzed the millennials' desire to own different vehicles if there were no financial

Table 1 Profile of respondents

Variable		Share (%)
Gender	Male	38.5
	Female	61.5
Education	Secondary or less	76.2
	Tertiary	23.8
Frequency of driving	Do not drive	6.4
	Less than one time per week	11.7
	1–2 times per week	21.2
	3–4 times per week	17.7
	5 times per week or more	43.0
Type of settlement	Urban settlement	41.9
	Suburban areas	24.5
	Small city	26.8
	Village areas	6.8

Source: Authors own study

Table 2 Preferred means of transport or mobility

Means of transport	Daily (%)	Weekly (%)	Monthly (%)	Occasionally (%)	Never (%)
Personal car	48.7	35.1	7.5	6.0	2.6
Rent a car	0.0	0.4	0.0	11.7	87.9
Taxi	0.0	1.9	10.9	59.2	27.9
Car sharing	3.8	14.3	8.3	18.5	55.1
Public transport	35.1	18.9	12.8	26.4	6.8
Bicycle	9.4	18.1	12.8	35.5	24.2
Walking	57.4	22.6	6.4	12.8	0.8

Source: Authors own study

restrictions. Millennials were asked to define the likelihood of owning a vehicle with a particular level of automation ranging from no automation to full automation, i.e., a transfer of all safety-critical driving functions from the driver to the vehicle (Osswald et al. 2012). According to Fig. 1, at least some automation in the vehicles is of interest for millennials. Considering the scale with the values "surely no" as 1, "no" as 2, "maybe" as 3 and "yes" as 4, first, third and fourth levels turned out as the most popular choices while millennials would less likely own a vehicle without automation in case of unlimited financial budget.

4 Results and Discussion

As a result of AV adoption, vehicles will no longer be merely a means of transport. Instead, they will be shifting towards becoming a diverse environment that will offer a conduction of several activities which were by now carried out in leisure time.

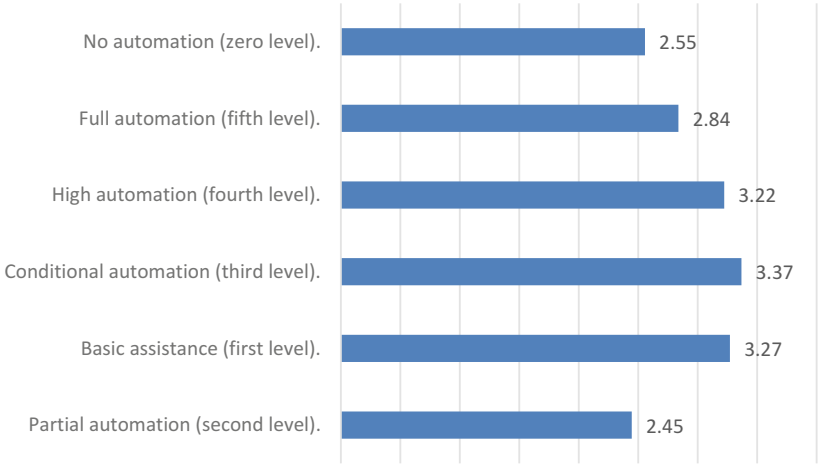

Fig. 1 Levels of AV in which millennials would be interested. (Source: Authors own study)

Table 3 The attitudes towards different in-vehicle activities by millennials

In-vehicle activities	Mean	Std. deviation
Listening to the music or radio	4.18	0.755
Chatting with co-passengers	4.16	0.830
Observing the environment	4.11	0.857
Using mobile phone, texting, or making phone calls	3.87	1.018
Checking emails or browsing the internet	3.79	1.070
Drinking or eating	3.64	1.082
Watching movies	3.14	1.129
Resting or sleeping	3.06	1.316
Reading books, newspapers, or magazines	3.04	1.205
Doing nothing	3.04	1.344

Source: Authors own study

Driving and usage patterns will change; therefore, we wanted to explore how individuals plan to make use of their in-vehicle time. There are some activities that could already be conducted in conventional vehicles, e.g., listening to the radio or chatting with co-passengers, whereas others offer new ways of spending in-vehicle time, e.g., reading books or eating. As Table 3 shows, millennials have been proven as inclined towards efficient in-vehicle time usage since all arithmetic means calculated for in-vehicle activities score above 3.00 on a Likert scale from 1 to 5. However, there was a more positive attitude towards the activities that could already be undertaken in non-autonomous driving, whereas the views on activities where the driver would hand complete control over AV are more neutral. This is of no surprise since conventional driving is closer to people as well as they are already used to conducting those activities while driving, while autonomous driving is still more

Table 4 The interest in the situations related to AV performing the activities instead of individuals

Activities	Mean	Std. deviation
Stay at home and do other things	4.06	0.904
Rest or relax	3.94	0.989
Stay at work	3.85	0.965
Be unable to drive due to tiredness	3.83	1.015
Specific route is too stressful	3.43	1.063
Be unable to drive due to alcohol, drugs, or medication	3.14	1.410
Specific route is congested	2.92	1.216
Specific route is too boring	2.87	1.178
To pick up my children or drive them to extracurricular activities	2.64	1.142
Stay at home and do other things	4.06	0.904

Source: Authors own study

theoretical than the practical concept and people might not be able to imagine the exact situations.

We further observed interest related to situations where AV could perform the driving instead of the individuals. Millennials would be willing to hand control to AV in order to either do other things at home or work or rest and relax. Moreover, they are inclined to drive in the AV in case of their inability to drive due to tiredness, alcohol, drugs, or medication impairment. Most of the arithmetic means in Table 4 are higher than 3.00 which on a Likert scale from 1 to 5 means that the millennials perceive these situations from positively to neutrally. Oppositely, congested or boring routes are less likely to be the situations which AV would perform instead of an individual which could be explained by the fact that driving alone represents a fun and enjoyable activity for many people and they would not give it up due to congested or boring routes. Less positive perceptions regarding picking up children could be explained by the fact that people might get some other things done when driving children to extracurricular activities.

Next, four items were used to measure millennials' attitudes towards new technologies in order to group them depending on their technology enthusiasm. These four items were measured on a Likert scale from 1 to 4 and are the following: (1) understanding new technologies as a contribution to increased living standards, (2) being a user of new technology right after its availability on the market, (3) being hesitant to new technology usage and (4) postponing the usage of new technology as long as it becomes inevitable. Considering these items, the average value measuring the enthusiasm regarding new technologies was calculated. The distribution of values is presented in Fig. 2. Based on normality testing, we outlined that millennials are normally distributed regarding their technology enthusiasm (Skewness −0.039 and Kurtosis −0.284) (Tabachnick and Fidel, 2007 cited in Zaremohzzabieh et al., 2015; Byrne, 2010 cited in Zaremohzzabieh et al., 2015). Table 5 shows the proportion of millennials in certain groups. The first group, i.e., technologically less enthusiastic, represents the smallest share of individuals followed by the third group, i.e., technologically more enthusiastic, with the second-highest share. Both together make up

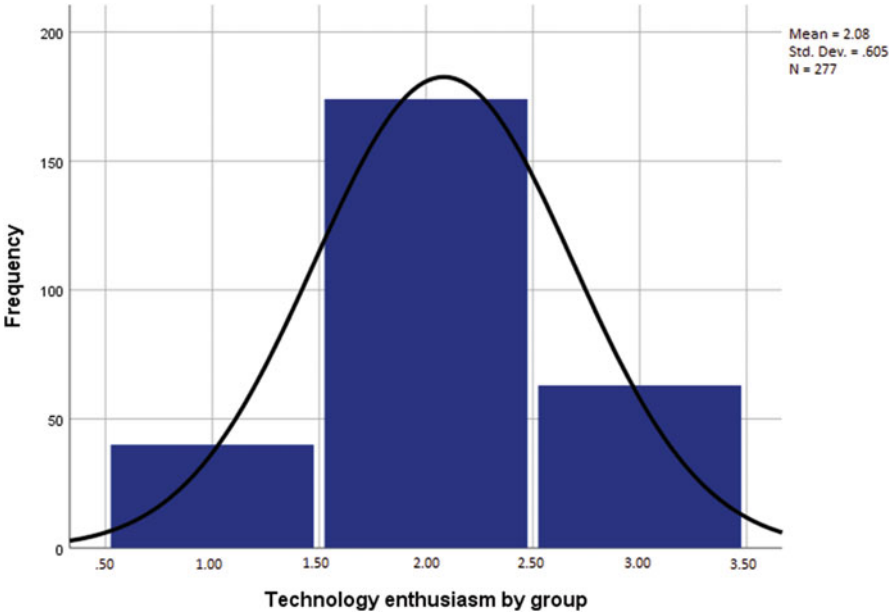

Fig. 2 Distribution of average values for technology enthusiasm. (Source: Authors own study)

Table 5 Distribution of millennials within three specified technology enthusiastic groups

Group	Frequency	Valid percent
1—Technologically less enthusiastic	40	14.4
2—Neutral regarding technology	174	62.8
3—Technologically more enthusiastic	63	22.7
Total	277	100.0

Source: Authors own study

about a third of individuals which is consistent with the literature indicating a lower proportion of technologically more and technologically less enthusiastic individuals as the two extremes (Hossain et al. 2019; Ruggeri et al. 2018).

T-test for equality of means was performed and, according to the table in Appendix, no significant differences were observed between the groups for most of the activities. This is of no surprise since the technology is relatively new and trust into it on a questionable level but being one important factor for AV adoption (Hossain et al. 2019; Ruggeri et al. 2018). Therefore, people have concerns not only to drive in AV but even more so that they give control to AV completely and do other activities instead of driving. Taking into account these findings, the adoption of AV could be understood at two levels. First, people are becoming familiar with technology and its benefits, building trust into AV and accepting it on public roads. At this phase, they might still want to be able to take control in unexpected circumstances. Second, once the initial concerns are overcome and trust gained,

which would result in widespread AV adoption, people would start thinking about activities that could be conducted while driving. As in-vehicle activities could be ranked at the second level of adoption, either technologically more enthusiastic or technologically less enthusiastic individuals still have vague perceptions of them. Further analysis of activities that showed statistically significant differences should be performed.

Xu et al. (2018) confirmed perceived benefits as an influential factor for AV adoption consisting of the benefits that mostly relate to societal benefits. These are communicated and promoted well as part of the broader concept of smart cities while the awareness of the benefits belonging exclusively to individuals, e.g., efficient time usage, are not so widely recognized. In a short term, people will still consider AV as a mere means of transport rather than an environment for conducting other activities in terms of multitasking even though AV are expected to transform the transport industry. Consequently, no significant differences between technologically more and technologically less enthusiastic millennials were observed since in-vehicle activities are still too distant phenomenon and technology enthusiasm does not have much impact. Lack of knowledge about driving and usage patterns of AV should be filled with further research. Therefore, our research is a contribution to the current literature.

5 Conclusion

AV will become an integral part of smart mobility as one component of smart cities. Clearly, lives and business will change from several aspects and the living standards increase; however, there are still under- or unresearched areas that have to be further considered. This research shed a light on one of them, i.e., in-vehicle time usage. Millennials as early AV adopters are increasingly in favor of using different autonomous systems installed in the vehicles and are looking forward to the era in which they would be able to productively use their in-vehicle time when the vehicles will shift from a mere means of transport and become a diverse environment offering a conduction of several activities that are so far carried out in leisure time.

Our results showed that among the activities in which millennials would engage in the AV, the highest ranked activities are those that could already be conducted in conventional vehicles, e.g., listening to music or radio, chatting with co-passengers, and observing the environment. Oppositely, millennials are more neutral towards the activities that are specific to AV, e.g., watching movies, resting or sleeping, and reading books, newspapers, or magazines. Moreover, they are less inclined to send AV to conduct an activity instead of them. However, in situations when AV would be conducting an activity, millennials would prefer to stay at home or work and rest or relax. In the perceptions regarding in-vehicle activities, no much significant differences between technologically more and technologically less enthusiastic individuals were observed since this phenomenon might be still too distant and, notwithstanding technology enthusiasm, individuals for now more focus on societal benefits and overcoming initial concerns rather than more efficient in-vehicle time usage.

Appendix: Independent Samples t-Test

		Levene's test for equality of variances		t-Test for equality of means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean difference	Std. error difference	95% Confidence interval of the difference	
									Lower	Upper
Resting or sleeping in AV	EVA	1.856	0.174	2.122	275	0.035	0.346	0.163	0.025	0.668
	EVNA			2.157	228.199	0.032	0.346	0.161	0.030	0.663
Listening to the music or radio	EVA	1.736	0.189	−1.543	275	0.124	−0.145	0.094	−0.329	0.040
	EVNA			−1.487	192.221	0.139	−0.145	0.097	−0.337	0.047
Using mobile phone, texting or making phone calls	EVA	2.099	0.149	1.433	275	0.153	0.191	0.133	−0.071	0.453
	EVNA			1.447	223.702	0.149	0.191	0.132	−0.069	0.451
Checking emails or browsing the internet	EVA	15.187	0.000	2.611	275	0.010	0.347	0.133	0.085	0.608
	EVNA			2.776	257.086	0.006	0.347	0.125	0.101	0.593
Watching movies	EVA	1.356	0.245	1.674	275	0.095	0.256	0.153	−0.045	0.556
	EVNA			1.700	227.740	0.090	0.256	0.150	−0.041	0.552
Reading books, newspapers or magazines	EVA	0.502	0.479	1.024	275	0.307	0.158	0.154	−0.146	0.461
	EVNA			1.036	225.053	0.301	0.158	0.152	−0.142	0.458
Drinking or eating	EVA	5.592	0.019	1.972	275	0.050	0.266	0.135	0.000	0.532
	EVNA			2.002	227.699	0.046	0.266	0.133	0.004	0.528
Chatting with co-passengers	EVA	0.651	0.421	−0.696	275	0.487	−0.072	0.103	−0.274	0.131
	EVNA			−0.703	223.560	0.483	−0.072	0.102	−0.272	0.129
Observing the environment	EVA	0.091	0.763	−0.691	275	0.490	−0.075	0.109	−0.290	0.139
	EVNA			−0.691	216.388	0.490	−0.075	0.109	−0.290	0.139
Stay at home and do other things	EVA	0.040	0.842	1.769	275	0.078	0.200	0.113	−0.023	0.423
	EVNA			1.848	246.782	0.066	0.200	0.108	−0.013	0.413

Stay at work	EVA	0.591	0.443	−0.284	275	0.777	−0.034	0.121	−0.273	0.204
	EVNA			−0.282	213.030	0.778	−0.034	0.122	−0.274	0.206
Rest or relax at home	EVA	2.393	0.123	2.466	275	0.014	0.302	0.123	0.061	0.543
	EVNA			2.551	240.038	0.011	0.302	0.118	0.069	0.536
Be unable to drive due to alcohol, drugs or medication	EVA	2.386	0.124	0.239	275	0.812	0.042	0.176	−0.305	0.389
	EVNA			0.242	227.461	0.809	0.042	0.174	−0.300	0.384
Be unable to drive due to tiredness	EVA	5.197	0.023	−2.269	275	0.024	−0.292	0.129	−0.546	−0.039
	EVNA			−2.159	184.662	0.032	−0.292	0.135	−0.559	−0.025
Specific route is too boring	EVA	1.291	0.257	1.478	275	0.141	0.218	0.147	−0.072	0.508
	EVNA			1.497	225.927	0.136	0.218	0.145	−0.069	0.504
Specific route is congested	EVA	0.307	0.580	−0.775	275	0.439	−0.117	0.151	−0.416	0.181
	EVNA			−0.787	227.685	0.432	−0.117	0.149	−0.411	0.177
Specific route is too stressful	EVA	2.296	0.131	−1.204	275	0.230	−0.159	0.132	−0.418	0.101
	EVNA			−1.167	196.167	0.245	−0.159	0.136	−0.427	0.109
To pick up my children or drive them to extra-curricular activities	EVA	3.947	0.048	1.365	275	0.173	0.193	0.141	−0.085	0.472
	EVNA			1.414	241.203	0.159	0.193	0.137	−0.076	0.462

Note: EVA = Equal variances assumed, EVNA = Equal variances not assumed

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The Social Construction of Identities in Migrant–Refugee Generation: The Role of the Tutor as a Leader in Multicultural Leadership

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Abstract The trends that have been witnessed over the last 15 years with regard to immigration to Greece are particularly strong and definitely without any historical evidence. These advancements have obviously changed Greece's position on the geopolitical map, providing it a place in the host countries of immigrants, while it has historically been a country of expatriates. Interestingly, the intensification of migration flows, especially when combined with the expansion of the role of migration for the temporal changes of the population as a whole, name for an increase in the importance of migration as a demographic and social component as a whole. The Greek policies concerning the role of the tutor as a leader in multicultural environments are gathered, studied, and analyzed. Fragmentation of policies, which falls in line with the attempts to solve the problems of refugees, are key components. The most relevant effect of this circumstance is not limited to the economic and political implications of the lives of the first immigrants, but primarily to the negative prospects of a stable social integration and prosperity for their descendants, i.e., the second- and third-generation "immigrants," who are invited—and often in the literal sense indigenous—to cope with this situation.

Keywords Multicultural leadership · Integration · First-Second-Third-generation migrants · Greek community

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1 Introduction

Identities have their origins in the overwhelming multitude of relationships that the person has participated in and that have influenced or formed essential parts of his life. Such relationships range from close interpersonal relationships, such as friendships and family relationships, to relationships and positions identified by social classes, professions, and relationships identified by gender, sex, and ethnicity (Benhabib 2002; Hogg and Vaughan 2010). European nations including Germany and the United Kingdom have appeared to consider multiculturalism to be identified as an equilibrium of the diversity of ethnic groups which can adequately maintain a differentiated culture and identity framework (Kerry 2011). The evaluation of the effect of ethnicity culture is important in a world where ethnic diversity is increasing (Theoharis and O'Toole 2011) as it occurs in Greece due to a high percentage of immigrants. Empirical social studies in other countries demonstrate that the first generation of immigrants remains limited to zero integration in the host country. Several studies were conducted for second- and third-generation migrants. According to a survey conducted by the International Organization for Migration (IOM 2020), the majority of immigrant and refugee children (62%) attended school in their home countries. The overwhelming majority of respondents (84%) reported either having friends already or engaging frequently with students from Greece or other countries and incorporating them effortlessly into the school environment.

Leadership in multicultural environments enhances a critical role in fostering the value and growth of institutional cultural competence. Leaders should ensure that this activity is a priority for the organization, tend to solve challenges, and act as a model. Leadership can actually occur in any organization, whether private or public, and not only official leaders, as the word can sometimes refer to. It is widely recognized that the impetus for the differentiation of roles and responsibilities is partly due to a growing awareness of the workload of leaders and other executives, especially in education systems with a high degree of decentralization within the school context.

The development of the leading characteristic of a modern tutor in the framework of a multicultural Greek reality is incontrovertible. In an ever-changing environment due to uninterrupted social and political developments, the teacher leader is termed upon to deal with social change, reform policies, the seamless integration of the school population, and in some cases, to act informally as a mediator in possible conflicts in order to be attained a proper coexistence. The need to examine its position in Greece can be illustrated as a result of migration flows and as an indication of good practice for countries where migration flows and the incorporation of immigrants into the school environment are more standardized. The purpose of this chapter is to examine the creation of the concept of "new political identity in the era of migration flows" as appears through the identities of the immigrant–refugee generation. Furthermore, it would be attempted to be analyzed bibliographically the role of the leadership, as leadership in multicultural environments

enhances a critical role in fostering the value and growth of institutional cultural competence.

2 The Identity Framework

The classic approach of signifier and signified may be useful in the understanding of the identities of the migrant–refugee generation as each particular event (signifier) or a series of such events is presented so that its meaning is based on the meaning of a more general term (signified). Social identity is also directly associated with self-esteem, as group affiliation, status, and prestige are incorporated into interpersonal self-perception (Crocker and Major 1994). Social interaction seems to be a process dependent on people's perception of who they are and who others are. Fully understanding who others are, on the other hand, helps one comprehend the thoughts and actions of others. Awareness of identity systems and control of human interaction, and in addition, interactive and social systems provide identities, as in the case of refugees, where their social identity is defined by past and present interactions (Hogg and Vaughan 2010).

Thanks to the limitations of the human species to think introspectively, one can think about oneself, who one is, how one would like to be, and how one would like to be seen by others. Self and identity are indeed essential aspects of human existence (Hogg and Vaughan 2010). Consequently, as individuals vary in self-complexity, they vary considerably in the complexity of their identities as a result of the different roles held by individuals within the different social groups to which they belong (Roccas and Brewer 2002).

Brewer and Gardner (1996) differentiated three types of self. The first type is the individual self, which is characterized by personal characteristics that differentiate the self from all others. The second form is the relational self, which is characterized by hierarchical relationships that incorporate the self into other significant individuals, and finally, the third type of the self is the collective self, which is characterized by the presence in a community that distinguishes "we" from "them." In addition, it is worth acknowledging the theory of symbolic self-interaction, which is the identification of oneself as arising and formed by social interaction, which refers to the exchange of verbal and nonverbal symbols, which are typically the product of agreement, representing abstract properties rather than tangible objects (Hogg and Vaughan 2010)

With respect to the types of identities, Tajfel and Turner (1986) argue that there are two general types of identities that describe themselves. On the one hand, there is the social identity that defines oneself on the basis of terms related to group involvement and, on the other, there is the personal identity that determines oneself on the basis of terms related to personal relationships and temperamental characteristics (Otten and Wentura 1999). In accordance with the alteration of the identity of individuals who are either subject to migration themselves or who undergo a wave of

migration in their region of residence and consolidation, it is apparent that there may be a differentiation between the two forms of identity.

More explicitly, European social psychologists, such as Tajfel and Turner (1986), use the word social identity to relate to the perspective of self-perception that is associated with individual involvement in different groups. In American terminology, it is alluded to as group identity, while the word "social identity" is used to refer to interpersonal areas and social roles (Luhtanen and Crocker 1992). As far as personal identity is concerned, it has little to do with group processes, while group life can provide a structure for the creation of personal identities (Hogg et al. 2004). Personal identity, which distinguishes the unique self from all other self, determines the social identity, which is internalization, often of stereotypes and collective recognition. Social identification is perhaps the most relevant influence on human behavior (Turner et al. 1987).

The group is a human collective whose members acknowledge its existence and participation in it and is therefore delineated by the mutual recognition of its members (Jenkins 2008). Groups, as sections of society who share the same social identity, interact with each other for an appreciably positive distinctive character, as is evident in immigrant communities. Social identity is related to group and group practices such as ethnocentrism, group unity and cohesion, intragroup bias and favoritism, group segregation, compliance, normal behavior, prejudice, and stereotyping.

It is also argued that the ambiguity of identities protects individuals from stress and is correlated with tolerance to change and resistance to conservatism (Fiske 2004). In particular, the view can extend to immigrant communities where the prevalence of stressful circumstances is especially high. Research has shown that as context factors alter, people identify themselves in several varied contexts, and can even behave differently in various situations (Hogg and Vaughan 2010). For example, the classification of an individual as a member of a group distinguishes entities from an outside group, abides by the norms of the inner group, communicates feelings and attitudes in favor of the inner group, and expresses a sense of belonging and devotion to the inner community (Tajfel and Turner 1979; Dalbert and Dzuka 2004).

Turner et al. (1994) contend that categorization is defined by "comparative relations." The conceptual formulation of the idea of social identity by Messick and Mackie (1989) also highlights the sense of the intragroup, and Van Knippenberg and Ellemers (1993) note that social identity is generally defined by comparisons with other similar social categories of groups. Deaux (1996) states in his analysis that the concept of comparison is fundamental to the theory of social identity. Eventually, Brewer (1991, 1993) recognizes the idea of social identity as a conflict between inclusion and distinctiveness, which is gained by contrasts between communities. She concludes that the necessity for a sense of belonging is the key reason for claiming a social identity within the group (Brewer 1991). Social identity, on the other hand, reinforces the sense of belonging. That is why social identity needs at least one other party to be associated with (Fiske 2004).

3 The Tutor as a Leader—The Case of Greece

In recent decades, Greece has attracted a substantial number of refugees, a phenomenon that has contributed to the internationalization of the economy, the evolution of technology, but also the intensification of policies aimed at incorporating a pluralistic new culture into the sociocultural and educational context. The ensuing social realignment has contributed to reforms in the field of education, which concerned not only the functional process of incorporation of refugees and immigrants but also the need to establish an educational framework capable of integrating the potential vibrations of social subsets. As a result, this multicultural challenge broadened the position of educator, including the characteristics of leader (Markou and Parthenis 2015).

A survey conducted on the perceptions of Greek pupils, students, and teachers toward Europe and national identity has shown that European identity coexists rather than contrasts with national identity but is of secondary importance in determining the social identity of respondents (Georgas et al. 2004).

People have a lot of internal selves that generate a diverse and varied self-perception. One category of multiple human selves, multiple identities (Deaux 1993; Frable 1997), highlights roles and group participation, such as the indigenous community, the group of immigrants, the group that is currently living in a hotspot. Identities are subdivided into a lot of component parts. People's professions as well as their interests are important to their identity. Political beliefs, stigmatized identities, and national identities are all meaningful. Identities are different roles that individuals hold and are socially structured (Fiske 2004).

More recent conceptions describe leadership as a decentralized phenomenon involving participants in the system of influence (Antonakis and Day 2004; Lakey et al. 1995). As Sayani (2013) claimed in the context of multicultural leadership, "It is not enough for educational leaders to help improve the academic achievement of minoritized students; they must also ensure that all their students are critically conscious of inequities that persist in our society and that they have necessary knowledge, abilities, and opportunities to redress these inequities." Arredondo (2008) argues that "multicultural understanding" is a dimension of multiculturalism. Multicultural understanding is characterized as the ability to know oneself and one's "cultural being" but to also recognize other cultures in a sense that 'leads' to meaningful relationships between individuals and groups " (Arredondo 2008), a reality that is of major concern as far as migration flows are concerned. Leaders or other entities who have "multicultural personalities" include personality types that, when assessed, evaluate highly on dimensions of cultural solidarity, social initiative, and open-mindedness (Van Woerkom and de Reuver 2009). For example, Zembylas and Iasonos (2010) focused upon the multicultural perspective of a group of principals who directed "multicultural" schools in Cyprus and evaluated results on both multicultural and leadership theory.

However, according to Rusch (2004), emerging educational leaders may conclude their degrees and achieve responsibilities and yet appear less than prepared to

address challenges of race and gender within educational institutions. The dynamic expectations of today's diverse population of students must be addressed by educators who are not only prepared with expertise and academic qualifications but also by teachers who are willing to address the diverse learning needs.

Bibliographically, it is proposed to differentiate the teacher in terms of monocultural practices with the ultimate goal of adopting the principles of intercultural education and the normalization of any conflicts, while reducing this differentiation to the profile of the modern leader. Educational versatility and pedagogical preparation are part of the profile of an intercultural educational mediator, but his/her intercultural expertise, intercultural readiness, and willingness to adapt to new data based on successful integration practices could improve his/her role in the field of leadership (Tsaliki 2016).

4 The Legal Framework of Multicultural Education

Regarding the Greek reality and in agreement with Law 2413/96 (Government Gazette 124/1996) regarding the organization and operation of intercultural education schools, the establishment of the Institute for Expatriate Education and Intercultural Education is mentioned (I.P.O.D. E.), which has as its main purpose the study and research of educational issues related to Greek education abroad, as well as the responsibility and coordination of efforts for the valid and timely execution of various programs. The responsibilities of the above body include:

1. The drafting and approval of programs, the approval and writing of textbooks, as well as the preparation of teaching material for educational units abroad and schools of Intercultural education.
2. The preparation of specifications of appropriate educational material for schools abroad, the preparation and production of subjects of tele-education, correspondence education, and telematics.
3. The training of foreign education coordinators.
4. The training of teachers who teach or are going to teach in other educational units of Greek education abroad, as well as foreign teachers working in these educational units.
5. The study of the issues of repatriated or repatriated Greeks and in particular the education of returnee students, in order to make their integration into the educational system of the country as easy and as easy as possible.
6. The study and timely treatment of any other relevant issue concerning Greek language education and Greek education abroad.
7. The care for the implementation of the means of support of the Greek education in other countries, according to the provisions of the previous article.
8. The adaptation of the programs in the schools of intercultural education according to their peculiarities.

9. The opinion on the establishment of schools of intercultural education and the study and timely treatment of any other relevant issue of intercultural education.

In a previous Law on Intercultural Education—Establishment and operation of Reception Classes and Tutoring Departments Ref. No. Φ2/37/Γ1/1124/8.12.94 (Government Gazette 930/14.12.94 τ.Β) decision of the Minister of Education states that in order for the education of returnees and foreign students to become more effective and participatory-active, so that these students can join smoothly and balanced in the Greek educational system, in the context of intercultural education, a flexible scheme of institutional and didactic intervention is formed, which allows the Association of Teachers of each Primary and Secondary Education unit, after weighing the educational needs of these students and the possibilities of to choose that shape that can work effectively and efficiently. The institutional format is as follows: Reception Class I, Reception Class II, Tutoring Department, and Classes of Extended Hours.

Intercultural Education Schools operate with the aim of: educational integration, the social integration of children of immigrant origin in the context of equality and with respect for the preservation of their cultural identity, the treatment of negative discrimination created on the basis of cultural differences, xenophobia, and racism.

These schools, according to Greek Law 4415/2016, can operate as Experimental Schools of Intercultural Education and seek cooperation with the country's universities. They implement on an experimental basis research and innovative programs related to intercultural education and the treatment of educational and social exclusion due to racial origin and cultural origin. Curricula and pedagogical methods are applied as in the existing Experimental schools. The number of Intercultural High Schools is 8.

5 Conclusion

There are various motivations, conditions, expediencies, and goals that can lead people to join or form groups. A sense of belonging and a positive relationship with others, either individually or in groups, evokes a profound and encouraging sense of self-worth and self-worth, especially in immigrants' communities. As a tutor relinquishes a picture of the structure of the student's social identity, his/her learning and behavior could really help to break down existing stereotypes toward different social groups and, in particular, racial stereotypes. Ultimately, however, the successful implementation of intercultural education in a school and even in society does not concern an individual teacher. It needs to be accepted by all tutors and leaders, who will embrace the principles of intercultural education and make themselves interculturally ready.

The attitude and behavior of the tutor, as well as the orientation of the teaching and the structure of the lesson to the content of the social groups and the identities in which the students create their social identity, would evoke the attention of the

student and motivate him to establish the different inclinations he has identified with particular groups (e.g., group dances, sports, etc.). The above shaping of the attitude and actions of the tutor, who, as an instructor, takes into consideration the social identities of his students, would reinforce mutual respect and support between the teacher and the students in the creation of a healthy environment for the integration of migration flows.

Taking into consideration the recently migrant movements witnessed and the status of Greece as the first host country, the preparation of teaching staff in this region should be the first priority for those responsible, not only at arrival points but throughout the territory of Greece. This is because the approaches of intercultural education are accepted by all as adding profoundly to the enhancement of the standard of education offered to all students of the school as they consider and involve some otherness that encourages further investigation of the topic of effective teaching practices at European level.

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How Can Evolve Support System of Innovation? Changes in the Influence of Business Support Organizations on Innovation Cooperation Based on the Example of Polish Region

Jadwiga Gorączkowska

Abstract Innovation cooperation allows the spreading of risks, especially financial risks, associated with innovative projects. This is more important for small and medium-sized enterprises that have less financial resources than large entities. At the same time, it is necessary to encourage entrepreneurs to cooperate in countries with a low level of trust. Therefore, the purpose of the study is to determine the impact of business support organizations on establishing innovative cooperation and to compare their impact in a dynamic approach. The study was conducted in small and medium-sized enterprises in the Łódź Voivodeship in Poland in two periods: 2010–2012 and 2014–2016. Two hundred and eighty-six entities participated in the study in the first period and 453 in the second. The research method used was logit modeling. The study showed that in the second research period support organizations more often contributed to establishing innovative cooperation. What was noted in particular was the activity of technology incubators and academic entrepreneurship incubators. This shows that young innovative enterprises in the early stages of development need support in building networks, and moreover that networks are important for their development. In addition, in both periods, support organizations more often initiated cooperation with other enterprises than with entities from the sphere of science. This shows that there is a huge gap between the areas of science and business in the surveyed entities.

Keywords Innovation · Cooperation · Technology parks · Incubator · Business angels · Technology transfer offices

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1 Introduction

Today, a number of studies prove the importance of innovation in economic development. Research works are focused on more and more detailed identification of relationships that connect innovation with success and competitive advantage of enterprises (Altindag et al. 2011; Gunday et al. 2011; Dzikowski and Tomaszewski 2014; Zhang et al. 2018; Dziallasa and Blinda 2019; Heredia Perez et al. 2019; Lee et al. 2019). In addition to identifying natural processes that allow entrepreneurs to become innovators, ways to support this process are sought. Europe has the opportunity to support this process, e.g., from the perspective of the Innovation Union (Cuckovic and Vuckovic 2018) as well as national economies. However, it turns out that some research related to supporting innovation contains contradictory conclusions. On the one hand, it has been proven that the SMEs awarded the grants the "EU Innovation Champions" are less engaged in the challenging dimensions of Open Innovation than companies that did not receive any funding (De Marco et al. 2020). On the other hand, in Germany, a reverse tendency was observed—grants and subsidized loans have a positive effect on investment, income, and employment growth, while grants stimulate research and development activities to a greater extent than loans (Hottenrott and Richstein 2019). The Czech financial program innovation voucher had a positive impact on the creation of innovation (Hlavacek 2017). Therefore, proper building of innovative development paths by the government is not a simple task (Martin 2020), all the more so because the geographical proximity does not have to promote cooperation (Lethiais 2018). In this context, the question arises about the right incentives for enterprises to create new products.

From the point of view of enterprises, especially small and medium, it is important to spread the risk associated with the implementation of innovation. For this reason, it is profitable to implement new products in cooperation with other entities. In the chapter, the author wishes to check whether institutional forms of stimulating innovation activity, such as: technology parks, technology transfer offices, university business incubators, technology incubators, business angel networks, local/regional loan funds, credit guarantee funds, training and consulting centers, encourage entrepreneurs to create innovations in cooperation with other entities—enterprises and entities from the sphere of science. The results will be presented taking into account two research periods: 2010–2012 and 2014–2016. The research hypothesis is the claim that over the years the influence of business support organizations on establishing innovation cooperation will improve; however, it may be at a low level due to problems of social trust in Poland.

The research conducted so far on the issues of the functioning of business support organizations and their impact on innovation relates to developed countries (mainly Western Europe and Asia), which will be presented in the literature review. In catching-up countries in Central and Eastern Europe, this type of analysis is starting to be carried out, but it is not a systemic study that would allow to assess the state of the innovation cooperation support system as a whole. The related difficulties result not only from the large number of entities that should be analyzed but also from the

smaller scale of entering into cooperation to create product and process innovations in catching-up countries. Therefore, the conducted study increased the amount of knowledge related to the influence of support organizations on building a network of connections between enterprises, and enterprises and the sphere of science in the field of innovation. At the same time, comparing the two research periods with each other will make it possible to notice changes in this area. The conducted analysis showed the evolution of the innovation support system in a positive direction—support organizations more and more frequently encouraged entrepreneurs to establish cooperation.

The chapter consists of four parts. The first presents issues related to innovation cooperation and the results of research conducted in this area. Then it focused on the most important aspects of the research method and presented the results of the research. The article closes the presentation of results and the most important conclusions related to the study.

2 Literature Review

The position of the region and the ability to implement innovation is determined by such variables as the region's openness to external knowledge and the ability to adopt it or the spread of knowledge and technology in the region (Wintjes and Hollanders 2011). These factors significantly affect the nature of the innovation policy created by the regional government. It should be built in such a way that it is possible to unbar disparities in the level of regional development by using tools that will be appropriate after taking into account their specificity (Han et al. 2018). One of these tools can be to stimulate innovation by activating the partnerships in the Triple Helix model of innovation, and thus in relation to "government–business–science." Governments can serve as not only a financier and legislator but also of a direct participant in innovation by making partnerships with the other Triple Helix actors (Bueno 2017; Mascarenhas et al. 2019; Pellegrino and Piva 2020).

Innovation cooperation plays a significant role in the process of their creation. Lack of cooperation may be a barrier that effectively hinders the implementation of new solutions (Oduro 2020; Ma et al. 2020; Pio 2020). At the same time, it brings measurable benefits to entrepreneurs, e.g., the risk associated with creating innovations is spread over many entities (Zouaghi et al. 2018) or allows to create better quality innovations (Sarpong and Teirlinck 2018; De Stefano and Montes-Sancho 2018). Despite the aforementioned benefits, entering a cooperation network, especially in entities that prefer to conduct joint R&D works, should be treated with a high degree of caution. Research conducted by Hottenrott and Lopes-Bento (2016) showed that the relationship an inverted-U shape between collaboration intensity and innovation, on average, costs start to outweigh benefits if a company pursues more than about two-thirds of its R&D projects in collaboration.

Innovation cooperation concerns not only the sphere of enterprises themselves but allows the knowledge transfer between public (universities) and private domains.

Currently, cooperation between enterprises occurs more often than between the sphere of science and the sphere of business. Cooperation in the supply chain area can be particularly productive. It turns out that innovative changes in the area of individual product modules contribute to the creation of innovations in enterprises that are in this chain (Sun and Zhong 2020). Nevertheless, cooperation with competitors is important too. Its influence, however, is smaller than that of cooperation with non-rivals (Pekovic et al. 2020).

Building cooperation between the public (universities) and private domains is not easy. The government–science link and the government–industry link can be fairly strong, but the science–industry link can be relatively weak (Liu et al. 2018), which hinders knowledge transfer from public domains to private. A similar problem appeared in Portugal too (Natario et al. 2017). Currently, universities are being set up as the most common example of a scientific institution that transfers knowledge to the economy. Although creating cooperation between them and enterprises brings measurable benefits (Schaeffer and Matt 2016; Lehmann and Menter 2016; Fischer et al. 2019), it turns out that the participation of universities in the total volume of intellectual property creation in the economy may remain low (Singh et al. 2015).

In Poland, business support organizations have the opportunity to initiate innovation cooperation. These include innovation centers (technology parks, technology incubators, university business incubators and technology transfer offices), financing institutions (business angels networks, local/regional loan funds, and credit guarantee funds), and training and consulting centers. Innovation centers should contribute the most to stimulating innovation. Enterprises and research centers are located in the technology parks. The proximity of the locations of companies and research centers induces that innovation cooperation is concluded more often (Rocio Vasquez-Urriago et al. 2016; Albahari et al. 2016) and creates favorable conditions for knowledge sharing (Balle et al. 2019). There are signals in the literature that not all technology parks contribute to the generation of innovation and that cooperation between companies in the park automatically occurs (Steruska et al. 2019). Nevertheless, companies located in parks have better economic performance, which do not have to be related to innovation necessarily (Liberati et al. 2016; Gwebu et al. 2019). This may be due to the fact that companies located in the park must achieve an appropriate level of development to enjoy the benefits associated with the location in its area (Ubeda et al. 2019).

Various types of business incubators can operate at the technology parks or as separate institutions. They provide support for young innovative companies that need help in surviving on the market and commercializing business ideas (Yusubova et al. 2019). Incubators, especially university ones, operate within the framework of political support for innovation. They support the commercialization of university research and mediate contacts between universities and industry (Rothaermel and Thursby 2005; Wonglimpiyarat 2016). Incubatory, due to the geographical proximity of member and graduate firms, increases the chance of connecting with other past or current member firms (Soetanto and Jack 2016; Breznitz et al. 2018; Galvao et al. 2019). This should positively affect the establishment of innovative cooperation by tenant-firms.

Technology transfer offices play an important role in innovation creation processes (Barra and Zotti 2018). Due to their frequent links with universities, they have the ability to transfer knowledge from these institutions (Baglieri et al. 2018; Castillo et al. 2018; Secundo et al. 2019). In addition, centers can play an important role in stimulating regional development, but they must transfer solutions consistent with the profile of local enterprises (Mukherji and Silberman 2019; Beltran-Morales et al. 2020).

Business angels support innovation activity in enterprises by funding them. The criteria on the basis of which they make investment decisions can be different: e.g., increase in revenues (Block et al. 2019a), willingness to take risks (Croce et al. 2019). The character traits of the potential investor also play a role in the selection of investments (Block et al. 2019b; Taylor 2019).

In the context of financial support for innovative activity, government activity is important (Anwar et al. 2020). In Poland, this support can take place using local/regional loan funds and credit guarantee funds. The activities of these institutions are typical for Central European countries. Funds are important in the case of small and medium-sized enterprises. They facilitate access to smaller amounts of capital than business angels; however, they provide significant support for growing enterprises (Vienna Initiative Working Group 2014). The amounts offered to entrepreneurs from the funds do not match the capital from business angels, but there is a possibility that they will be transferred to innovation cooperation, because modest amounts of funding may cause that entrepreneurs will be looking for partners to develop more diverse ecosystems (Ahn et al. 2020). At the same time, funds can be a great support for SMEs, especially during the economic crisis (Zabolotskaya 2019).

Training and consulting centers should offer so-called innovation consulting. In the case of providing innovation services, it is important for the consulting company to allocate the best consultants, i.e., those who have the ability to quickly introduce new tasks, build trust, and establish a position in the project team that adds value to the client's project and organization (Pantic-Dragisic and Soderlund 2020). Research conducted by Barthelemy (2017) has shown that the use of consultants' services helps to improve product quality, because the best practices of technical consultants are generally more valuable than internally generated knowledge. The problem that appears in Poland concerns the scope of services offered by the centers. Mostly they relate to basic services related to running a business—company creation, management, marketing. Only some of them provide services related to technologies, patents, and intellectual property protection (Bąkowski and Mażewska 2018).

3 The Use of Logit Modeling in Innovation Research

The variables for this study were indicated with the recommendations regarding international standards for testing innovation activity included in the Oslo Manual (OECD/Eurostat 2018). The specificity of the Polish market was taken into account. Dependent variables consisted of:

- Cooperation on a sectoral basis—with a supplier, recipient, or competitor
- Institutional cooperation—with the Polish Academy of Sciences departments, university, national or foreign R&D centers
- Business Support Organizations have been adopted as independent variables that exist in Poland. They are divided into three groups of centers (Bąkowski and Mażewska 2018):
- Innovation centers—Technology Parks, Technology Incubators, University Business Incubators, Technology Transfer Offices
- Financing institutions—Business Angels Networks, Local and Regional Loan Funds, Credit Guarantee Funds
- Entrepreneurship centers—Training and Consulting Centers

In the analysis of the impact of Business Support Organizations on innovation activity, logit modeling was used (The author of the study used this method in other studies, including: Gorączkowska 2018a, b). This method is based on the theory of probability. The variables adopted for the study were of qualitative nature, i.e., respondents indicated whether they used the services of, e.g., technology parks or implemented new solutions in cooperation with another entity. Their answers were then assigned the value 0 if the answer to the question was negative or 1 if the answer was positive. This is correct because forecasting qualitative variables with any number of variants can always be reduced to forecasting zero-one variables (Zeliaś et al. 2003).

Logistic regression indicates how several variables X_1, X_2, …, X_k affect the dichotomous Y variable. The logistic function, unlike the multiple regression methods, takes values in the range of 0 to 1. Thanks to this, it can describe the probability, which is always in this range (Stanisz 2007).

By estimating the parameters of logit models, maximum likelihood estimation (MLE) is used. It consists of looking for a parameter vector that guarantees the highest probability of obtaining the values observed in the sample (Welfe 2008). In logit models, the so-called odds ratio is interpreted. It is defined as the ratio of the probability that a given phenomenon occurring in one group to the probability that a given phenomenon its occurrence in another group (Danieluk 2010). They are written with Equation 1 (Stanisz 2007):

$$OddsRatio = \frac{p_1}{1-p_1}\frac{1-p_2}{p_2} = \frac{p_1(1-p_2)}{p_2(1-p_1)} \quad (1)$$

The odds ratio values are interpreted as follows:

- OddsRatio $>$ 1—means that in the first study group the chance of an event is higher than in the reference group.
- OddsRatio $<$ 1—means that in the first study group the chance of an event is lower than in the reference group.
- OddsRatio $=$ 1—means that in both groups the chances for the occurrence of events are similar.

In this study, the enterprises that used the services of business support organizations were analyzed. The second group (references group) consisted of entities that were not interested in these services. Thanks to logit models, it is possible to assess how the recipients of individual support organizations and enterprises that did not use their services spread the chances of establishing cooperation (e.g., with universities) in the area of new solutions. The chapter presents logit models whose parameters met the conditions of statistics significance. The calculations were made at the significance level $\alpha = 0.01$, $\alpha = 0.05$, and $\alpha = 0.1$. Their statistical significance was determined on the basis of Wald's chi-square statistics.

4 Impact of Business Support Organizations on Cooperation in the Area of New Solutions: The Results of the Study

The research of the influence of business support organizations on innovation cooperation was conducted on a sample of small and medium-sized enterprises located in the Łódź Voivodeship in Poland. Two hundred and eighty-six enterprises took part in it in the years 2010–2012, and 450 in the years 2014–2016.

Both in the first and second research period, the hierarchy of interest in services provided by BSO was comparable (Table 1). The sum of the percentage shares is not equal to 100%, because in the sample were enterprises that did not cooperate with business support organizations and those that simultaneously used the services of several.

Table 1 Cooperation of the studied company with business support organizations in 2010–2012 and 2014–2016

Business support organizations	2010–2012		2014–2016	
	Quantity of companies	Percentage	Quantity of companies	Percentage
Technology parks	31	10.84%	37	8.22%
Technology incubators	8	2.80%	5	1.11%
University business incubators	4	1.40%	9	2.00%
Technology transfer offices	14	4.90%	26	5.78%
Business angels networks	4	1.40%	10	2.22%
Local and regional loan funds	42	14.69%	172	38.00%
Credit guarantee funds	29	10.14%	164	36.22%
Training and consulting centers	62	21.68%	203	44.89%

Source: Own research based on conducted survey

Table 2 Odds ratio in logit models illustrating the impact of business support organizations on innovation cooperation in industrial enterprises in Łódź Voivodeship in 2010–2012

	Cooperation with		
Business support organizations	Supplier	Recipient	Competitor
Technology parks			
Technology incubators			
University business incubators			
Technology transfer offices			
Business angels networks			
Local and regional loan funds			
Credit guarantee funds	2.49**		
Training and consulting centers			5.08**
R&D		2.52***	
constants	0.29***	0.20***	0.01***
chi-square	4.50	10.53	4.27
p-value	0.0338	0.0012	0.0389

Note: ***statistical significance 0.01, **statistical significance 0.05, *statistical significance 0.1
Source: Author's own research based on survey

In the first research period, training and consulting centers were the most popular—over 20% of the surveyed entities used their services. Nearly 15% of the group borrowed funds from local and regional loan funds, and more than 10% were also supported by guarantees from credit guarantee funds. Among the analyzed innovation centers, the largest number of enterprises (over 10%) used the services of technology parks, followed by technology transfer offices (5%), technology incubators (nearly 3%) as well as university business incubators and business angels networks (1.4%).

In the second research period, training and consulting centers were also the most popular. However, their services were used by twice as many enterprises—nearly 45%. Thirty-eight percent of the surveyed entities sought funds in local and regional loan funds, and over 36% supported the services of credit guarantee funds. Taking into account innovation centers, interest in them was comparable to the period 2010–2012. Over 8% of the surveyed enterprises used the technology parks services, nearly 6% TTO, 2% Business Angels Networks and university business incubators, and 1% technology incubators.

In the years 2010–2012, business support organizations slightly stimulated the creation of innovations in cooperation with other enterprises (Table 2). In enterprises that used the services of Training and Consulting Centers, the chances of cooperation with competitors increased fivefold. The client of Credit Guarantee Funds 2.5 times more often cooperated with suppliers. In the case of cooperation with recipients, only the control variable played a role—it turned out that in entities that incurred expenditure on R&D activities 2.5 times more often they cooperated with recipients.

In the case of creating new solutions between enterprises and entities from the sphere of science (Table 3) in 2010–2012, the chances of cooperation with

Table 3 Odds ratio in logit models illustrating the impact of business support organizations on innovation cooperation in industrial enterprises in Łódź Voivodeship in 2014–2016

	Cooperation with		
Business support organizations	Supplier	Recipient	Competitor
Technology parks	0.34*		
Technology incubators			
University business incubators			
Technology transfer offices	3.11**		
Business angels networks		8.95**	
Local and regional loan funds	1.77**		
Credit guarantee funds		1.66**	
Training and consulting centers	1.97***		
R&D	2.90***	2.29***	
constants	0.51***	0.51***	
chi-square	69.46	39.85	
p-value	0.0000	0.0000	

Note: ***statistical significance 0.01, **statistical significance 0.05, *statistical significance 0.1
Source: Author's own research based on survey

universities were raised by Training and Consulting Centers 2.5 times, and by University Business Incubators more than 17 times. University incubators have also more than 23 times increased the possibilities of knowledge transfer from foreign research centers. Entities incurring R&D expenditure over three times increased the chances of cooperation with universities, and more than four times with national research centers.

In 2014–2016, business support organizations had a greater impact on sectoral innovation cooperation than in 2010–2012 (Table 4). The model with the largest number of variables occurred in the case of cooperation with suppliers. Technology Transfer Offices increased the chances for this type of cooperation more than threefold, and Local and regional loan funds and training and consulting centers nearly twofold. Cooperation with recipients was more than eightfold more frequent in entities that were looking for capital from business angels networks, and more than 1.5 times more often among customers of credit guarantee funds. The control variable had an impact on the model—entrepreneurs incurring expenditure on R&D cooperated with suppliers almost three times often, and more than twice as often with the recipient. No relationship was noted between BSO and cooperation with the competitor.

In 2014–2016, the chances of cooperation with entities from the science sphere increased only in the case of innovation centers (Table 5). The chances of cooperation with the Polish Academy of Sciences departments increased in entities that used the services of university business incubators. Entrepreneurs established cooperation with universities under the influence of technology incubators and university business incubators. Cooperation with national research centers was more frequent among technology parks service recipients (nearly eight times).

Table 4 Odds ratio in logit models illustrating the impact of business support organizations on innovation cooperation between industrial enterprises and science institutions in Łódź Voivodeship in 2010–2012

Business support organizations	Cooperation with			
	Polish Academy of Sciences departments	Universities	National R&D centers	Foreign R&D centers
Technology parks				
Technology incubators				
University business incubators		17.58**		23.08**
Technology transfer offices				
Business angels networks				
Local and regional loan funds				
Credit guarantee funds				
Training and consulting centers		2.46*		
R&D		3.09**	4.31***	
Constants		0.03***	0.05***	0.01***
chi-square		21.25	12.20	23.23
p-value		0.0001	0.0005	0.0488

Note: ***statistical significance 0.01, **statistical significance 0.05, *statistical significance 0.1
Source: Author's own research based on survey

5 Discussion

Looking at the changes in the influence of business support organizations on establishing innovative cooperation, its evolution is noticeable. In 2014–2016, innovation centers more often contributed to knowledge transfer between public (universities) and private domains, while financing institutions and training and consulting centers to cooperation between entrepreneurs.

In the case of technology parks, a slight change was noted in the impact on establishing innovative cooperation. In the first research period, no impact was noted, while in the second parks contributed to cooperation between enterprises and national R&D centers. Research centers can be in the parks, which facilitates the transfer of solutions produced in them to industry. Díez-Vial and Montoro-Sánchez (2016) came to similar conclusions by examining the links between universities and technology parks. Parks with deep links with universities obtain technical knowledge from universities, which they then transfer to enterprises. Similar processes could have occurred in the case of parks and research centers in the province of Lodz.

Table 5 Odds ratio in logit models illustrating the impact of business support organizations on innovation cooperation between industrial enterprises and science institutions in Łódź Voivodeship in 2014–2016

Business support organizations	Cooperation with			
	Polish Academy of Sciences departments	Universities	National R&D centers	Foreign R&D centers
Technology parks			11.42*	
Technology incubators		10.65**		
University business incubators	55.00***	12.17***		
Technology transfer offices				
Business angels networks				
Local and regional loan funds				
Credit guarantee funds				
Training and consulting centers				
R&D				
Constants	0.00***	0.02***	0.00***	
chi-square	5.20	7.96	2.41	
p-value	0.0226	0.0187	0.1203	

Note: ***statistical significance 0.01, **statistical significance 0.05, *statistical significance 0.1
Source: Author's own research based on survey

Incubators had the greatest impact on innovation cooperation in the region. In the first research period, only university ones increased the chance of establishing cooperation with universities and foreign R&D centers. In the second, they stimulated cooperation with the university and Polish Academy of Sciences departments. In addition, they were also joined by technology incubators that initiated cooperation with universities. In the studied region, incubators are one of the most important organizations that generate knowledge exchange processes between enterprises and institutions from the sphere of science. This may be due to the fact that the wide range of business services offered in incubators makes it easier for incubator companies to enter network systems (Stokan et al. 2015). University incubators initiated cooperation between enterprises and universities in both research periods. This is a positive phenomenon, because universities are an important help for young enterprises in the process of improving products. The positive impact of incubators was also confirmed in studies conducted in Australia and Israel. While universities were not a rich source of innovative ideas for incubatees, they played an important role in the later stages of new product development (Rubin et al. 2015).

Technology transfer offices contributed to establishing cooperation between enterprises and their suppliers. Stimulating this kind of cooperation is beneficial

because innovative changes in the area of individual product modules contribute to the creation of innovations in enterprises that are in this chain (Sun and Zhong 2020). In the second period, this area of activity was also supported by loan funds and training and consulting centers.

In the studied region, the impact of financing institutions on establishing cooperation with suppliers and recipients was noted. The positive is that their impact has increased over time. The importance of non-bank financial support for innovation was emphasized by Pato and Teixeira (2019). It turns out that this support is crucial for new ventures, especially in rural areas.

At this stage of consideration, it should also be emphasized that systemically financing institutions did not participate in the process of knowledge transfer from science to business. This is due to the specificity of the functioning of loan and guarantee funds in Polish conditions. It is related to the fact that the funds mainly support entrepreneurship (e.g., they include vocational activation programs) and not only innovation. The situation is similar with training and consulting centers. The lack of their impact on establishing cooperation between enterprises and the sphere of science may be related to the fact that the centers are not able to provide highly specialized services related to the knowledge and technology transfer between public (universities) and private domains.

Business angel networks fell poorly compared to other financing institutions. It may also be associated with their low activity in Poland compared to other countries of Central and Eastern Europe (Prohorovs et al. 2019).

6 Conclusion

Summarizing the conducted analyzes, the author of the study assumes that the verified research hypothesis has been confirmed—in the studied region, progress has been noticed in the influence of business support institutions on establishing innovation cooperation. However, despite the increase in this impact, it is difficult to say that their impact levels were satisfactory over the periods studied. Organizations most often played a role only in one type of cooperation. The reason for this can be different. Firstly, business support organizations implement public innovation support programs, including those that promote cooperation. Currently, cooperation with knowledge providers, slightly with suppliers and customers, is strongly promoted in EU programs, while the promotion of cooperation with competitors is lacking (Radicic et al. 2020). Therefore, coopetition was not initiated. Secondly, the science-innovation paradox is noticeable on the Polish market. Karpinska (2020) notes that public institutions such as innovation centers involve the state in the international process of building innovative economies, but barely stimulates Poland's innovation. This is also reflected in this study.

Thirdly, difficulties in creating cooperation may be related to a low level of social trust. Papula et al. (2018) came to similar conclusions comparing cooperation in Austria, Germany, and Switzerland as well as in the Czech Republic. Czech

companies and their behavior are largely influenced by their historical experiences and only starting to move toward a more open innovation culture, with strategic partnerships being a new trend. According to the author, a similar situation occurs in Poland.

The presented study has some limitations. First of all, it is a systemic study—it shows how business support organizations affect the entire innovation system, so it does not capture individual cases of positive impact of support institutions. The study was also limited to the Łódź Voivodeship. In other regions, the situation may be different, which means that its results cannot be generalized to other regions in Poland. These defects can be removed by conducting further tests. It will also allow a deeper assessment of the links between BSO in Łódź Voivodeship and innovation cooperation in this region.

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Part V
Eurasian Business Perspectives: Management

Facility Services: An Underestimated Sector?

Alexander Redlein and Eva Stopajnik

Abstract Facility Services (FS) as defined as "support provision to the primary activities of an organization, delivered by an internal or external provider" by the European norm 15221-1 are not presented as a whole industry sector in the Statistical Classification of Economic Activities in the European Community (NACE) or other international statistics. This chapter analyzes the economic indicators "value added at factor cost" and its correlation with "employment and employment types" of the FS industry in detail after the recession of 2008/2009 until 2016 in different European countries. The research is based on EU statistics and European norms. Results show that 10% of employees in the nonfinancial business economy in the EU work in the FS sector. The FS sector is very steady during and after recession, because services, such as janitorial work, maintenance, waste management, specialized cleaning, water and steam and air conditioning supply have to be kept running, even during a crisis. And employees in FS will keep their job, which is important for the purchasing power in a country.

Keywords Employment · Facility management · Facility services · Recession · Value added

1 Introduction

Facility Services (FS) are defined as "support provision to the primary activities of an organization, delivered by an internal or external provider" in 2006 in the European norm 15221-1 (British Standards 2007, p. 6). There is a lack of reports and analysis on the FS industry. One reason for that is that the FS industry as a whole is not presented in the Statistical Classification of Economic Activities in the

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European Community (NACE) (Eurostat 2008). As most reports are based on those systems, the FS industry is neglected in those reports.

Furthermore, the understanding of Facility Management (FM) and which services can be considered Facility Services varies not only in European countries but also between organizations. So, the European Norm EN 15221 was created to establish a common understanding of FM and FS and to increase transparency (British Standards 2007; EuroFM 2011). In 2012, a list of all activities that can be considered FS was included in the fourth part of the norm: EN 15221-4-2011 (British Standards 2012). This list of services is used as the basis for further analysis.

In previous publications, we concentrated on a valid calculation of the size of the FS industry in general. In several publications, we found open questions of the relation of employment forms (full-time or part-time) and their influence on the profitability of the FS industry. Since there is this lack of analysis and reports on the FS industry, this chapter tries to bridge this gap by providing a new study about the FS industry: The aim of this chapter is to analyze the relationship between value added and employment of the FS industry. Value added is defined as "...the gross income from operating activities after adjusting for operating subsidies and indirect taxes. ... it can be calculated from the gross operating surplus by adding personnel costs" (Eurostat 2013). The focus of the analysis is the development of the FS industry after a recession period in the long term. This is important to evaluate the role of the industry for the national economy and also to prepare for the next recession.

The FS industry is compared to the economy as a whole and to different countries of the European Union and the EU. In order to evaluate the development of an industry, it is necessary to set them into relation with other industries or the whole economy to see if the performance was good or bad.

There is not so much literature on the FS sector, but the service sector, in general, has been analyzed in previous studies. Studies showed that the service sector kept growing even during economic downturns. An analysis of the cyclical behavior of the service sector showed that there is a cyclical behavior but it is much less than in the goods sector. Business services were very stable and never shrank during a downturn. Services improved the stability of the economy because employment shrank less during recessions. However, this does not mean that services are recession-proof (Urquhart 1981).

Victor Fuchs did an intensive research on the service sector in the USA between 1929 and 1965. The study showed that output and employment in the service sector is more stable than in the industry sector. This is linked to the fact that services cannot be stored. Thus, output is also more stable. Other sectors are directly affected by the demand of businesses and customers. Service employment even increased during time periods when other sectors decreased. In the service sector, there are many self-employed and salaried workers, whose salary depend on their output. Many of them have rather flexible wages and depend on commissions, tips, or profit shares but their working hours are not so flexible. This increases stability (Fuchs 1968).

2 Methodology

First, the listed services in the EN 15221-4 were compared with the NACE system to identify the relevant industries for FS from NACE. The relevant industries were selected and grouped to Total Facility Services, consisting of Typical FS and General FS. Typical FS for the operation of business and residential buildings include typical services like cleaning, maintenance, and security services. General FS comprises services such as water supply, waste management, and office and administrative and support services.

Then the available data sources were analyzed. Suitable and reliable data could be found in the Structural Business Statistics (SBS) from Eurostat (2019e). Eurostat collects the data from the national statistical offices in the EU member countries. National statistical offices get the data from other administrative sources, business registers, or by conducting surveys. SBS offers a collection of annual detailed enterprise statistics with data on the number of enterprises, turnover, production value, value added, employment, and more. This data is available even for the lowest level of the NACE structure. The NACE structure is hierarchical with information about the most detailed economic sectors on the lowest level and aggregated sectors on the higher level (Eurostat 2008), e.g., the economic sectors general cleaning of buildings and other building cleaning activities are separate industries on the lowest level of the structure. Both are part of the sector administrative and support service activities, which is on the highest level. SBS provides data on several hundred economic sectors. Agriculture, forestry, public education, and personal services are excluded (Eurostat 2019e).

The data from SBS was validated carefully:

- Outliers and their causes were investigated.
- The consistency over time was checked.
- Ratios were calculated and checked for their plausibility.
- The completeness of the data was examined.

The plausibility checks showed that all data could be used for the calculation. Only the data of the financial sector showed shortfalls. The financial sector (K) is only recorded from 2013 onward and even in the following years there is data missing. This would provoke extreme dips in the time series; therefore, the financial sector has to be omitted. In very few other subindustries, there was also data missing. So, data is only shown if missing subindustries were less than 0.5% of Total FS in the previous years.

Then the data of the different subindustries of FS from Eurostat were summed up to form the industry Total FS. This industry is analyzed in relation to the other industries and to the total business economy except financial and insurance activities from the NACE structure. Total business economy except financial and insurance activities is a term used by the Eurostat for the sectors B-N excluding K. Time series from 2008 to 2016 are presented. As measures “value added at factor cost” and “employees” were used. As the value added can be calculated by summing up the

gross operating surplus and the personnel costs (Eurostat 2013) and its major part is personnel cost in most industries, it is a direct indicator for income. Income will be spent by the people that earn it and this way it creates further value.

3 Results

Figure 1 shows value added at factor cost from 2008 to 2016 as a percentage of total business economy excluding the financial and insurance sector. Figure 2 shows the FS industry and the business economy excluding the financial and insurance sector in absolute numbers. The chosen countries are the four largest economies Germany, Great Britain, France, and Italy, and the smaller countries Austria, Lithuania, and Portugal. This ensures a good mixture of European countries in terms of geographical location, cultural and historical background. Data is only shown if the database was sufficient. In Fig. 1, it seems like the recession of 2008/2009 boosted the FS industry as there is a peak in almost all countries in 2009. Figure 2 shows that this is not true. In all shown countries, except for Italy, the FS sector declined in 2009 and so did the total business economy. However, compared to the rest of the economy, the FS sector was not hit that hard. This means that during a crisis the FS industry is quite resilient. This can be explained by the fact that many FS cannot be neglected even if there is a crisis. Taking a closer look into the detailed subcategories of FS, it shows that in Austria and France janitorial works are increasing and, in most countries, services connected to waste management, water supply, specialized industrial cleaning activities and steam and air conditioning supply were hardly not at all touched by the crisis.

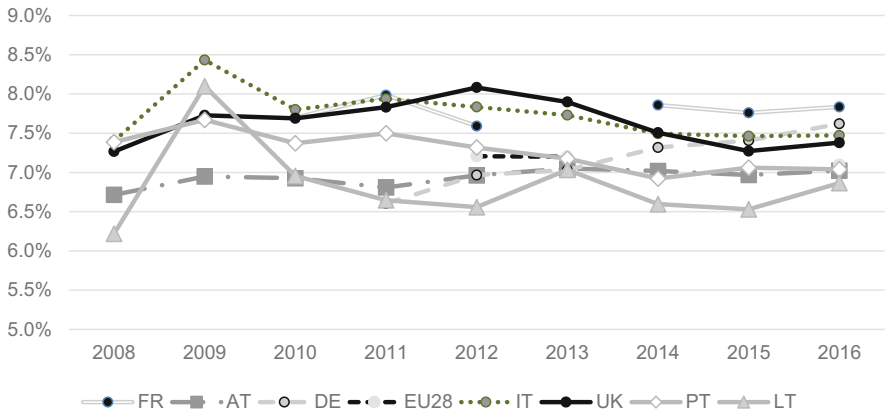

Fig. 1 Value added at factor cost as a percentage of nonfinancial business economy (NACE B-N, S95, excl. K) expressed in millions of €. (Source: Own calculation on the base of annual detailed enterprise statistics (Eurostat 2019a, b, c, d))

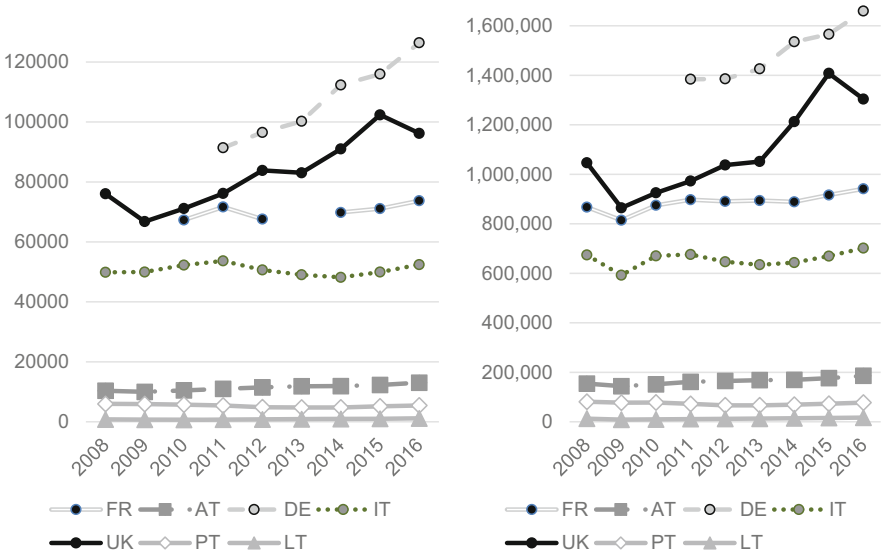

Fig. 2 Left: Value added at factor cost—FS in total right: value added at factor cost in total nonfinancial business economy (B-N, S95 excl. K). (Source: Own calculation on the base of annual detailed enterprise statistics (Eurostat 2019a, b, c, d) expressed in millions of €)

In the long term, it is visible that the business economy in Austria, France, Lithuania, and UK recovered very quickly. After 1 year, value added increased again and this trend continued. In the southern countries Portugal and Italy, the increase lasted only for 1 year, and until 2015, the economy continued to decrease. Considering the shrinking economy (and FS industry) in Italy from 2011 to 2015, it looks like the crisis had a retarded, longer-lasting effect on Italy. In the long run in Austria and Germany, the FS industry keeps growing faster than the rest of the economy. This is not the case for the other countries.

The sudden decrease of value added in the UK in 2016 in absolute numbers is probably provoked by the Brexit referendum from June 2016. Principles of economics suggest that there are economic costs because of Brexit: as there is a lot of trade between the EU and the UK that will not be as smooth as before and for other reasons (Belke and Gros 2017).

The absolute numbers for Lithuania show that Lithuania is a really small country. Low absolute numbers can have a very high impact on the percentages, this is why the peak in percentages in 2009 is so extreme.

Figure 3 shows the number of employees in FS as a percentage of the business economy excluding financial and insurance activities. Figure 4 shows the FS industry and the business economy excluding the financial and insurance sector in absolute numbers. The unit of measurement is not full-time equivalents. The UK and France are excluded due to missing data.

Similar to value added there is also a small peak in 2009 in Fig. 3 that makes the FS industry look like it increased during the recession. A close look into the absolute

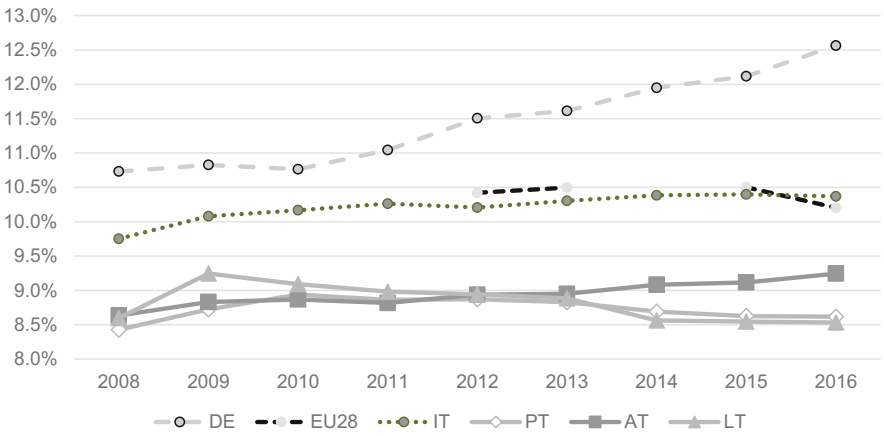

Fig. 3 Number of employees as a percentage of nonfinancial business economy (NACE B-N, S95, excl. K). (Source: Own calculation on the base of annual detailed enterprise statistics (Eurostat 2019a, b, c, d))

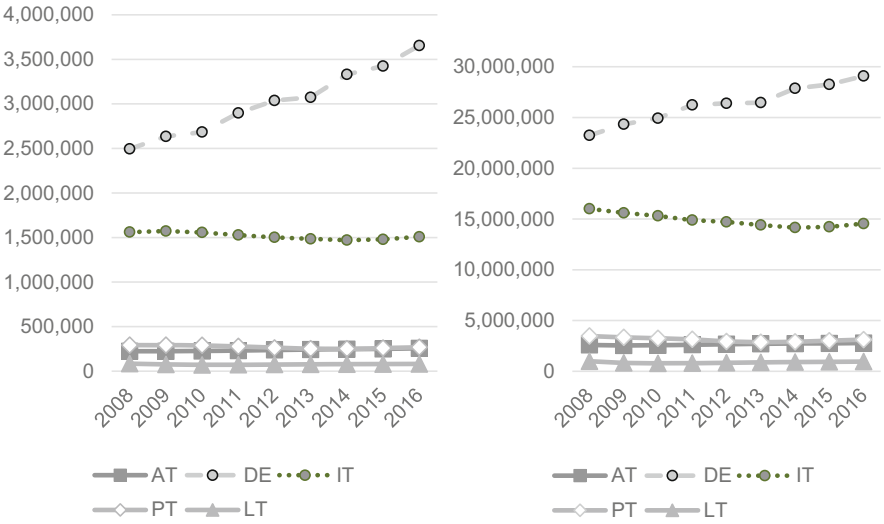

Fig. 4 Left: Number of employees—FS in total right: number of employees in total nonfinancial business economy (B-N, S95 excl. K). (Source: Own calculation on the base of annual detailed enterprise statistics (Eurostat 2019a, b, c, d))

numbers reveals that actually in Germany and in Austria the number of employees in FS increased, even from 2008 to 2016. But from 2008 to 2009, the increase was less steep than in the following years. While Germany's nonfinancial business economy also increased throughout all years, in Austria it decreased in 2009. In Lithuania, the absolute numbers show that Lithuania was affected by the crisis in 2009 and 2010 and then started to recover again. In Italy and Portugal, the impact of the recession is

visible from 2009 to 2014 in the business economy and in the FS industry. However, in Italy, the FS industry showed a retarded decrease again in 2010 and in Portugal, it took the FS industry 1 year longer to recover.

4 Value Added and Employees

Between 8% and 13% of employees in the total nonfinancial business economy work in the FS industry. This number is very high compared to value added. In terms of value added the FS industry is only between 6% and 8.5% of the total nonfinancial business economy. This shows that the FS industry is an industry that employs many people but neither the wages and salaries nor the profits are exceptionally high.

This makes the FS industry so important because first of all many people depend on it. Secondly, most employees in FS do not have extremely high incomes, which means that they have to use high proportions of their income for their basic needs. As they spend their income, they create income in other industries which helps the economy and creates value. Especially during times of recession, where the FS industry is comparably stable and robust, this is essential for the economy.

A comparison between Portugal and Austria is an example of the income differences between different European countries. In terms of value added, Austria is clearly larger than Portugal, but Portugal has more employees in FS and in general.

5 Conclusion

More than 10% of employees in the nonfinancial business economy are in the FS sector in the EU. The FS sector is quite stable during a recession period. This is mainly due to the fact that many services around buildings have to be done, no matter if there is a crisis or not. Especially janitorial works, specialized and industrial cleaning, waste management and water and steam and air conditioning supply are necessary. In some countries also repair activities increase during the recession. As the FS industry is stable and as many FS jobs like cleaning do not pay extremely high wages, employees will spend their wages. This way they create income for other people and support the whole economy. For those reasons, the FS industry is one of the most important industries.

During the Coronavirus crises, it is also visible that along with medical staff and supermarket employees also many employees in FS continue their work, while most employees in other fields are sent to home office or cannot work at all. Some activities such as cleaning activities in hospitals even increase. For the future, it would be interesting to evaluate the role of the FS sector during this global crisis for the economy and society.

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What Really Matters—Employer Attractiveness in Healthcare

Manuela Koch-Rogge and Georg Westermann

Abstract Although the area of employer branding an employer attractiveness is a well-researched field, there is only little information on the healthcare industry in particular. Since this is a professional branch that becomes more and more important with demographic change and, on the other hand, suffers from a lack of skilled labor, answering this question is of high importance to the whole industry. With the present study, we want to contribute to expanding the empirical knowledge on employer attractiveness in healthcare. In particular, we focus on the internal perspective of the employer branding process and posit that it is crucial to examine which attributes and image dimensions organization insiders (employees already working for a healthcare organization) associate with attractive employers. We apply the instrumental–symbolic framework to investigate attributes relating to organizational attractiveness using a sample of 226 employees working for different healthcare SMEs in Germany. Results show that both instrumental and symbolic attributes predict employees' attraction to healthcare organizations. Conversely, attributes within the symbolic dimension are perceived as important by employees. However, the results of the multivariate analysis show that those attributes are not the ones that best predict an employer's attractiveness. Rather, attributes that address esteem needs and the need for self-actualization become significantly important in this context. Eventually, implications on the political and managerial level are discussed.

Keywords Employer Attractiveness · Employer Branding · Instrumental–Symbolic Framework · Healthcare

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1 Introduction

Due to the demographic development in Germany, the demand for healthcare and nursing services will increase significantly in the next decade. Forecasts assume that the number of people in need of care will have increased by around 50% in the period 2012–2030 (Rothgang et al. 2012). In addition, according to studies by the German Federal Statistical Office (2018), more elderly people will live alone in the future without being able to access family networks if they are in need of care. Thus, institutional end-of-life care structures will become more important (von Schmude and Kern 2017).

This situation is compounded by the fact that the number of people of working age is decreasing, so that a growing number of nursing staff is not to be expected. The declining supply of skilled labor on the one hand and the increasing need for care on the other hand lead to a situation that is often referred to as a "supply gap" in healthcare. Current figures show that this situation is no longer a distant future scenario, but rather real. In its annual labor market report, the German Federal Employment Agency points out that since 2015 there has been a constant shortage of skilled employees in the health and nursing professions, which primarily relates to qualified specialists in elderly and nursing care (2019). Within the same period, the German Federal Statistical Office noted a significant increase in the number of people in need of care and, accordingly, an increased demand for services provided by outpatient care services and fully inpatient nursing homes (2018). Closing this "supply gap" in healthcare is a central task for politics in the coming years. At the same time, however, companies in the nursing and healthcare industry need to tremendously increase their efforts in trying to become or stay "attractive employers."

Although the construct of employer attractiveness and its underlying attributes are well-researched topics, there is little empirical evidence on the specific requirements in healthcare. In particular, there is a lack of information on what attracts experienced employees to an employer or makes them stay with their current organization. Focusing on a specific branch and group seems even more relevant considering the fact, that there seem to be no unique features or attributes that generally relate to employer attractiveness. Rather, attributes that have impact employer attractiveness seem to differ over branches, cultures, or company sizes (Theurer et al. 2018). Hence, this study aims at providing some empirical evidence on what attributes make up an "attractive" organization for experienced nursing staff in German SMEs. Also, we want to investigate whether these attributes influence overall employee satisfaction. In addition to answering these questions on an empirical basis, in the closing section, we aim to derive recommendations for action for companies and politics in order to make working in healthcare become more attractive.

2 Theoretical Background

2.1 The Concept of Employer Attractiveness

Considering the current lack of skilled workers, it is crucial for healthcare organizations to employ strategies in order to address potential applicants but at the same time to retain current employees. In this context, terms such as "employer branding," "employer attractiveness," or "corporate image" are often used inconsistently, sometimes synonymously. There is no established definition for the term "employer attractiveness." This is partly due to the fact that it is an interdisciplinary topic within the disciplines of personnel management and marketing (Theurer et al. 2018). However, there is broad agreement that the concept of employer attractiveness is very closely related to the construct of employer branding (Berthon et al. 2005). Employer branding is often described as a process to create and communicate a distinctive corporate image. As part of this process, certain attributes are fostered. The active management of an organization's overall reputation may result in attracting larger and higher quality job applicants and retaining and engendering loyalty amongst current employees (Bankins and Waterhouse 2019). Companies then use different strategies and channels to communicate their values and to strengthen associations between the company, its attributes and the desired image (Backhaus 2016; Edwards 2009). Therefore, employer branding can be summarized as the companies´ efforts to communicate to existing and prospective employees that it is a desirable place to work. Employer attractiveness, on the other hand, can therefore be interpreted as the result of this process. The term is often defined as the intention of (potential) applicants to apply to a company (Story et al. 2016). In our opinion, this definition falls short because the company's efforts in the area of employer branding are generally directed both internally and externally. The aim of the employer branding process is not only aimed at creating a positive corporate image for (potential) applicants but also at retaining the loyalty of existing employees. Accordingly, the concept of employer attractiveness should be addressed from a more holistic perspective.

Figure 1 depicts employer attractiveness as the result of the employer branding process which is based on specific attractiveness attributes which the company communicates via individual strategies and communication channels. The recipients of the process are both external stakeholders (especially potential applicants) and employees already working in the company. The aim of the process is to both retaining current employees and drawing the attention of potential applicants.

2.2 Research on Employer Attractiveness in Healthcare

Empirical research on attributes that may affect employer attractiveness so far has focused on potential applicants and thus on the external perspective (Lane 2016).

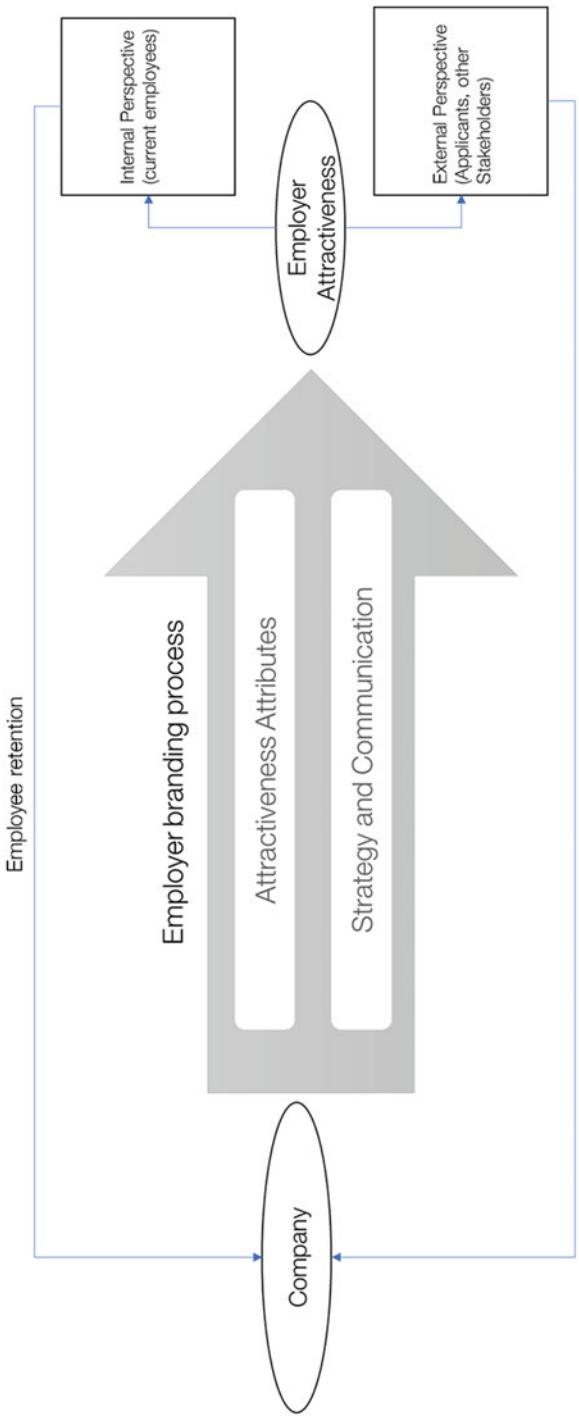

Fig. 1 The holistic perspective of employer attractiveness. Source: own representation

Numerous studies with both national and international focus show that certain attributes can influence the perceived attractiveness of employers significantly. Most of the studies included students, trainees, or applicants from different industries as participants. A comprehensive review of studies over the past two decades including their key research findings is provided by Theurer et al. (2018). Besides focusing on the external perspective, the vast majority of studies were conducted among insurance companies, banks, or international operating companies. The healthcare industry so far is significantly underrepresented in this field of research. Examining the expectations of graduates from Canadian nursing schools toward their future employers, Frèchette et al. (2013) were among the first to explicitly focus on employer attractiveness in nursing and healthcare. The authors found that above all, the quality of care, the type of work (e.g., intensive care or outpatient), and the salary show a significant impact on the assessment of an employer as "attractive."

Employer attractiveness in healthcare has also been examined on a national level. In Germany, Winkler et al. (2017) investigated this field from a managerial perspective by examining which attributes contribute to the job satisfaction of healthcare managers and their willingness to retain. They identified opportunities for personal career development, a certain degree of responsibility, salary, and the diversity and complexity of the task as essential attributes. Conducting a study among nursing school graduates in the federal state of Saxony-Anhalt, Reifgerste et al. (2017) found that the salary, family-friendliness, work–life balance, and interesting tasks are the top 4 attributes an employer should provide to become attractive.

In conclusion, it becomes evident that there are no attributes that possess a general validity in predicting employer attractiveness. Theurer et al. (2018) point out that the perception of these attributes is supposed to be moderated by both individual motivations and perspectives as well as cultural differences. Further, the impact of some attributes may depend on who the addressee is. Thus, the studies by Winkler et al. (2017) and Reifgerste et al. (2017) show that nursing graduates obviously have other priorities than managers. Hence, the primary focus on applicants and graduates in previous studies reveals a crucial knowledge gap since there is almost no empirical evidence on which attributes are most important to employees with professional experience. Answering this question may bring important insights on attractiveness attributes that are suitable to retain employees in healthcare in the long term. In this respect, Kumari and Saini (Kumari and Saini 2018) emphasize that knowing which attributes have an impact on employer attractiveness could help organizations in designing and communicating the most attractive employee value proposition for potential employees. Further, these attributes may indirectly contribute to reducing recruitment costs, since it is very well researched that word-of-mouth recommendations are among the most effective recruiting tools (Theurer et al. 2018).

2.3 Dimensions of Employer Attractiveness

Analogous to the numerous studies on attributes influencing perceived employer attractiveness, there are several approaches to categorize them. One prominent and overarching method of clustering employer image attributes is the "instrumental–symbolic framework," originally introduced by Lievens and Highhouse (2003) to investigate attractiveness in the employer branding context. The framework categorizes attributes that are supposed to influence employer attractiveness into instrumental and symbolic dimensions. The instrumental (i.e., functional) dimension contains rather objective, tangible, and measurable attributes from which employees usually strive to maximize benefits and minimize costs (Kumari and Saini 2018; F. Lievens and Highhouse 2003). Various employer branding studies tested these attributes in various contexts or different professional branches usually including economic factors such as salary and job security or working conditions such as the work–life balance.

Symbolic dimensions, on the other hand, are linked to peoples' needs and include attributes that are trait-based, subjective, and most often of intangible nature. Among them are social factors such as management culture and work environment, but also image factors such as the degree of innovation or awareness of the company. Previous research in other professional branches has shown that attributes from both dimensions may have an impact on employer attractiveness. However, more often symbolic attributes were relevant from an internal perspective, i.e., for employees already working in the company (Theurer et al. 2018). The study by Lievens and Highhouse (2003) reported that symbolic image dimensions accounted for incremental variance over and above instrumental attributes in predicting a bank's perceived attractiveness as an employer. Moreover, it was easier to differentiate among banks on the basis of symbolic dimensions, versus instrumental job and organizational attributes. Later, Lievens et al. (2005) confirmed the importance of symbolic attributes over instrumental attributes in explaining students' attraction to the Army. Slaughter et al. (2004) focused on the symbolic image dimensions and found that they were related to employer attractiveness. Also, they found that specific traits assigned to organizations were more attractive depending on personality traits. People tended to be especially attracted to organizations with traits similar to their own traits. In this respect, Kumari and Saini (2018) conclude that expectations toward employers differ from generation to generation. They found that job seekers of generation Y prefer carrier growth opportunities which are rather instrumental attributes over symbolic attributes. In summary, the instrumental–symbolic framework as a way to categorize employer attractiveness attributes and dimensions has proven to give valuable insights on the importance of these concerning employer attractiveness.

2.4 Case Study

The study was situated in the German healthcare industry and was carried out as a case study approach. The study included four small and medium-sized companies that represent German healthcare SMEs considering organizational structure, size of staff, and tasks. Our aim was to apply the instrumental–symbolic framework to examine which factors attract and connect employees (company insiders) to healthcare organizations as an employer. Therefore, in a first step, we conducted several workshops together with the companies' management and HR departments in order to select attractiveness attributes that—from professional experience—seemed relevant to employees in healthcare. Given these attributes, we carried out a questionnaire study among the employees of the participating companies. We asked the participants to rate the attributes according to their perceived relevance to employer attractiveness. Also, participants were asked to assess their current employer based on these attributes. Hence, we wanted to shed some light on what attributes really matter from an internal perspective. We relied on the instrumental–symbolic framework to serve this end. As a result, we expect to find that symbolic attributes are rated higher above instrumental attributes. This expectation was based on findings of previous studies indicating the relevance of symbolic attributes over instrumental attributes with respect to the internal perspective. Moreover, as Slaughter et al. (2004) pointed out traits and attributes that make an organization become attractive depend on employees' personality traits. Since healthcare and nursing are social professions, it seemed admissible to assume social attributes from the symbolic to be more relevant. Also, we expected that attributes that are ranked highest by the employees should be of significant relevance to predict employer attractiveness.

3 Method

3.1 Measures

To define attributes that measure employer attractiveness in healthcare, we applied the instrumental–symbolic framework according to Lievens and Highhouse (2003). We adapted an overall of 42 attributes on both perspectives that were used in previous studies including Lievens et al. (2005), Tumasjan et al. (2011), Schlager et al. (2011), and van Hoye et al. (2013). In moderated workshops with managers from our cooperating companies, we selected a total of nine different attributes from four dimensions for the instrumental perspective. The selection of these attributes was oriented toward their perceived relevance for nursing and related professions. Table 1 holds the selection of instrumental attributes.

For the symbolic perspective, eight attributes stemming from two dimensions were included in the survey, which are presented in Table 2.

Table 1 Instrumental attributes

Dimensions	Attributes
Economical dimensions	Adequate salary
	High job security
	Performance bonuses
Development opportunities	Trainings offerings
	Opportunities for personal development
Variety of tasks	Responsible tasks
	Varied tasks
Working conditions	Location/closeness to home
	Reliable work scheduling

Source: own representation

Table 2 Symbolic attributes

Dimensions	Attributes
Social dimensions	Fair leadership culture
	Reliable colleagues
	Good working environment/team spirit
	Organization's social engagement
	Outside-the-job activities (e.g., team events)
Company image	Organization's image among friends and relatives
	Reputation
	Sincerity

Source: own representation

Table 3 Profession and gender

Profession	Percentage	Gender (female)
Nursing professional	48.61%	82.35%
Nursing assistant	20.37%	79.55%
House keeping	6.02%	84.62%
Other	25.00%	83.02%

Source: own representation

In summary, an overall of 17 attributes in six dimensions were included in the study.

3.2 Participants

All participants who took part in the study were employed at one of the participating companies at the time the survey was carried out. Participation was voluntary and conducted anonymously. We received 212 completed questionnaires. The participants came from various professions, which are provided in Table 3 according to their distribution. Most of them were nursing professionals or nursing assistants.

Table 4 Age

Age	Percentage
To 25 years	4.69%
26–35 years	22.54%
36–45 years	28.64%
46–55 years	25.35%
56–65 years	18.78%

Source: own representation

Table 5 Professional working experience

Profession	Professional work experience (in years)				
	Less than 1	*1 to 3*	*4 to 8*	*9 to 10*	*More than 10*
Nursing professional	1.00%	7.00%	14.00%	8.00%	70.00%
Nursing assistant	11.36%	15.91%	25.00%	4.55%	43.18%
House keeping		25.00%	25.00%	25.00%	25.00%
Other	9.38%	18.75%	18.75%	12.50%	40.63%
Sum	4.89%	11.96%	17.93%	8.70%	56.52%

Source: own representation

Other closely related professions, e.g., caregivers, were summarized in the category "other."

The vast majority of participants in the study (overall 81.8%) were female. This proportion remains robust across all professions. Considering the age distribution, which is provided in Table 4, only 4.69% of the participating employees were under the age of 25. The 36 to 45-year-old make up the largest group with 28.64%. More than 40.0% were over 45 years old. According to the Federal employment statistic (German Federal Statistical Office 2018), this distribution is representative of the nursing professions in Germany.

Table 5 holds the distribution of work experience. Analogous to the rather high average age, with 56.2% more than half of the participants, have more than 10 years of professional experience. Just under 15.0% have less than 3 years of professional experience.

The majority of respondents (48.6%) worked inpatient or intensive. 19.55% were on outpatient care. Daycare work made up the smallest area at just under 6%.

3.3 Questionnaire

To investigate which attributes impact employer attractiveness in healthcare, we conducted a questionnaire study among the employees of the participating healthcare companies. The questionnaire was divided into four parts. The first part contained survey information on the background of the survey, the responsible contact person as well as information on the anonymity of the data collection and voluntary participation. In the second part, the participants were asked to rate the

symbolic and instrumental attributes regarding their importance to perceive an employer as "attractive." In the third part, the participants would assess their current employers regarding the fulfillment of these attributes. The final part was used to collect socio-demographic information. Except for the part on socio-demographic information, a 5-point Likert scale was used throughout the survey. It was carried out between May and September 2019. In response, we received 226 completed questionnaires. Of these, 176 were from nursing and nursing assistants, the remaining respondents included in supporting activities or related activities.

4 Results

4.1 Rating by Employees

The participants rated the importance of the attributes on a 5-point Likert scale ranging from 1 = "not important" to 5 = "very important." Respectively, the scale for assessing their current employers according to these attributes used a range from 1 = "does not apply" to 5 = "does fully apply." Table 6 provides the results of the descriptive analysis. Considering the assessment of the instrumental attributes, the rating is quite homogeneous with a range between highest and lowest rating of only 0.63. A reliable working schedule is perceived as most important within the instrumental dimension with an average of 4.80. Job security is also considered to be very important at an average score of 4.77. Contrary to the results from other professional branches, the importance of salary and performance bonuses tends to be rather mediocre. Closeness to home plays the least important role within the instrumental attributes, whereas this attribute also has the highest standard deviation. It also becomes evident that task-related attributes such as the type and variety of tasks do not play an outstanding role for the respondents.

The evaluation of the symbolic attributes shows a somewhat different picture. Thus, the range of ratings from highest to lowest is significantly higher at 2.01. In particular, outside-the-job-activities (2.90) and the organization's reputation among family and friends (3.10) are perceived as less important by many. On the other hand, considering the overall ranking, four out of five top-ranked attributes are within the symbolic dimension. This provides some evidence to the hypothesis that social and cultural attributes are particularly important to the employees in the internal perspective. In particular, sincerity (4.91), a good working environment/team spirit (4.90), reliable colleagues (4.88), and a fair leadership culture (4.83) are most important to employer attractiveness from the employees´ point of view.

Table 7 compares the rating of nursing professionals and nursing assistants. Examining the results, it becomes evident that the assessments between the two groups are basically very similar. Both emphasize the importance of the symbolic dimension over the instrumental dimension. However, while nursing professionals consider reliable work schedules to be within the top five, nursing assistants place their focus rather on job security. This may be explained by the fact that shortage of

Table 6 Descriptive analytics

			Importance of attributes in general			Assessment of current employer		
	ID	*Attributes*	*Rank*	*Mean*	*SD*	*Rank*	*Mean*	*SD*
Symbolic attributes	F1	Outside-the-job activities	17	2.99	1.26	16	3.58	1.08
	F2	Sincerity	1	4.92	0.32	15	3.59	0.99
	F3	Reliable colleagues	3	4.86	0.50	14	3.70	0.90
	F4	Reputation of organization	16	3.13	1.26	2	4.37	0.73
	F5	Fair leadership culture	4	4.85	0.43	13	3.73	1.01
	F6	Organization's social engagement	13	4.20	0.95	1	4,21	0.85
	F7	Organization's image among friends and relatives	15	3.60	1.15	11	3.80	0.98
	F8	Working environment/team spirit	2	4.90	0.45	9	3.90	1.03
Instrumental attributes	G1	Training offerings	8	4.55	0.60	5	4.26	0.78
	G2	Location/closeness to home	14	4.17	0.81	3	4.32	0.90
	G3	Varied tasks	12	4.22	0.74	7	3.99	0.93
	G4	High job security	6	4.77	0.49	4	4.32	0.82
	G5	Responsible tasks	11	4.35	0.73	6	4.21	0.80
	G6	Adequate salary	7	4.69	0.53	10	3.87	0.81
	G7	Opportunities for personal development	10	4.50	0.65	12	3.79	1.03
	G8	Reliable work schedule	5	4.80	0.43	17	2.74	1.01
	G9	Performance bonuses	9	4.54	0.63	8	3.92	0.99
Dependent variables	H1	Satisfaction with employer					4.48	0.85
	H2	Job satisfaction					4.40	0.90
	H3	Willingness to recommend employer to others					4.22	1.04

Source: own representation

Table 7 Ratings according to profession

	Nursing professionals		Nursing assistants	
Pos.	*Attribute*	*Mean*	*Attribute*	*Mean*
1	Working environment/team spirit	4.93	Sincerity	4.91
2	Sincerity	4.92	Reliable colleagues	4.84
3	Fair leadership	4.88	Working environment/team spirit	4.82
4	Reliable colleagues	4.87	Job security	4.83
5	Reliable work schedule	4.83	Fair leadership	4.80

Source: own representation

skilled workers and with this is the number of vacancies is particularly high among nursing professionals. Therefore, job security is not a particularly important attractiveness attribute for them.

4.2 Impact on Employer Attractiveness

In the third part of the survey, the respondents were asked to assess the extent to which their current employers meet the given attributes. By using a multiple regression analysis, we wanted to investigate whether these attributes actually have an impact on perceived employer attractiveness. Based on Lievens et al. (2007), we defined three dependent variables to capture the rather complex construct of employer attractiveness using the following statements:

(H1): I like to work for this company.

(H2): I am satisfied with my job.

(H3): I would recommend this company to acquaintances who are looking for a job.

The descriptive analytics for the data on employer assessment and the dependent variables are provided in Table 6. The correlations matrix provided in Table 8 shows that the correlation between the independent variables (attributes) varies from a very low 0.12 (reliable working schedule and outside-the-job activities) to a high 0.80 (sincerity and leadership culture). Thus, there seems to be a substantial overlap between how employees feel treated by their company and the supervisor's role in this. Not surprisingly, the intercorrelation between a good working environment/team spirit and reliable colleagues is also quite high (0.75). To check for multicollinearity issues among the independent variables, we calculated the variance inflation factor (VIF) for each predictor (Table 9).

For the subsequent multiple regression analysis, we defined three distinct models, each of which uses one of the statements H1 to H3 as a dependent variable. A total of 17 symbolic and instrumental attributes were given as independent variables. Since none of the variables exhibit a VIF greater than 4.00 we did not drop any of the predictors due to multicollinearity. Table 9 presents the results for models 1 to 3. As can be seen, the total set of instrumental and symbolic dimensions explain 49% of the variance in model 1 (satisfaction with employer) up to 59% in model 2 (job satisfaction) and 51% in model 3 (willingness to recommend). All three models have a significance level of $p < 0.000$. So, there is strong support for our hypothesis that these attributes contribute to employer attractiveness in the healthcare industry.

The analysis of the distinct models brings to light some interesting results. Model 1 examines the relationship between how their current employer meets the given attractiveness attributes and how much employees enjoy working there. In total, five attributes emerged as significantly positive predictors with the company's reputation among friends showing the greatest impact. Variety of tasks, reliable working schedules, and opportunities for personal development are also among the significant variables. Surprisingly, the variable "outside-the-job activities" also is a significant predictor. The results for model 2, which examines the impact of the given attributes on job satisfaction, are very similar. In this model, training offerings also have a significant influence. Both models 1 and 2 reveal that attributes predicting satisfaction with the current employer and job satisfaction are not necessarily the ones that were perceived as most important by the employees. In particular, attributes such as

Table 8 Intercorrelation matrix

ID		F1	F2	F3	F4	F5	F6	F7	F8	G1	G2	G3	G4	G5	G6	G7	G8	G9	H1	H2	H3
d	***Symbolic attributes***																				
F1	Outside-the-job activities	1.00																			
F2	Sincerity	0.32	1.00																		
F3	Reliable colleagues	0.25	0.68	1.00																	
F4	Reputation	0.20	0.42	0.29	1.00																
F5	Fair leadership culture	0.34	0.80	0.71	0.39	1.00															
F6	Social engagement	0.35	0.51	0.33	0.53	0.53	1.00														
F7	Organization's image	0.26	0.59	0.60	0.46	0.68	0.49	1.00													
F8	Working environment/team spirit	0.24	0.65	0.75	0.28	0.68	0.44	0.58	1.00												
	Instrumental attributes																				
G1	Training offerings	0.52	0.31	0.24	0.42	0.38	0.54	0.34	0.27	1.00											
G2	Location/closeness to home	0.28	0.30	0.35	0.32	0.31	0.43	0.42	0.34	0.41	1.00										
G3	Varied tasks	0.35	0.49	0.49	0.38	0.57	0.46	0.52	0.56	0.42	0.41	1.00									
G4	High job security	0.30	0.38	0.49	0.42	0.44	0.35	0.52	0.42	0.34	0.42	0.45	1.00								
G5	Responsible tasks	0.39	0.46	0.44	0.42	0.52	0.45	0.56	0.44	0.48	0.39	0.65	0.62	1.00							

(continued)

Table 8 (continued)

ID		F1	F2	F3	F4	F5	F6	F7	F8	G1	G2	G3	G4	G5	G6	G7	G8	G9	H1	H2	H3
G6	Adequate salary	0.35	0.36	0.43	0.30	0.43	0.40	0.51	0.46	0.43	0.44	0.45	0.58	0.55	1.00						
G7	Opportunities for personal development	0.41	0.58	0.55	0.26	0.63	0.36	0.65	0.55	0.49	0.35	0.64	0.61	0.72	0.59	1.00					
G8	Reliable work schedule	0.12	0.48	0.54	0.22	0.59	0.31	0.58	0.55	0.20	0.29	0.52	0.42	0.49	0.41	0.57	1.00				
G9	Performance bonuses	0.29	0.40	0.36	0.26	0.43	0.35	0.38	0.42	0.46	0.28	0.36	0.50	0.55	0.59	0.52	0.45	1.00			
	Dependent variables																				
H1	Satisfaction with employer	0.38	0.53	0.47	0.36	0.61	0.49	0.63	0.54	0.50	0.37	0.59	0.49	0.56	0.51	0.66	0.54	0.42	1.00		
H2	Satisfaction with job	0.40	0.52	0.48	0.33	0.58	0.46	0.59	0.51	0.51	0.36	0.61	0.47	0.60	0.49	0.68	0.56	0.42	0.86	1.00	
H3	Willingness to recommend	0.28	0.59	0.55	0.25	0.67	0.43	0.67	0.61	0.35	0.31	0.55	0.53	0.50	0.52	0.66	0.59	0.40	0.77	0.68	1.00

Source: own representation

Table 9 Summary of multiple regression analysis for Models 1–3

ID	Attribute	Model 1			Model 2			Model 3		
		Beta	*t*	*VIF*	*Beta*	*t*	*VIF*	*Beta*	*t*	*VIF*
F1	Outside-the-job activities (e.g., team events)	0.11 *	2.17	1.19	0.1 7**	2.93	1.18	0.03	0.65	1.17
F2	Sincerity	0.02	0.23	3.16	0.06	0.58	3.06	0.15	1.36	3.22
F3	Reliable colleagues	0.05	0.56	2.96	0.01	0.14	2.94	0.11	1.09	2.82
F4	Reputation of organization	0.00	0.09	1.50	0.01	0.13	1.51	0.20 *	2.18	1.49
F5	Fair leadership culture	0.15	1.44	3.76	0.13	0.18	3.75	0.26 *	2.18	3.96
F6	Organization's social engagement	0.11	1.37	1.83	0.09	−0.96	1.82	0.11	1.16	1.95
F7	Organization's image among friends and relatives	0.25 ***	3.25	2.18	0.25 **	2.83	2.19	0.36 ***	4.04	2.26
F8	Working environment/team spirit	0.12	1.56	2.73	0.09	0.98	2.76	0.1 8*	2.00	2.78
G1	Training offerings	0.11	1.24	1.53	0.18 **	2.11	1.58	0.01	0.13	1.58
G2	Location/closeness to home	0.04	0.56	1.45	0.03	0.05	1.44	0.02	0.24	1.44
G3	Varied tasks	0.15 *	1.82	2.26	0.17 *	2.04	2.28	0.07	0.74	2.29
G4	High job security	0.14	1.57	2.04	0.10	1.35	1.99	0.23 **	2.09	2.04
G5	Responsible tasks	0.05	0.52	3.00	0,15	0.56	3.08	0.06	0.48	2.91
G6	Adequate salary	0.07	0.78	2.11	0.05	0.68	2.11	0.15	1.31	2.16
G7	Opportunities for personal development	0.16*	1.83	2.76	0.15*	1.81	2.75	0.31 ***	2.99	2.73
G8	Reliable work schedule	0.16 **	2.43	1.68	0.19 **	2.87	1.68	0.32 ***	4.11	1.65
G9	Performance bonuses	−0.003	−0.05	1.93	−0.003	−0.38	1.97	−0.05	−0.0	2.02
R^2		0.52			0.57			0.59		
Adj. R^2		0.49			0.59			0.51		
p		***			***			***		

Note: significant at $p < 0.1$;*; $p < 0.05$**; $p < 0.01$***
Source: own representation

the variety of tasks or the importance of a good reputation among friends and acquaintances were rather underestimated in terms of their importance for employer attractiveness. This becomes particularly evident when considering the attribute "outside-the-job activities." Although the variable is a significant predictor in both models, it was assessed as the least important by the employees.

Model 3 gives a slightly different perspective by examining what attributes enhance the willingness of the employees to recommend their company as an employer to friends and acquaintances. A total of seven attributes emerge as significant predictors. Unsurprisingly, the company's reputation in this case is crucial. For the first time, rather social factors such as a fair leadership culture and team spirit become significant. These are among the attributes employees considered to be particularly important. But again, attributes that were considered less important such as reputation or opportunities for personal development are those with the greatest impact and highest significance level.

5 Discussion

The present study aims to contribute some evidence on which attributes make up an "attractive" company for employees in healthcare. While healthcare is still underrepresented in studies on employer attractiveness and employer branding, the analysis of existing studies shows that mostly the perceptions of applicants or graduates were investigated so far. The focus of the present study, therefore, was placed explicitly on the internal perspective. Since the respondents were asked to rate attractiveness attributes according to their perceived importance in general (regardless of their current employer) in the first part of the survey, the external perspective was inexplicitly included. To determine which of the attributes are positive predictors of employer attractiveness, we carried out a multiple regression analysis. In order to identify these attributes in the first place, we applied the instrumental–symbolic framework, which has already been used in similar studies on employer branding and employer attractiveness.

The results show that the attributes in the symbolic dimension were perceived as more important than instrumental attributes. This is, in particular, true for social attributes such as reliable colleagues, fair leadership culture, and team spirit. With regard to the instrumental attributes, a reliable working schedule and job security are considered to be most important. A comparison of results from nursing professionals and nursing assistants shows, however, that job security plays a more important role for nursing assistants. Economic attributes such as salary and performance bonuses, but also the task-related attributes tend to occupy middle-ranking positions. When comparing these results with previous studies, it becomes evident that there are certain overlaps in the assessment, but also differences, between applicants, graduates, and experienced staff. Hence, Frèchette et al. (2013) and Reifgerste et al. (2017) found that graduates or young professionals rate economic attributes over all others. These obviously play a less important role for experienced professionals. The

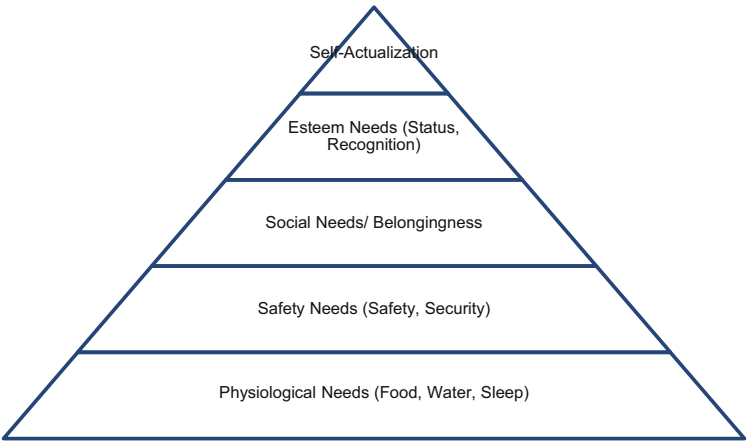

Fig. 2 Maslow Hierarchy of Needs. Source: Own Representation modified from Lester (2013)

assessment of the task-related attributes also differs in that they are rated as more important by applicants and young professionals. Experienced professionals rather emphasize the importance of social factors. It is common to both groups that they prioritize attributes regarding the work–life balance (e.g., planning of leisure time through reliable working schedules, delimitation of work, and leisure time). However, both groups consider individual needs such as opportunities for personal development and responsible tasks to be less important.

The multivariate analysis on the actual impact of these attributes to predict employer attractiveness reveals some surprising results. Thus, the results showed that the investigated attributes explain 49–59% of the variance of the distinct models and that some of the attributes showed a significant effect on predicting employer attractiveness in healthcare. These include opportunities for personal development, good reputation, responsible tasks, and training opportunities. Although there is a small overlap, most of these attributes differ significantly from those the respondents perceived to be most important. Hence, the attributes employees perceive as important are not the ones that actually matter most. A possible explanation for this finding may lie in the hierarchy of needs, which is depicted in Fig. 2. When classifying the attributes on Maslow's pyramid of needs, a more meaningful picture emerges.

Respondents rated the fulfillment of security and social needs as highly important for employer attractiveness. These are deficit needs and must first be met in order to be able to feel satisfied with a situation at all. At the same time, the participants tended to underestimate the importance of growth needs including the categories esteem needs and the need for self-actualization. The attributes—that were identified as being significant to predict employer attractiveness—rather belong to those last two categories, i.e., image attributes such as the company's degree of awareness and its reputation among friends belong to the category of esteem needs. The desire for personal development and varied or responsible tasks meet the need for self-actualization. From the internal employer branding perspective, meeting

employees´ growth needs is, therefore, a crucial component to retain employees in the long term. This can be a huge challenge, especially for healthcare SMEs, where career and development prospects for employees are often limited.

6 Conclusion and Recommendations

This study has provided some strong evidence that employer attractivity in healthcare is linked to certain attributes from the instrumental–symbolic framework. However, the attributes that have shown significant effects on predicting employer attractiveness are not necessarily the ones that employees believe are most important. Considering these findings, some recommendations for increasing employer attractiveness in healthcare can be derived on political as well as on managerial level. From the political perspective, one key finding draws on the importance of attributes belonging to the categories of esteem needs and self-actualization. Thus, implementing laws to increase the minimum wage for nursing staff, as the German government is planning to do in June 2021, is one important first step, but it will not be enough to make the healthcare professions more attractive in the long term. Rather, opportunities for professional and personal development should be facilitated. Nursing professions in particular are often perceived as unattractive because of lacking career opportunities. Reforming nursing education including the academization in some professions may be a good starting point. Eventually, monetary appreciation must be accompanied by a greater social appreciation of these professions.

The study also highlights some implications for healthcare management in order to shape the employer branding process and increase employer attractiveness. Respondents perceive the importance of social and safety needs as highly important. From the perspective of applicants with some professional experience, the corresponding attribute including sincerity and fair leadership culture represent central attractiveness factors. In order to attract applicants, external communication should therefore be geared primarily to conveying these attributes. For instance, short testimonials from employees, visual language, and photo stories could be suitable for this intention. From the internal perspective, the results suggest a different approach. To retain employees, healthcare organizations should target their efforts on growth needs. Besides offering varied and responsible tasks, this may also include providing opportunities for career development and recognition for work done. However, esteem attributes such as organizational awareness and above all a good reputation among acquaintances also contribute to address and meet these needs.

Based on the results of this study, we believe that the efforts of the employer branding process in healthcare organizations should emphasize different attractiveness attributes, depending on which perspective to address. Ultimately, both perspectives need to mesh with one another since only an integrated, holistic approach

is suitable to find new specialists and, at the same time, to sustain a high attractiveness level for the existing employees.

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The Central European Perspective on Managerial Staff Development Practices in Local Subsidiaries of MNCs Operating in Eastern and Western Europe

Marzena Stor and Łukasz Haromszeki

Abstract The main goal of the chapter is to identify the differences in the scope of internal relationships among the elements composing managerial staff development (MSD) in local subsidiaries of multinational companies (MNCs) headquartered in Central Europe and operating in Eastern and Western Europe. The research sample was composed of 200 headquarters (HQs) of nonfinancial MNCs and their local subsidiaries. In the research process, some statistically significant differences between MNCs operating in Eastern and Western Europe have been identified. The correlation between the financial performance results of local subsidiaries and the advancement level of MSD appears to be higher in Eastern Europe, although the advancement level of MSD itself is higher in Western Europe. In Eastern Europe, the internal relationships among the elements composing MSD are numerous and with stronger ties than in Western Europe. MSD is of more complex and systems approach in Eastern Europe. Furthermore, here the higher the appraisal level of managerial staff's competencies as a competitive factor, the more systems approach to MSD is practiced. In Western Europe, the higher the advancement level of individual components of MSD the less systems approach to MSD is preferred. Our study, therefore, contributes some original findings to the discipline of management science.

Keywords Managerial staff development · Managerial competencies · Multinational company · Eastern Europe · Western Europe

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1 Introduction

Setting up and running a profitable business in the conditions of increasing competition and a rapidly changing environment is becoming more and more complicated. The companies realize that the key to success is finding effective ways to develop the competencies of their managerial staff (Anzengruber et al. 2017) which may build up their competitive advantage as a competitive factor. The role of managerial competencies in the company's performance has been under research in many ways and in various geographical regions. By and large, the research findings imply the positive relationship between competency-based superior performance and organizational performance results (Shet et al. 2019). There are also numerous publications in which the authors empirically prove the existence of the correlations between the advancement level of HRM and the company's performance outcomes. Some of them consider the overall advancement level of human resources management (HRM) and its value to the organizational outcomes, while others focus on individual inputs of separate HRM subfunctions, to the company's performance outcomes (Ginevičius et al. 2010). Because managerial competencies differ significantly from those of other employees (Raziq et al. 2020), some of the HRM subfunctions are dedicated in organizations only to the current managers or those whom they are going to promote to such positions. One of such examples is managerial staff development (MSD). The basic assumption is that to enhance the managerial competencies in their role of the company's competitive factor it is necessary to have good policies and programs of MSD. Moreover, the accumulated knowledge and experience gained by managers are treated as valuable assets, the replacement or reconstruction of which is costly (Brauer 2013).

In this context, it should be noted that the development of managerial competencies in multinational companies (MNCs) is a much more complicated process than in national organizations. It is just to say that the geographical regions in which the MNCs run their businesses are usually very different. Their distinctiveness may rely on their ranking positions calculated within the range of such indices as the environmental friendliness for doing business, international competitiveness, economic freedom, innovation, perception of corruption, or maybe simply connected with their GDP, history, culture, and many others (Díez-Esteban et al. 2019; Kiselakova et al. 2019). All these provide a specific environment for MSD in various foreign subsidiaries of MNCs. For MNCs, the comprehension of local environmental requirements is critical for the proper assessment of what type of organizational and managerial practices their foreign entities need to transform into high-performance businesses. For this reason, they can recognize some of their HRM practices, including MSD, as extraordinarily significant to their local performance results and success, and this may mean imposing certain programs or policies (Berchtold et al. 2010).

In the perception of Europeans themselves, there are even clear differences between the Eastern and Western regions of Europe which may result in different MSD practices preferred at the local subsidiary's level and the headquarters'

(HQ) level. The above-mentioned phenomena have not been the subject of deeper scientific research in economies such as Eastern Europe so far (Farndale and Sanders 2017: 1630). The overwhelming majority of the research on MNCs has been carried out in the companies from developed countries (usually from the West) which located their foreign direct investment (FDI) in countries with a lower level of development (e.g., Brewster 2007; Morley et al. 2009; Chaudhry 2013; Wilkinson and Wood 2017; Arora et al. 2018). No detailed research in this field has been conducted in MNCs based in the transition economies or in the economies which are just after transformation processes, like those in Eastern Europe (Morley et al. 2009; Festing and Sahakiants 2013; Haromszeki 2014; Stor and Kupczyk 2015; Stor and Haromszeki 2020b). Hence, the more complex and the more composite interrelated links between the appraisal of the managerial competencies as a competitive factor, the advancement level and significance of MSD to organizational performance in such organizations stay rather unidentified. In this context, the main goal of the chapter is to identify the differences in the scope of internal relationships among the elements composing MSD in local subsidiaries of MNCs headquartered in Central Europe and operating in Eastern and Western Europe. In this book, we present the revised version of our conference article delivered at the 31st EBES Conference (Stor and Haromszeki 2020a).

As an effect of the above considerations, the chapter is structured in the following way. After this brief introduction, the authors—basing on the literature review—outline the theoretical framework they assume in their study. This results in the formulation of the main hypotheses: one regular and four contextual. Then, the authors explain the methods, tools, measures, and samples used in the research. The results of empirical research follow, along with a discussion about them. The summary of the research and final conclusions are placed at the end of the chapter.

2 The Theoretical Background of the Study

2.1 Two Regions as the Object of Research Interest: Eastern Europe and Western Europe

The year of 1989—in which the Central and Eastern European socialism collapsed—is considered as a turning point of the modern history of Europe. It is only three decades that the Europeans have been witnessing all the most crucial political, economic, and social reforms. Before that turning date in European minds Europe had been divided into two worlds, meaning Eastern Europe and Western Europe. At that time Eastern Europe had been named the Socialist Bloc or the Soviet Block because it had been a collection of socialist countries located in the zone of influence of the Soviet Union and its imperialist control. And Western Europe had been just called the Capitalist Block or—colloquially—the West.

For a couple of decades, these two worlds had been developing under entirely different political and economic systems, even causing different social arrangements (Apsalone and Šumilo 2015), resulting in different concepts and styles of leader–followers interactions and specific conceptualizations of applicable management decisions. Before the changes that occurred in the late 1980s, in most East European countries it had been even the state government that controlled HRM activities at the companies' level. Moreover, special governmental attention was given to those activities which were dedicated to MSD (Listwan et al. 2009). The financial and economic growth of Eastern Europe has accelerated since the end of the Socialist Block but on overall it is still lower than in Western Europe (Stawicka 2014; Albulescu et al. 2018; Skare and Porada-Rochoń 2019). In the past, this resulted in presuppositions taken by MNCs that the managerial competencies and their development may be at the lower advancement level in Eastern Europe than in Western Europe because of lesser financial, technological (Bartelsman et al. 2019), or educational resources. In most cases, the reason to engage in foreign direct investment (FDI) was the low labor cost (Ali and Cantner 2020). Now it has changed a lot and the Western MNCs invest in the Eastern region because they value here, among many other things, the managerial capital rather high (Cieślik 2019).

But many MNCs headquartered in Central Europe still perceive the Eastern and Western regions of Europe differently (Albulescu et al. 2018). From their perspective, the sociocultural, managerial, and organizational changes, although visible in business practice, are not devoid of features typical of the previous epoch, which were based on the authoritarian or patriarchal managerial models or assumption of what people are like, how they work, and how they should be managed in these two European worlds to gain and maintain company's competitive advantage (Arora et al. 2018). The differences are also noticeable in some kind of the Eastern and Western heritage of different approaches to the significance of managerial development (Mabey and Gooderham 2005) with connection to the contextual job characteristics (Srikanth and Jomon 2018) or institutional requirements of the Eastern country's political and economic system. Hence, even the career development in MNCs may look differently (Chaudhry 2013).

For 30 years now, the Easterners of Europe have been trying to catch up with the Westerners. This period seems to be very short in the entire history of European civilization, but the phenomena that appeared in it, and above all their real consequences, justify why it is reasonable to apply the Central European perspective to compare the MSD practices in local subsidiaries of MNC in Eastern and Western Europe. The above outline of our regional interest of study makes a general context for the five hypotheses to be developed in the further part. Yet one of our hypotheses will be a regular type and four of contextual character.

2.2 *The Managerial Staff's Competencies as a Company's Competitive Factor*

The observation of business practice leads to the conclusion that companies apply various competitive factors (Nasab et al. 2013). They compete on the features and quality of their products or services, quality of design or manufacturing, profit margin, technology, price for each sale, reputation and image, and human capital, including managerial competencies upon which everything is embedded. The literature analysis suggests that managerial competencies are of central importance to the success of a business and its capability to acquire competitive advantage (Patel and Hamlin 2012; Yoon et al. 2016). This is because the implementation of business strategies and the achievement of the intended organizational outcomes depend, inter alia, on the competencies that the managerial staff possess (Katou and Budhwar 2010; Kearns 2010). Furthermore, these competencies can be seen as a competitive factor of the company. This standpoint has accompanied the resource-based theory for almost 30 years or more (Barney 1991; Dyer 1993; Wright et al. 1993; Becker et al. 2001; Harvey and Novicevic 2005; Huselid and Becker 2011). It has been founded both on the reasonably formulated theoretical conceptions on how to develop managerial competencies and on the empirical research findings obtained from business practice (Ingham 2007; Mayo 2012; Delery and Roumpi 2017) with particular emphasis on the international context (Raziq et al. 2020). This is why in our research project we have assumed the organizational perspective in which the managerial staffs' competencies are considered as a company's competitive advantage which covers all the skills, knowledge, personal qualities, and behaviors that are needed to effectively perform a role or work of a manager and help the business achieve its strategic goals in gaining and maintaining its competitive advantage (*c.f.* Stor 2016:165). All this brings us to our first contextual hypothesis:

H_1 The managerial staff's competencies as a competitive factor in the foreign subsidiaries of MNCs are appraised higher in Western Europe than in Eastern Europe.

2.3 *The Advancement Level and Complexity of MSD Activities*

The main conclusion from the previous section is the recognition that the value of the managerial staff' competencies as a competitive factor is a resultant of how the potential and current managers have been developed. But it can also be the opposite. An investment in MSDs may depend on how the company views its contribution to the business success (Stor and Haromszeki 2019). Consequently, the value assigned to MSD for contributing to the company's performance may depend on the value

attributed to the managerial staffs' competencies and simultaneously may determine the level of MSD activities

The research findings show that organizations which do not have interesting and well-designed developmental programs for their managerial staff are less competitive in the labor market and are not able to attract and retain managerial talents. Moreover, since there is a linear relationship between managerial competencies and company results (Hughes and Rog 2008), investments in managerial competencies are desirable, especially as their role in developing and implementing the company's strategy is invaluable (Zakrzewska-Bielawska 2019) and proved by different types of research on various controlling mechanisms (Sageder and Feldbauer-Durstmüller 2019). Therefore, it is necessary to improve managerial competencies, because failure to improve management skills has a detrimental effect on the selection and retention of managerial staff (Sheehan 2012). When creating developmental programs for managers, it should be remembered that their effectiveness depends on whether the variety of developmental methods offered within them meets both the needs of the organization and the managers themselves, and whether their quality and quantity are conducive to the achievement of development goals (Becker and Bish 2017) at different organizational levels (Mueller et al. 2020). What is more, the contemporary environmental requirements impose on MNCs a rather high rate of competencies improvement and delivery of high-level MSD activities (Nikitina and Lapiņa 2019). Accordingly, our two other contextual hypotheses are:

H_2 The advancement level of MSD in foreign subsidiaries of MNCs is higher in Western Europe than in Eastern Europe.

H_3 MSD is of more complex and systems approach in foreign subsidiaries of MNC in Western Europe than in Eastern Europe.

2.4 The Advancement Level of MSD Activities and Company's Financial Performance Results

While browsing the literature on the subject, we encounter various classifications of the enterprise's performance results and their correlations with HRM practices that have been proved by the researchers. The performance results of the company are usually categorized according to the following schema of outcomes: organizational, managerial, financial, and behavioral. In this chapter, we focus on the two last categories. In brief, the financial performance results may include, for example, market share, sales, share price, profits, financial liquidity, company's image and goodwill, and the value of the enterprise (Richey and Wally 1998; Arthur 1994; MacDuffie 1995; Huselid 1995; Becker and Gerhart 1996; Pfeffer and Veiga 1999; Combs et al. 2006). The behavioral results signify employee engagement and satisfaction, worker attitudes, managerial and/or employee social relations, competency development of employees and/or managerial staff, and leadership in a sense

of interactions between the leaders and their followers (Nagy 2002; Rich et al. 2010; Ferguson and Reio 2010; Sparrow et al. 2016; Stor and Haromszeki 2019; Børing 2019). So, the linear relationship between managerial competencies and company results (Hughes and Rog 2008) mentioned in the previous section is classified into the category of behavioral company's performance results.

Additionally, it is worth highlighting that the research findings indicate that MSD is associated with firm performance as well (Hooi 2019). Therefore, another responsibility of the organization is to recognize the importance of MSD. The value of this for organizational efficiency and effectiveness has been proven in many ways. For example, the authors of one research reveal that priority and high rank assigned to MSD significantly affects the performance of the organization (Mabey and Thomson 2000), while the others prove the positive relationships between the company's performance and the selected MSD activities (Thomson et al. 2001). It means that successful MSD activities increase the level of managerial competencies which then help improve the company's performance results (Garavan and Heraty 2001). Additionally, they affect the selection and retention of managerial staff (Sheehan 2012). Furthermore, MSD activities build up organizational learning capability as a key element in organizational performance (Mallén et al. 2016). On the whole, there is a wide range of different approaches to the connections between the advancement level of MSD and organizational performance results. Anyway, our literature review has finally brought us to the formulation of two other hypotheses: one regular and one contextual:

H_4 The higher the advancement level of MSD practices the better the financial performance results of foreign subsidiaries of MNCs.

H_5 The positive impact of the advancement level of MSD practices on the financial performance results of foreign subsidiaries of MNCs is bigger in Western Europe than in Eastern Europe.

3 The Empirical Research Methodology

In our research problem, we focused on the identification, analysis, and comparison of the internal relationships among the elements composing MSD in local subsidiaries of MNCs operating in Eastern and Western Europe with a view to the financial performance results of these companies, the value ascribed to the managerial staff's competencies as a strategic competitive factor and the advancement level of MSD. Our theoretical studies have resulted in the formulation of one regular and four contextual hypotheses to be verified in the empirical research which were provided in the previous section.

The company's financial performance result is a dependent variable. The MSD and its composing activities, also called elements, are treated as an independent variable. MSD and its components were analyzed on the basis of their advancement level with comparison to the general worldwide trends based on the best practices.

Based on the literature review, the authors have selected 11 components of MSD that are the most common or appreciated in business practice, i.e., attractive career paths adjusted to employees' expectations; developmental activities resulting from a diagnosed competency gap; methods, techniques, and instruments used in employee performance appraisal; employee training and development financed by the organization; systems talent management through developmental paths; creation of transorganizational cooperation; building a platform for experience exchange; identification of managerial staff's competencies; regular research on the competency gap of managerial staff; identification of leadership talents; and programs developing leadership skills. The measures and scales applied to the individual variables included in the tested hypotheses are presented in Tables 1 and 2.

Two methods were used to collect the research data: CATI (i.e., computer-assisted telephone interview) and CAWI (i.e., computer-assisted Web interview). During the interview survey, the respondents were reminded several times to answer the questions in the context of the last two fiscal years. This planned procedure was to ensure that they relate to a well-defined period of time within which they would likely be able to logically evaluate the interconnections between the individual MSD activities and the studied business phenomena. The research was performed in January 2018. The data was analyzed on the basis of descriptive and correlation statistics. All calculations were made with the aid of Statistica v. 13.3—an advanced suite of analytics software. The significance level was set at alpha = 0.05. The normal distribution of data was established using the Kolmogorov–Smirnov test. On the other hand, the Pearson correlation coefficient (i.e., Pearson's r) was used to investigate the relationship between the quantitative variables.

The research sample was composed of 200 headquarters of MNCs originating from a Central European country (Poland). They represented nonfinancial economic organizations with a dominant share of the Polish capital, functioning on the market no less than 2 years, which owned at least one foreign subsidiary that was the result of a foreign direct investment (FDI). The latest report prepared by the Polish Central Statistical Office made the reference base for the general number of business entities. According to this report in 2015, there were 1760 active Polish nonfinancial economic entities that reported the establishment of 4086 foreign subsidiaries in 150 countries (*Activities of Enterprises*. . ., 2017). As a result, it was assumed that the sufficient size of a research sample is 200 entities. With such a sample size and the confidence coefficient set at the level of 0.95, the maximum measurement error amounts to 0.065.

To meet the requirements specified above the authors used purposive sampling. Even though a few sectors of the economy were missing, the structure of the research sample varied in terms of company size (as measured by the number of people employed), type of FDI investment; the length of its operation in years; its business profile (as determined on the basis of ECBA—the European Classification of Business Activity), and the ownership share of the enterprise HQ in its foreign subsidiaries. Moreover, the selected MNCs differed in the total number of the subsidiaries they possessed in general, in the number of subsidiaries they controlled abroad, in the number of host countries in which their overseas units were located,

Table 1 Basic descriptive statistics for the company performance, managerial staff competencies, and the advancement level of MSD in MNCs in the research sample

Variables	Region	Valid N	Mean	Median	Min	Max	SD
Financial results	World Globally	200	3.74	4.00	2.00	5.00	0.51
	Eastern Europe	83	3.72	4.00	2.00	4.00	0.48
	Western Europe	102	3.79	4.00	2.00	4.00	0.47
Managerial staff competencies as a competitive factor	World Globally	200	3.37	3.00	2.00	5.00	0.56
	Eastern Europe	83	3.42	3.00	2.00	5.00	0.54
	Western Europe	102	3.32	3.00	2.00	4.00	0.58
The mean of advancement level of all MSD components	World Globally	200	3.77	3.82	2.64	4.46	0.38
	Eastern Europe	83	3.71	3.82	2.73	4.36	0.41
	Western Europe	102	3.82	3.91	2.64	4.36	0.35
Advancement level of: Attractive career paths adjusted to the employees' expectations	World Globally	200	3.69	4.00	3.00	5.00	0.56
	Eastern Europe	83	3.69	4.00	3.00	5.00	0.54
	Western Europe	102	3.69	4.00	3.00	5.00	0.58
Advancement level of: Developmental activities resulting from a diagnosed competency gap	World Globally	200	3.64	4.00	2.00	5.00	0.56
	Eastern Europe	83	3.57	4.00	2.00	5.00	0.57
	Western Europe	102	3.67	4.00	3.00	5.00	0.55
Advancement level of: Methods, techniques, and instruments used in employee performance appraisal	World Globally	200	3.78	4.00	2.00	5.00	0.54
	Eastern Europe	83	3.71	4.00	2.00	5.00	0.62
	Western Europe	102	3.83	4.00	3.00	5.00	0.49
Advancement level of: Employee training & development financed by the organization	World Globally	200	3.83	4.00	2.00	5.00	0.68
	Eastern Europe	83	3.72	4.00	2.00	5.00	0.65
	Western Europe	102	3.90	4.00	2.00	5.00	0.70
Advancement level of: Systems talent management through developmental paths	World Globally	200	3.58	4.00	2.00	5.00	0.59
	Eastern Europe	83	3.54	4.00	2.00	5.00	0.63
	Western Europe	102	3.63	4.00	2.00	5.00	0.54

(continued)

Table 1 (continued)

Variables	Region	Valid N	Mean	Median	Min	Max	SD
Advancement level of: Creation of transorganizational cooperation	World Globally	200	3.55	4.00	1.00	5.00	0.67
	Eastern Europe	83	3.53	4.00	2.00	5.00	0.65
	Western Europe	102	3.62	4.00	1.00	5.00	0.69
Advancement level of: Building a platform for experience exchange	World Globally	200	3.71	4.00	1.00	5.00	0.63
	Eastern Europe	83	3.72	4.00	2.00	5.00	0.53
	Western Europe	102	3.73	4.00	1.00	5.00	0.71
Advancement level of: Identification of managerial staff's competencies	World Globally	200	4.20	4.00	3.00	5.00	0.70
	Eastern Europe	83	4.19	4.00	3.00	5.00	0.72
	Western Europe	102	4.21	4.00	3.00	5.00	0.69
Advancement level of: Regular research on the competency gap of managerial staff	World Globally	200	3.64	4.00	2.00	5.00	0.58
	Eastern Europe	83	3.51	4.00	2.00	4.00	0.55
	Western Europe	102	3.76	4.00	2.00	5.00	0.58
Advancement level of: Identification of leadership talents	World Globally	200	4.09	4.00	2.00	5.00	0.75
	Eastern Europe	83	3.95	4.00	2.00	5.00	0.82
	Western Europe	102	4.20	4.00	3.00	5.00	0.68
Advancement level of: Programs developing leadership skills	World Globally	200	3.74	4.00	2.00	5.00	0.62
	Eastern Europe	83	3.63	4.00	2.00	5.00	0.66
	Western Europe	102	3.84	4.00	2.00	5.00	0.58

Source: Own research data
Note: Scales:
Performance results: comparison to the main competitors: 1—poor, 2—below average, 3—similar to others, 4—above average, 5—very good
Managerial staff competencies as a competitive factor: comparison to the HQ: 1—strongly lower, 2—rather lower, 3—similarly to an average, 4—rather higher, 5—strongly higher
Advancement level: comparison to the general trends based on the best worldwide practices: 1—very low, 2—low, 3—average, 4—high, 5—very high

and even within the scope of the country's development level in which their most representative entity operated. The average MNC was a fairly large organization, it operated on the market for over 11 years, it had about 13 entities, of which about 8 were located abroad in 4 countries, its foreign subsidiaries were established as greenfield investment in which the Polish HQ had a majority share in the ownership. Our research sample included 83 of the largest foreign subsidiaries of such

Table 2 The ranking of competitive factors in local subsidiaries of MNCs

Eastern Europe			Western Europe		
No	Competitive factors	Mean value	No	Competitive factors	Mean value
1	Products/services quality	3.77	1	Products/services quality	3.78
2	Competencies of managerial staff	3.42	2	Organization structure & size	3.52
3	Knowledge & skills of employees	3.41	3	Knowledge & skills of employees	3.38
4	Organization structure & size	3.28	4	Competencies of managerial staff	3.32
5	Financial resources	3.22	5	Financial resources	3.27
6	Products/services innovativeness	3.16	6	Low cost of production	3.22
7	Low cost of production	3.16	7	Products/services innovativeness	3.10
8	Technology of production	3.14	8	Technology of production	3.04
Mean:		3.32	Mean:		3.33

Source: Own research data
Note: Scale: With comparison to the HQ: 1—strongly lower, 2—rather lower, 3—similarly to an average, 4—rather higher, 5—strongly higher

companies in Eastern Europe and 102 in Western Europe. We supposed that some variables, for example, country's economic development, type of industry, size of the company, or its legal form could differentiate the business performance results in the sample. However, the results of statistical testing did not prove such relationships.

4 The Empirical Research Findings

4.1 Descriptive Statistics

The basic descriptive statistics for the variables related to the main research problem are collected in Table 1. On average, the global financial performance results of MNCs, when compared to their main competitors, rank somewhere between "similar to others" and "above average" ($\overline{x} = 3.74$). So, their financial situation is on average good. In this context, the financial results in Western Europe ($\overline{x} = 3.79$) are a little higher than in Eastern Europe ($\overline{x} = 3.72$).

From the worldwide perspective, the managerial staff competencies as a competitive factor are on average evaluated similarly to the managerial staff competencies at the HQs ($\overline{x} = 3.37$). However, in Eastern Europe ($\overline{x} = 3.42$) they are appraised higher than in Western Europe ($\overline{x} = 3.32$). It is worth emphasizing that none of the MNCs gives a rate of strongly lower ($min = 2$). In Eastern Europe, in some cases, the

appraisal gains the highest possible grade ($max = 5$), whereas in Western Europe it is lower by 1 point on the scale ($max = 4$).

The research findings show that managerial staff's competencies are considered as one of the eight most important competitive factors of companies (see Table 2). But some differences between Western and Eastern Europe are visible. In Western Europe competencies of managerial staff are on the fourth-ranking position and knowledge and skills of employees on the third. In Eastern Europe, it is competencies of managerial staff that is placed on the second position (just after the products/services quality) and knowledge and skills of employees coming third. In general, the human factor seems to have a lower competitive value in Western Europe.

So, our hypothesis $\mathbf{H_1}$ is not confirmed because what we have found is the opposite phenomenon than the expected one. Namely, it is not Western but Eastern Europe in which the managerial staff's competencies as a competitive factor in the foreign subsidiaries of MNCs are appraised higher.

As about the average advancement level of MSD is relatively high in the World ($\overline{x} = 3.77$) as compared to the general trends based on the best practices. The mean calculated for all its components ranges from $min = 2.64$ to $max = 4.36$. Although the *max* score is the same in Eastern and Western Europe, the *min* scores are different. In Western Europe ($min = 2.64$) it is lower than in Eastern ($min = 2.73$). But the mean of all MSD components is higher in Western Europe ($\overline{x} = 3.82$) than in Eastern Europe ($\overline{x} = 3.71$). Even more, apart from one component, i.e., attractive career paths adjusted to the employees' expectations which reaches the equal rank, all the other components in Western Europe, when analyzed individually, are at slightly higher advancement level. Furthermore, in both regions, the highest level of advancement appears (in descending order) in the identification of managerial staff's competencies; identification of leadership talents; and employee training and development financed by the organization. In Eastern Europe, the other two places are occupied by building a platform for experience exchange and techniques and instruments used in employee performance appraisal, whereas in Western Europe by programs developing leadership skills and techniques and instruments used in employee performance appraisal. The full ranking order of the MSD components is depicted in Table 3.

All in all, our hypothesis $\mathbf{H_2}$ can be accepted. The analysis of the collected data proves that the advancement level of MSD is higher in Western Europe than in Eastern Europe. It concerns both cases: when MSD is evaluated totally as a set of components and when individual components are evaluated separately.

4.2 Correlation Analysis

In our research, we were also interested in the internal relationships among the elements composing MSD. Table 4 presents the results of the correlation tests (at $p < .05$) for the key research variables. In the idea systems model, each particular component of MDS can be correlated with 10 other composing elements

Table 3 The ranking of MSD's components by their advancement level in local subsidiaries of MNCs

Eastern Europe			Western Europe		
Rank	Elements of MSD	Mean	Rank	Elements of MSD	Mean
1	Identification of managerial staff's competencies	4.19	1	Identification of managerial staff's competencies	4.21
2	Identification of leadership talents	3.95	2	Identification of leadership talents	4.20
3	Employee training & development financed by the organization	3.72	3	Employee training & development financed by the organization	3.90
4	Building a platform for experience exchange	3.72	4	Programs developing leadership skills	3.84
5	Methods, techniques, and instruments used in employee performance appraisal	3.71	5	Methods, techniques, and instruments used in employee performance appraisal	3.83
6	Attractive career paths adjusted to the employees' expectations	3.69	6	Regular research on the competency gap of managerial staff	3.76
7	Programs developing leadership skills	3.63	7	Building a platform for experience exchange	3.73
8	Developmental activities resulting from a diagnosed competency gap	3.57	8	Attractive career paths adjusted to the employees' expectations	3.69
9	Systems talent management through developmental paths	3.54	9	Developmental activities resulting from a diagnosed competency gap	3.67
10	Creation of transorganizational cooperation	3.53	10	Systems talent management through developmental paths	3.63
11	Regular research on the competency gap of managerial staff	3.51	11	Creation of transorganizational cooperation	3.62
Mean:		3.71	Mean:		3.83

Source: Own research data
Note: Scale: Advancement level: comparison to the general trends based on the best worldwide practices: 1—very low, 2—low, 3—average, 4—high, 5—very high

($\Sigma_{(1;11)}$=10) at the potential degree of $r = 1.00$. In Eastern Europe, there are 5 components that reach $\Sigma_{(1;11)}$=10. They are: employee training and development financed by the organization; building a platform for experience exchange; regular research on the competency gap of managerial staff; identification of leadership talents; and programs developing leadership skills. In this category of variables, the range of values for the correlation coefficient is in the interval between $r = .24$ and $r = .67$. Moreover, their correlations with the mean of MSD ($\overline{x(MSD\ 1;11)}$) ranges from $r = .58$ to $r = .80$. As far as the remaining components are concerned, the number of their correlations with other components is between $\Sigma_{(1;11)}$=6 and $\Sigma_{(1;11)}$=9, and their correlations with the mean of MSD ($\overline{x(MSD\ 1;11)}$) ranges

Table 4 The results of a correlation test for the internal relationships among the components of MSD in Eastern and Western Europe

Variables: Elements of MSD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	$\overline{x(MSD)}$	$\Sigma_{(1;11)}$	$\overline{x(1:11)}$
Eastern Europe														
1. Attractive career paths adjusted to the employees' expectations	1.00	0.21	**0.33***	**0.39***	**0.34***	**0.35***	**0.23***	0.08	**0.24***	**0.27***	**0.29***	**0.45***	8	0.31
2. Developmental activities resulting from a diagnosed competency gap	0.21	1.00	0.21	**0.27***	0.18	0.21	**0.31***	**0.39***	**0.34***	**0.26***	**0.31***	**0.47***	6	0.31
3. Methods, techniques and instruments used in employee performance appraisal	**0.33***	0.21	1.00	**0.51***	**0.27***	**0.31***	**0.36***	**0.31***	**0.35***	**0.40***	**0.34***	**0.58***	9	0.35
4. Employee training & development financed by the organization	**0.39***	**0.27***	**0.51***	1.00	**0.32***	**0.32***	**0.58***	**0.42***	**0.47***	**0.59***	**0.53***	**0.71***	10	0.44
5. Systems talent management through developmental paths	**0.34***	0.18	**0.27***	**0.32***	1.00	**0.40***	**0.38***	**0.28***	**0.45***	**0.46***	**0.57***	**0.60***	9	0.39
6. Creation of transorganizational cooperation	**0.35***	0.21	**0.31***	**0.32***	**0.40***	1.00	**0.31***	**0.35***	**0.33***	**0.42***	**0.34***	**0.59***	9	0.35
7. Building a platform for experience exchange	**0.23***	**0.31***	**0.36***	**0.58***	**0.38***	**0.31***	1.00	**0.41***	**0.30***	**0.49***	**0.47***	**0.58***	10	0.38
8. Identification of managerial staff's competencies	0.08	**0.39***	**0.31***	**0.42***	**0.28***	**0.35***	**0.41***	1.00	**0.47***	**0.58***	**0.59***	**0.68***	9	0.42

9. Regular research on the competency gap of managerial staff	**0.24***	**0.34***	**0.35***	**0.47***	**0.45***	**0.33***	**0.30***	**0.47***	1.00	**0.53***	**0.45***	**0.68***	10	0.39
10. Identification of leadership talents	**0.27***	**0.26***	**0.40***	**0.59***	**0.46***	**0.42***	**0.49***	**0.58***	**0.53***	1.00	**0.67***	**0.80***	10	0.47
11. Programs developing leadership skills	**0.29***	**0.31***	**0.34***	**0.53***	**0.57***	**0.34***	**0.47***	**0.59***	**0.45***	**0.67***	1.00	**0.74***	10	0.46
Total/Mean													100	0.39
Western Europe														
1. Attractive career paths adjusted to the employees' expectations	1.00	**0.22***	0.12	**0.25***	0.13	−0.02	0.01	0.00	0.09	0.10	**0.28***	**0.43***	3	0.25
2. Developmental activities resulting from a diagnosed competency gap	**0.22***	1.00	**0.20***	0.01	**0.24***	−0.04	0.07	0.06	0.10	0.14	0.07	**0.25***	3	0.22
3. Methods, techniques and instruments used in employee performance appraisal	0.12	**0.20***	1.00	**0.37***	**0.22***	**0.30***	**0.28***	**0.24***	**0.29***	**0.35***	**0.37***	**0.54***	9	0.29
4. Employee training & development financed by the organization	**0.25***	0.01	**0.37***	1.00	**0.22***	**0.41***	**0.22***	**0.21***	0.16	**0.30***	**0.36***	**0.59***	8	0.29
5. Systems talent management through developmental paths	0.13	**0.24***	**0.22***	**0.22***	1.00	−0.08	**0.22***	0.15	**0.21***	0.10	0.18	**0.41***	5	0.22
6. Creation of transorganizational cooperation	−0.02	−0.04	**0.30***	**0.41***	−0.08	1.00	**0.30***	0.12	**0.24***	**0.21***	**0.25***	**0.33***	6	0.29

(continued)

Table 4 (continued)

Variables: Elements of MSD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	$\overline{x(MSD)}$	$\Sigma_{(1;11)}$	$\overline{x(1:11)}$
7. Building a platform for experience exchange	0.01	0.07	**0.28***	**0.22***	**0.22***	**0.30***	1.00	**0.37***	**0.31***	**0.33***	**0.23***	**0.52***	8	0.28
8. Identification of managerial staff's competencies	0.00	0.06	**0.24***	**0.21***	0.15	0.12	**0.37***	1.00	**0.35***	**0.41***	**0.29***	**0.51***	6	0.31
9. Regular research on the competency gap of managerial staff	0.09	0.10	**0.29***	0.16	**0.21***	**0.24***	**0.31***	**0.35***	1.00	**0.31***	**0.32***	**0.45***	7	0.29
10. Identification of leadership talents	0.10	0.14	**0.35***	**0.30***	0.10	**0.21***	**0.33***	**0.41***	**0.31***	1.00	**0.43***	**0.57***	7	0.33
11. Programs developing leadership skills	**0.28***	0.07	**0.37***	**0.36***	0.18	**0.25***	**0.23***	**0.29***	**0.32***	**0.43***	1.00	**0.66***	8	0.32
Total/Mean													70	0.28

Source: Own research data

Note: * Asterisk and numbers in bold → Pearson's r significant at $p < .05000$; $\overline{x(MSD)}$ the mean value of all MSD activities; $\Sigma_{(1;11)}$ the sum of all statistically significant correlations; $\overline{x(1:11)}$ the mean value of all statistically significant correlations

Table 5 The results of a correlation test for the MSD advancement level and the financial performance results of foreign subsidiaries of MNCs

Variables	World	Eastern Europe	Western Europe
The mean of advancement level of all MSD components	0.17*	0.33*	0.23*

Source: Own research data
*Pearson's r significant at $p < 0.05$

from $r = .47$ to $r = .60$. Thus, in Eastern Europe, the internal relationships among the elements composing MSD are numerous and with rather strong ties.

In Western Europe, none of the MSD components has reached $\Sigma_{(1;11)}=10$. The highest number of correlations is 9 and it refers to methods, techniques, and instruments used in employee performance appraisal. Interestingly, it is not the component that has the highest value for the correlation coefficient. Its correlations with other MSD components ranges from $r = .20$ to $r = .37$ and with the mean of MSD ($\overline{x(MSD\ 1;11)}$) is at $r = .54$. There are also three other components that reach the highest number of correlations, i.e., $\Sigma_{(1;11)}=8$, and they are: employee training and development financed by the organization; building a platform for experience exchange; and programs developing leadership skills. The values for the correlation coefficient range from $r = .21$ and $r = .43$. As about the remaining components, the number of their correlations with other components is between $\Sigma_{(1;11)}=3$ and $\Sigma_{(1;11)} = 7$, and their correlations with the mean of MSD ($\overline{x(MSD\ 1;11)}$) are in the interval between $r = .25$ to $r = .57$. Thus, in Western Europe the internal relationships among the elements composing MSD are observable but they are not as numerous and with so strong ties as in Eastern Europe. Among 110 possible internal statistical correlations within the MSD components, there are 100 correlations identified in Eastern Europe, while in Western Europe only 70. At the same time, the strength of these associations is larger in Eastern Europe. It means our hypothesis $\mathbf{H_3}$ is not confirmed because what we have identified is the phenomena in opposition to our expectations. MSD is of more complex and systems approach in Eastern Europe than in Western Europe.

Our final analysis of the relationships between the MSD practices and the financial outcomes confirms the hypothesis $\mathbf{H_4}$. As depicted in Table 5, the higher the advancement level of MSD practices the better the financial performance results of foreign subsidiaries of MNCs. Taking the worldwide perspective as a context, where $r = .17$, the correlation is stronger in Eastern Europe ($r = .33$) than in Western Europe ($r = .23$). In this way, our hypothesis $\mathbf{H_5}$ is unconfirmed and needs to be reformulated because the identified phenomenon is of the opposite character. The positive impact of the advancement level of MSD practices on the financial performance results of foreign subsidiaries of MNCs appears to be bigger in Eastern Europe than in Western Europe.

5 Research Summary

Our research problem concentrated on the identification, analysis, and comparison of the internal relationships among the elements composing MSD in local subsidiaries of MNCs operating in Eastern and Western Europe with a view to the financial performance results of these companies, the value ascribed to the managerial staff's competencies as a strategic competitive factor and the advancement level of MSD. Therefore, we conducted a comparative analysis of the obtained research results, which led to the conclusion that it is possible to indicate some differences between local subsidiaries of MNCs operating in these two regions of Europe.

The financial situation of the companies in the research sample is good and it makes the basic research context. The financial performance outcomes of foreign subsidiaries of MNCs in Eastern Europe are a little lower than in Western Europe. In both regions the financial results are positively correlated with the advancement level of MSD; however, the correlation is stronger in Eastern Europe than in Western Europe. Interestingly, the advancement level of MSD itself is higher in Western Europe than in Eastern Europe. It concerns both cases: when MSD is evaluated totally as a set of components and when individual components are evaluated separately. Furthermore, in Eastern Europe the internal relationships among the elements composing MSD are numerous and with rather strong ties, whereas in Western Europe, although also observable, they are not as numerous and with weaker correlations. Hence, MSD is of more complex and systems approach in Eastern Europe than in Western Europe. As a matter of fact, the managerial staff's competencies are considered as one of the most important competitive factors of companies in all organizations, the possible reason for the identified differences is that in Eastern Europe they are appraised higher than in Western Europe. Moreover, in Eastern Europe, the managerial staffs' competencies are in the second position among eight company's competitive factors, whereas in Western Europe they come fourth. It seems that in Eastern Europe the higher the appraisal level of managerial staff's competencies as a competitive factor, the more systems approach to MSD is practiced. In Western Europe, the higher the advancement level of individual components of MSD the less systems approach to MSD is preferred.

6 Final Conclusions

The final conclusions inferred from the comparative analysis of the empirical research results suggest that for the MNCs headquartered in Central Europe it is much more difficult to build the competitive advantage of their foreign subsidiaries on the managerial staffs' competencies in Western Europe than in Eastern Europe. The possible reason is, what has been also mentioned in the theoretical part of this chapter, that the advancement level of MSD is in general high in Western European companies and hence the level of managerial staffs' competencies is potentially high

as well. But this results in high competition on the labor market for such managers. In such circumstances what the Central European MNCs can offer to attract and retain good managers is to provide them with high standard MSD practices. At the same time, they operate in the Western part of the world which is considered to be the leader of the most important trends based on the best practices within management. Being responsive to these trends, the Central European MNCs must implement constant changes in their MSD systems in subsidiaries located in this part of the World. The changes may target at the particular components of MSD, and hence the components do not exhibit such interrelated connections as in the Eastern European subsidiaries. This may also explain why the positive correlation between the company's financial performance results is stronger in Eastern Europe. Namely, the so-called synergy effect, possibly taking place in subsidiaries located in Eastern Europe, makes here the difference. The interconnected elements of MSD have a greater impact on the companies' financial results than the simple sum of their individual impacts.

We believe that the goal of our chapter has been attained. We have managed to identify some differences in the scope of internal relationships among the elements composing MSD in local subsidiaries of MNCs operating in Eastern and Western Europe. However, some limitations of the research are noticeable. Although the research sample was selected in a purposive manner, it consisted only of those MNCs based in one Central European country. Hence, the final conclusions cannot be generalized to the entire population of MNCs around the world. Additionally, despite the fact that the sample was diversified in terms of the business profile of companies, it did not include representatives of all sectors of the economy, and just a very small percentage of foreign subsidiaries was set up as a brownfield investment. This may also have an impact on the research data collected. Other disadvantages can also be seen in measurement scales or in calculations based solely on average values. There are also concerns about asking the informants the general questions about the financial results of their companies rather than using hard and precise performance indicators. Obviously, this practice is not uncommon within this type of study; however, it may weaken the subjectivity of assessment. And for future research, we recommend looking for intermediary variables that can explain in detail or discover new relationships between the variables studied.

Despite all these limitations, the novelty value of our research consists in the identification of some statistically significant differences between local subsidiaries of MNCs conducting their businesses in Eastern and Western Europe within the scope of relationships between their financial performance results, the activities in the field of MSD and the value ascribed to the managerial staff's competencies as a company's competitive factor. And to the best of our knowledge, among the overwhelming number of articles on MNCs whose HQs are based in the Western and more developed countries, it is probably the first to adopt the Central European perspective on the phenomena mentioned above.

As far as the practical implications of the research findings are concerned, they are mainly based on identifying certain similarities and differences between MNCs and their foreign subsidiaries in two European regions, which may influence

management's considerations of which MSD practices should be recognized as effective and which possibly as ineffective in relation to the financial results of enterprises. It is worth accentuating that the effectiveness itself is defined not only by the competencies of local managers and the perceived outcomes of work. It also depends on how managerial competencies are appraised as a competitive factor and what advancement levels of MSD are offered as recognition in response. Accordingly, the presented research results can help managers of MNCs discover some hidden opportunities in their regional business management practices and inspire them to create MSD activities and systems that successfully deal with the challenges of MSDs at the regional and country level.

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Which Motivational Theories Are Suitable to Motivate Employees Belonging to Generation Y?

Povilas Foktas and Palmira Jucevičienė

Abstract The aim of the chapter is to justify which theories have the motivation potential applicable to employees of Generation Y. The research was based on a selection of Lithuanian employees, whose socioeconomic situation is particularly deeply known by the authors of this chapter. Replies were submitted by 107 respondents. Ninety-nine were identified as respondents, who fully met the characteristics of the Y generation. Maslow's Hierarchy of Needs theory helps to draw attention to the fact that an organization has to focus on the higher needs of esteem and self-actualization in order to motivate its employees. Herzberg's theory is also not easily applicable to the motivation of the Generation Y employees, because it is hard to apply it in different social contexts. Vroom's Expectancy theory and its development, performed by Porter and Lawler is highly important for the motivation of Generation Y. Goal setting Theory of Motivation may be used. It is important to ensure that the goal given to employees is understandable, clear, and can be implemented. An organization that can ensure all these factors can expect to motivate employees of Generation Y.

Keywords Motivation theories · Generation Y · Motivation of employees

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1 Introduction

Motivation is a reason that encourages members of an organization to act, take initiative, and realize it. Researchers agree that often the reasons for motivation are so different and diverse that there is a need to research deeper the personality of the employees (Delfgaauw and Dur 2007) as well as the features of groups of employees. Only then it is possible to design the external motivational factors. In designing management factors, the motivation theories are developed, which are created at different times and under different social conditions. Hammill (2005) highlights the differences between the generations. These differences affect the various areas of the organization: from recruiting in the company to leaving a job place, including motivation, job satisfaction, team building, and other human resource management issues. Generation X (born in 1965–1980), Generation Y (born in 1981–2000), and Generation Z (employees born from 2000) meet on the labor market (Eisner 2005).

Currently, the work organization focuses on Generation Y, as it prevails in the labor market. However, Loy (2010) suggests that special preparation is needed to motivate staff of this generation. Researchers are seeing several reasons for these challenges: some special features of Generation Y and differences in work environment compared with other generations (Choi et al. 2013). The application of the theories for the motivating of Generation Y employees is seen as a relief to a particular solution of this problem, but at the same time managers of companies face problems related to the deviations from the substantive statements of motivation theories (Gursoy et al. 2008). Unfortunately, there are only several sources (for example, Jucevičienė 1996), which investigate the possibilities of applying these theories to a different social reality than they were created. Unfortunately, none of these investigations touch upon Generation Y. Therefore, the main question is: do motivational theories based on social constructs in those times when Generation Y has not yet acted in the labor market have a motivational potential for the application for the current Generation's Y employees?—is a problem that requires research, because there is lack of these types of researches. The solution to this question first of all requires a study that will identify which factors of motivational theories can influence the employees of Generation Y, taking into account the features of this generation.

The aim of this chapter is to determine which motivation theories have a motivational potential applicable to employees of Generation Y. The following research methods are used: literature review as well as survey. The chapter consists of three parts. The first part presents the research methodology. The second part reviews the characteristics of employees of different generations, emphasizing employees of Generation Y. The third, main part, presents the essential theories of motivation. When emphasizing the characteristics of Generation Y employees, it is theoretically highlighted the possibilities and limitations of a particular theory, motivating employees of the abovementioned generation. Presenting the results of the empirical research carried out in Lithuania by the Generation Y employees and

discussing them, the possibilities of specific theories for applying them to the motivation of Generation Y employees are determined. The chapter ends with conclusions, presenting the results and highlighting the guidelines for further research.

2 Relevance of Study

The constructivist epistemological approach (Yilmaz 2013) is adhered to that knowledge of the world is always socially constructed. Therefore, social theory (this group of theories includes motivation theories) is influenced by the social environment in which a particular theory was created. This study also admits the position that the features of Generation Y can be fully emphasized only by identifying their differences when compared with the features of previous generations. Especially those generations, which employees worked in the period when motivation theories were created and developed. Having identified the above-mentioned differences in the features, motivation theories are examined by raising the question of whether the features of Generation Y employees can give rise to a motivational response in the personality of this generation, if factors, which influence specific motivational theories, operate. All this is done using the *method* of research literature analysis.

Emphasizing the characteristics of the Y generation, Maslow's Hierarchy of Needs theory is analyzed (Maslow 1943), discussing it in the context of the ERG theory (Alderfer 1969); also Herzberg's two-factor theory (Herzberg 1964) and the theory of Work Enrichment (Herzberg 1968), Vroom's Expectancy theory (Vroom Victor 1964), and Porter and Lawler Expectancy theory, which developed Vroom's theory (Lawler and Porter 1967). Adams' Equity theory (Adams 1963), Goal-Setting theory of Motivation (Locke and Latham 1990) are analyzed aiming to find which theories best reflect the factors of Generation Y motivation.

We held the view that the motivation of employees is most determined by the factors specific to the organization and their field of activity, as well as personal factors, but not the nature of this area of activity (Hackman 1980). For example, the motivating factors in the public sector and industry are determined not by the differences between the nature of the activities of these sectors, but by the motivating factors prevailing in the particular sector's environment and its organizations. Therefore, the results of the effects of motivational theories in one sector can be applied to motivate employees of the other sector, taking into account the differences in motivating factors.

3 Research Methods and Sampling

In particular, the characteristics of Generation Y employees are highlighted and motivational theories are analyzed using the method of research literature analysis. Having highlighted the possibilities and problems of applying these motivational theories to the motivation of Generation Y employees, these intermediate theoretical results were verified empirically by conducting a written survey of Generation Y employees. The research was based on a selection of Lithuanian employees, whose socioeconomic situation is particularly deeply known by the authors of this chapter. However, this choice has also raised problems, as the country's situation is still quite different from that of the developed economies and research works based on these economies, which have led to the development of the main motivational theories. Differences are especially noticeable when comparing employees' salaries (Stulgienė and Daunorienė 2009). Therefore, it was necessary to select employees of the sector whose salary, in comparison, was rather high compared to other sectors of Lithuania's employees, and not so much different from the average salary in the Western countries. Based on this logic, we chose the empirical research of the Lithuanian pharmaceutical industry. Three hundred and twenty-nine respondents were expected to be interviewed of the 2300 employees in the Lithuanian pharmaceutical sector, applying a 5% error. Replies were submitted by 107 respondents. Ninety-nine were identified as respondents, who fully met the characteristics of the Y generation.

4 Characteristics of Employees of Different Generations

People born at different times are divided into different generations: "Veterans" (born 1922–1945), Generation of "baby boomers" (1946–1964), Generation X (1965–1980), Generation Y (1981–2000) (Eisner 2005). In this chapter, we will not consider Generation Z, because it does not affect the object of this research. The Generation of "Veterans" (born 1922–1945), also called the "Silent" Generation or "Depressed Babies," is distinguished by conservatism, discipline, stability, and strong orientation toward work ethic. This generation has its own values: loyalty, respect for status, and patience (Notter 2002). "Veterans" tend to work with executives who set clear, long-term goals. It is difficult for this generation to work with those leaders who are not determined and willing to accept populist decisions. The "Veterans" need to communicate directly, face to face, to show that their generation's experience is appreciated.

The "Baby boomers" Generation (born 1946–1964) is also described as demographic explosion children. This generation was taught to work in a team (Ballone 2007). Teamwork is one of the hallmarks of this generation. The employees of the "Baby boomers" Generation like stability, they feel fear of change and challenges. They foster traditions such as idealism, health, social and personal self-expression,

children's success, and financial security. Representatives of this generation feel attached to one job and respect hierarchical relationships (Joy and Haynes 2011). A strong orientation toward excellent performance is very important.

Generation X (born 1965–1980) grew under the conditions where their parents were highly concentrated on their work and did not spend much time on their children. They value the work in one organization but are ready to work for themselves. This generation gives priority to freedom and reward for the results of completed work. They care more about their work than personal life. Persons in this generation are flexible and want measurable results. Representatives of Generation X are motivated when they are allowed to create their own rules of work; they like to finish their work completely (Joy and Haynes 2011).

Representatives of Generation Y (born 1981–2000) are highly self-confident persons. Such employees are able to easily get into any information, request, or instruction (Nuttall 2004). However, any information must be based on facts. Representatives of this generation are hard at raising routine tasks. It is easy for employees of Generation Y to communicate online. They are the generation of media and information technology, who tend to establish virtual relationships. However, these personalities create a narrower social environment than representatives of previous generations. Employees of Generation Y are the persons who want quick results, recognition, and evaluation (Joy and Haynes 2011). It should be emphasized that these individuals want a quick reward for their work. These people require attention, so they feel bad at work if managers do not respond to them. This generation is inclined to try new jobs, freely change them, or work several jobs at the same time.

The results of the characteristics of employees of Generation Y in the Lithuanian pharmaceutical sector confirmed the features of this generation, which were highlighted in the research literature: 81% of the respondents from Generation Y said that they work to live and not live in order to work, but even 98% of all the respondents look at their work very seriously, take responsibility and strive to do their job as best as possible. Most of them learn from their and others' work, they always think of work results and draw conclusions; want the manager to be honest and respect his staff; emphasizes job tasks that they can initially raise and adjust according to circumstances. Therefore, it is worth emphasizing the following essential features when exploring the motivation of the Generation Y employees:

- They work to live and not live in order to work.
- High expectations for themselves: they want to work faster and better than others.
- High expectations for employer: they want employers to be honest, open, and pay great attention to the professional development of their employees.
- They value their knowledge critically, constantly learn.
- They want specific goals that require timelines that are quick to fulfill, so that they can feel like the owners of the tasks they have achieved by splitting the goal.

5 Application of Motivation Theories to the Employees of Generation Y

5.1 The Applicability of Maslow's and Alderfer's Theories of Needs

Maslow (1943) divided the needs into primary and secondary ones. In the specified hierarchy of needs, the first three needs are primary—physiological, safety, and social. The secondary ones include the needs of esteem and self-actualization. In Maslow's studies with co-authors (Maslow et al. 1998), the Theory of Needs was adapted to motivate employees in organizations. According to these authors, the needs of esteem and self-actualization allow employees to express themselves and help them to achieve, first of all, the goals of the organization rather than their own goals. Therefore, organizations must focus on the needs of esteem and self-actualization.

It is already usual to explain that the physiological needs of the employees which are at the lowest hierarchy level are related to material needs and mostly are met with a salary for a work completed. Of course, safety needs are also related to material needs. According to Maslow and his co-authors (Maslow et al. 1998), safety needs cannot exist without the meeting of material needs. Safety in an organization is a sense of the confidence that person will have this work in the future. The social needs are on the next level in the hierarchy of needs. The social needs can be met by teamwork, by communication with others, etc. Seidler-de Alwis and Hartmann (2008) state that self-esteem needs are met with those work elements which allow to be recognized in an organization. Maslow and co-authors (Maslow et al. 1998) emphasized that the highest level—the needs of self-actualization—relates to the desire to develop, to realize themselves and their goals, and the freedom to make decisions.

Alderfer (1969) criticized Maslow's hierarchy of needs theory, which states that one person emphasizes only one level of needs at the same time, meets the needs strictly according to their hierarchical order, and the need, which has been already satisfied, has no longer a motivating power. He suggested the ERG theory, stating that person can feel the needs of several different levels at the same time.

Researching the Generation in the pharmaceutical sector, it was found that the physiological needs of 82% of respondents were satisfied. Ninety-five percent of all the respondents have typical feelings of Generation Y: their qualifications allow them to feel, relatively, safely in their workplace. Even 93% of respondents more or less meet the need of communication with colleagues. It is interesting that some respondents emphasize the higher level of needs without satisfying the lower one. This allows us to remember the ERG theory and its creator, Alderfer (1969), who did not endorse Maslow's strict hierarchical order of needs meeting. All respondents considered the importance of physiological and self-actualization needs. Here one of the biggest differences in the assessment of social needs is also noticeable. Only 25% of our surveyed respondents said that social needs are very important; also even 22%

of respondents stated that this communication is only partially important. The survey made it possible to notice that it is most desirable to meet physiological needs and safety needs are not so important to be satisfied. This is characteristic of Generation Y, because their safety (especially in the context of maintenance of workplace in a particular organization) is not very significant for employees of the Generation.

It looks like Maslow's Hierarchy of Needs theory ultimately proves that an organization employing employees of Generation Y should create conditions for their self-actualization needs, since this generation is oriented toward the level of satisfaction of these needs (they want to improve and develop their skills, constantly learn, feel the "owners" of work tasks). But what can an organization expect if an employee of Generation Y feels completely unhappy with his/her unsatisfied physiological needs? Moreover, what kind of expression are their physiological needs? After all, Generation Y works to live and does not live to work! Also, the employees of Generation Y live in the twenty-first century, so their needs are adapted precisely for this period: there are no more "hunger" needs (Djamasbi et al. 2010). Therefore, the analysis of the motivation of Generation Y should be based on ERG theory (Alderfer 1969), which is more appropriate in this case than Maslow's Hierarchy of Needs theory.

5.2 The Applicability of Two-Factor Theory

Herzberg (1964) identified two groups of factors: (a) hygienic (related to physiological, safety, and social needs), employees are not happy if these needs are not met, but their presence does not motivate most employees; b) motivators (related to the higher ones—esteem and self-actualization needs), whose presence motivates employees, but if these needs are not met, the position of employees is neutral. The presence of these motivators allows the employee to move forward, to pursue the goals set for the benefit of the organization. The most important factors and means of motivation are promotion, recognition, achievements, and career opportunities. However, some empirical studies argue that it is impossible to categorize motivational and hygienic factors strictly and to align them according to their importance (Jucevičienė 1996). Moreover, the reward factor can be oriented toward the level of higher needs if the employee sees the reward as a source of recognition (Jucevičienė 1996).

So, we paid extra attention to factors which raise the biggest number of questions.

5.2.1 Material Reward for Completed Work

Herzberg (1964) stated that the significance of material rewards, primarily monetary, is undoubted. However, Denhardt (1993) did not agree with this, believing that such

reward is not one of the most important motivators, and self-actualization and recognition are undoubtedly much more important for every successful employee.

The opponents of raising salaries argue that material reward cannot be a motivator: (a) the employees stop growing or even regress after some time and a good salary does not motivate anymore; (b) it is important to apply this measure correctly: this can be done if it helps to reveal the necessary qualities of employee that help an organization to remain competitive on the market (Riley 2001). But is this argument (a) suitable for the employees of Generation Y who have high expectations for themselves because they want to work faster and better than others?

For example, it may be that the employee, who receives a high salary, does not relate this money with the satisfaction of physiological needs. If the work done is complex, requiring a high level of competence, a person who works such a job usually has high self-esteem. Therefore, he/she can interpret a high salary as a sign of recognition (orientation to the level of esteem needs). When discussing the material rewards of Generation Y employees, the particular aspect has to be taken into consideration: they are 18–37 years of age—young, ambitious people. In their case, material reward may act as a factor in satisfying their needs of the higher levels. Apparently, this and other similar features of employees of the Y generation are just those that help an organization to be competitive on the market.

5.2.2 Other Nonmaterial Factors

McGregor (1967) and Maslow et al. (1998) stated the importance of internal factors in organizations. Among these factors, one of the most important is the relationship between people, their behavior. The authors also emphasize management techniques and the work environment as an important factor in opening an employee's self-actualization and initiative.

As the employees of Generation Y emphasize the high requirements for themselves and their managers as well as autonomy at work, some factors such as organizational policy, management, and career opportunities should be more analyzed.

5.2.3 Organization's Policy and Management

The management has a great influence on employee motivation. An important aspect is the attention of managers to employees, leadership, and interconnection based on honesty and equity (Martin 2005). This author (Martin 2005) emphasizes that managers build a relationship with members of an organization by choosing the right leadership style; it is also very important for employees to be involved in corporate decision-making and to be open to them. Organizational leaders have also provided feedback on the results of the work of each employee. According to Wong et al. (2008), an employee, who has contact with the members of the organization

and the managers, learns more about the company in which he/she works, enhances his/her knowledge, and improves his/her personal and work-related characteristics.

However, Herzberg (1968) considered the organization's policy and management to be a hygienic factor rather than a motivator. This means that its "absence," in other words, "negative presence" (employees' negative attitude to organization policies, leadership) should lead to employees' dissatisfaction. Employees of Generation Y emphasize the high expectations to their managers: they like managers to be honest, open, and focused on the professional development of their employees. Thus, there is a high probability that employees of Generation Y will be very dissatisfied if these expectations are not fulfilled. In such a situation, it will not be possible to talk about the motivation of the Y generation by other means.

5.2.4 Career Factor

Career is a very challenging motivator. Career prospects, promotion in the organization must be well thought out and an event of optimal frequency (Martin 2005). Promotion is often perceived as an opportunity to grow the competence of the member of the organization and to make progress in the professional field. A career is understood more and more liberally, perceived as "horizontal" development, rather than climbing up in the hierarchy of the organization. In order for a career to be a motivating factor, it is necessary that: (a) career should be pursued; (b) it would be possible to achieve the desired career stage; (c) there must be a connection between the performance and career opportunities.

When career factor is applied to employees of Generation Y, it is important to keep in mind that they work to live and not live in order to work, which means they are not necessarily oriented toward a vertical career strategy. However, they like to work faster and better than others and continually improve themselves; therefore, they are highly likely to be focused on a horizontal career (to be an expert). It is logical for them to be motivated for such a career.

We tried to answer the questions or doubts raised by analyzing the results of surveys, filled in by employees of Generation Y. Hygiene factors may include work effects on health (56% of respondents would be unhappy if this factor would get worse). Similarly, relationships with colleagues can be attributed to the same factors (59% would be dissatisfied if this factor would get worse). The most motivating factors are the organization's policy toward the respondent's workplace and career opportunities (72% of respondents think this is important). Also, the change in salary in the positive direction would be quite a motivating factor (69%); personal achievements in the organization (64%); positive attitude of the direct manager toward the job, duties, and responsibilities of the respondent (63%); improvement in the organization as an employee (64%), and improvement as a personality (60%). Lower motivation is given by a positive relationship with a direct manager (52%), a change in working conditions (56%). Thus, the results of hygienic factors and motivators are more similar to the results of the study of Lithuanian employees

carried out by Jucevičienė (1996), rather different from those obtained by Herzberg (1968) following his study in the United States.

Therefore, it may be that Herzberg's (1968) factors will act as motivators for Generation Y, depending on the macro-level (country level) in which these employees live and their organizations operate. Thus, it would be difficult to decide the full application of Herzberg's theory for motivation of Generation Y.

However, attention should be paid to the higher levels of needs highlighted by employees of Generation Y. Therefore, these employees should be motivated by factors linked to enrichment of work. Enrichment of work, which Herzberg (1968) predicted as the continuation of the theory of two factors, according to Wong et al. (2008), is making a job more interesting, meaningful, significant, i.e., making it similar to activity, which motivates.

The motivation of employees, especially those focused on the level of higher needs, is strongly influenced by the content of the work. Research provided in the United States (Houston 2000) states that employees value the essence of the work rather than the reward they receive. The responsibility given to the employee and the importance of the work itself is also an integral part of the motivation (Wong et al. 2008).

Organizations that state the work of their members is significant and important, motivates them to achieve higher performance. Participation in the development of activities is an indirect process of self-actualization. It is noticeable that such a system is really effective; the more employees are involved in the management of the company, the more good ideas are generated. If the work is monotonous, an organization tries to make it more diverse. If the work is not monotonous, an organization gives more responsibility to the employee (Martin 2005). This is a complete counterpoint to previously established norms such as obedience, rules, and authority (Broadbridge et al. 2007). Motivation by enrichment of work seeks for the movement in the opposite direction—it is not necessary to obey the rules in order to achieve successful results.

Flexible working hours provide more freedom for employees. Organization shows a higher degree of trust (Broadbridge et al. 2007), which is also a direct motivator. An employee who is confident feels more pleasure in performing job tasks and can devote himself/herself entirely to work, not thinking about control and managers.

As Generation Y lives in a world where information is widely disseminated, they constantly receive a lot of information about the surrounding environment. As a result of continuous improvement, they are interested in the nature of the work, its content. However, the representatives of Generation Y do not seek to overpower themselves; they are more dedicated to their family and the people around them. For these reasons, the person of Generation Y does not give himself away for work or employer and puts out self-actualization above everything (in the general sense).

5.3 Possibilities of Application of Adams' Equity Theory

The theory of equity created by Adams (1963) explains that when a person feels the equity between what he/she has put in work and what he/she has received for this work and his/her results, he/she understands reward received as fair. Anyway, an employee may consider the reward unfair even if his/her personal contribution corresponds to the reward which he/she has received. This is the case when a person evaluates his/her relationship between input and output not only "through his/her personal glasses" but also on the basis of rewards received and contributions made by other people (Adams 1963).

Although this assessment has some objectivity, it is, in essence, subjective. The perception of the reward received and the input is often reflected by an individual's personal value, quality of thinking, age, etc.

Interestingly, that after asking respondents of our study, whether they believe that what they "put" into work, they "got" "we received" only 21 percent answered positively. Forty-eight percent of respondents thought that part of the reward was worth the effort they had made, and one-third of respondents did not agree with this statement and said that this ratio is unbalanced. Comparing with other colleagues, only 24% of respondents believed that they receive a fair reward; 46%—partly fair reward, the rest of respondents feel that they receive unfair reward for their work completed. Almost a quarter (24%) of respondents thought that the reward is not fair, when comparing the ratio of "input" and "output" to the ratio of similar employees in other organizations. This ratio was similarly rated by 23% of respondents, 50% rated it only partly positively.

These results suggest that about 3/4 of the employees feel event triple feelings of unfair and partly unfair reward, which they receive for the work completed (comparing their personal input–output ratio, this ratio compared to the ratio of input–output of other employees in the same organization, as well as comparing their ratio with the ratio of similar employees of other organizations).

Depending on the features of Generation Y, it should be noted that the personal value of these employees is usually high, although their efforts to do good work are also high. Thus, it can be assumed that employees of the Y generation are particularly sensitive when they seek equity by evaluating the ratio between "input" and "output." When they understand equity, i.e., justice, they should be motivated and continue to work well. But in what degree of subjectivity do they evaluate the input–output ratio? It can be predicted that they can take radical steps when they realize injustice—even to leave the organization. Due to the Y generation's sensitivity to injustice, an additional empirical investigation is still needed to find out the issues raised.

5.4 Potential of Application of Theory of Expectancy and its Development

The Vroom's Expectancy theory (1964), the so-called theory of expectations or hopes, is based on the idea that an employee of an organization chooses from several alternatives what, according to him/her, are the best ways to act. Lawler and Porter (1967) developed Vroom's Expectancy theory based on the following principles: (a) human behavior is determined by the commonality of the environment and its inner world; (b) the person is responsible for making certain decisions that describe his/her behavior within the organization; (c) employees are different as well as their unique desires and needs; (d) the person chooses only the solution that will help to achieve the expected results.

The result produced by each person depends on the expected result, its nature. Certain results are already themselves an internal reward, a definite means of motivator, which motivates an employee. Internal rewards are a good feeling of work task completed, personal value, and satisfaction (Latham and Pinder 2005). An external reward can be career growth, material rewards. In the Theory of Expectancy, performance and future results are no longer linked to only one variable but are linked to many of them. According to Lawler and Porter (1967), it is recommended to find out what result the employee wants.

It should be noted that Vroom's Expectancy theory (1964), further developed by Lawler and Porter (1967), is special because it combines several theories (expectations, justice of reward, and the completion of work, distinguishing the real competences (knowledge, capabilities)) that are needed for this work, as well as the role of the work conditions granted by the organization in the workplace and the efforts made by the employee during his/her work performance.

When we asked whether an employee who has received a job assignment thinks that the results of "good work" will be achieved (competence and working conditions will allow to complete a task very well), almost the absolute majority (93%) of respondents of Generation Y responded positively. As previously discussed, only a smaller proportion of employees was convinced that they could expect a fair reward when performing a task. More than half of respondents (even 57%) claimed that they sometimes disadvantage working conditions.

It was also examined whether the received monthly salary (its absolute size) was rated by respondents as significant. There is a positive correlation (even it is mildly expressed) between the injustice felt by employees and the frustration of material reward received (although in financial terms this size is not so small). Anyway, many employees pay more attention to nonmaterial rewards that are associated with socialization, recognition, and self-realization. However, most of all, as a nonmaterial motivational tool, the manager's trust in the work done by employees is most important (even 96% of respondents state it). The respondents also highlighted the respect of the managers for respondents personality (89% of them indicated it as a significant reward). In addition, 84% of the respondents indicated that the positive attitude of the supervisor and the respect as well as recognition paid

to them personally by the associates would also be a very significant reward for their work.

This theory, which emphasizes the individual's inner position, formed on the basis of past experiences and expected results, can be successful in predicting or motivating the employees of Generation Y. According to this theory, employees of Generation Y seek to get the results they deserve for their work (Latham and Pinder 2005). This motivating force is characterized not only by internal factors (satisfaction, development) but also by external factors such as material reward.

5.5 *Opportunities of the Application of the Goal Setting Theory of Motivation*

Locke and Latham (1990) states that desires and intentions expressed in the form of goals can be one of the most important means of motivation. If the goal is specific, it can act as an internal stimulus to a person. According to Robbins (2006), on the same terms, a person with a goal will perform a work more productive and high-scoring than the one who does not have this goal. It is important that the employee is involved in forming this purpose.

Thoreau (2015) suggests listing the work goals as accurately as possible. According to Thoreau (2015), it is very important for an employee, who seeks to achieve the goal, to know in advance what he/she will get for the goal completed. In addition, this researcher emphasizes the importance of feedback. It allows to update the goals during the work process and further specify them. We have already highlighted the fact that the employees of Generation Y like specific goals that require to be completed in a short time of period, so that they can feel the owners of the tasks they have achieved by dividing the goal. Spiro (2006) also emphasizes the motivational value of raising the goals, especially if they are challenging. When we have asked the respondents whether they are motivated by the purpose of the job, even 76% of respondents answered positively. Seventy-eight percent of respondents indicated that they would be motivated by self-controlled goals. The results show that the Goal setting Theory of Motivation may be used. It is important to ensure that the goal given to employees is understandable, clear, and can be implemented. Taking into account the independence of Generation Y, it is important that the managers should formulate job goals together with employees, the solutions should be mutually compatible and managers would allow for employees of Generation Y to formulate their own work tasks.

6 Conclusions

Maslow's Hierarchy of Needs theory helps to draw attention to the fact that an organization has to focus on the higher needs of esteem, and self-actualization in order to motivate its employees. This is especially important for employees of Generation Y who like to work better than others, to develop themselves, have open and honest managers, specific goals and autonomy while doing their work tasks, but who work to live and not live to work. Employees of Generation Y tend to emphasize several levels of needs at the same time. Unfortunately, in this regard, Maslow's Hierarchy of Needs theory is not a good advisor; the ERG theory created by Alderfer (1969) (it is the development of Maslow's Hierarchy of Needs theory) can be more helpful.

Herzberg's theory is also not easily applicable to the motivation of Generation Y employees, because it is hard to apply it in different social contexts. In order to apply it in each particular social context, additional research should be carried out to determine which factors affect these employees as hygienic and which factors act as motivators. But, apparently, the continuation of Herzberg's theory—the enrichment of work, which is particularly important to employees of Generation Y, may be applied without any exceptions.

Vroom's Expectancy theory and its development, performed by Lawler and Porter (1967) is highly important for motivation of Generation Y. It integrates the essence of almost all of the aforementioned theories into one system. Managers should note that the important factor in motivating the employees is the formulation of the purpose of the work, when it is discussed together with employees. This is particularly emphasized by Locke's Goal setting Theory of Motivation. It should be understood that employees of Generation Y like self-sufficiency by dividing the purpose of work into several tasks. Thus, motivation for the purpose and tasks is an extremely important aspect. However, the employee's reflection process does not end there: he/she asks himself/herself whether he/she will be able to perform the task well, whether he/she will be rewarded and whether the expected reward is significant to him/her. Not only the employee's previous experience in evaluating the work process and the equity of contribution and reward are important here. Questions about employee's competence and expected work conditions as well as opportunities to achieve the purpose of the work also play important roles. An organization that can ensure all these factors can expect to motivate employees of Generation Y.

Although the results obtained are important for Management research and practice, it is also necessary to evaluate the fact that the theoretical aspects of applying the theories of motivation are revealed only in a very limited scope of the empirical study. More extensive empirical research should be carried out not only in Lithuania but also in other countries, especially those with different socioeconomic contexts.

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Understanding Born Global Firms in Turkey: A Literature Review

Ceyda Tanrikulu

Abstract The main purposes of the study are to present knowledge stock about the profile and barriers of the born global firms in Turkey and provide research agenda. Data are obtained through a systematic literature review comprised of the studies regarding the born global firms in Turkey. The studies chosen for this review are based on primary data. They have been published in both Turkish and English languages and printed in 2010–2020. Also, "Born global," "marketing," and "Turkey" are used as keywords for filtering these studies. The major findings indicate that the born global firms have encountered many obstacles such as marketing and procedural barrier. They have also some common features related to entrepreneurship orientation, network connection, proactive approaches, and technological abilities. This study integrates the major findings of previous studies on the subject of the born global firms in Turkey. This integration may be useful for expanding and advancing the knowledge in this field. Therefore, it is expected that it provides a knowledge reserve, starting points, basics and insights for further studies and business applications. In this context, major findings are discussed on the conditions of Turkey and strategic recommendations are presented.

Keywords Born global firms · Global marketing · Turkey · Emerging market

1 Introduction

In the recent business environment, digitalization and globalization encourage firms' internationalization process which leads the firms to be born global (McCormick and Somaya 2020; Falahat et al. 2018; Gabrielsson and Kirpalani 2012; Knight and Cavusgil 1996). Born global firms (BGFs) that have a significant increase in

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numbers are one of the most popular topics in highly dynamic global marketing. They have a fast and short internationalizing process as distinct from the firms having internationalized in accordance with the traditional internationalization approaches, which result in more consideration for both researchers and practitioners in business (Paul and Rosado-Serrano 2019; Cavusgil and Knight 2015; Hagen and Zucchella 2014; Knight and Cavusgil 2004). In addition, the topic of emerging economies is a pivotal topic in global business. It is claimed that they have a unique institutional context for internationalization research and have a critical role in the world economy due to their large and increasing contributions. BGFs are also seen to come into prominence due to globalization and digitalization in the global business setting (McCormick and Somaya 2020). Therefore, BGFs in these economies are demonstrated as an essential research field that requires deeper understanding (Rossato et al. 2020; McCormick and Somaya 2020; Falahat et al. 2018; Felzensztein et al. 2015). Turkey is one of the ten big emerging markets that has rising economic development and is expected to be one of the countries with the strongest economic power in the world. Turkey has the 7th biggest economy in Europe and the 19th biggest economy in the world based on current GDP as of 2019 (Republic of Turkey Ministry of Trade 2020) and therefore has more potential to encourage the BGF.

In the given literature, the attention is drawn to the need that provides advanced understanding focused on crucial insights through a concrete review about the topic of BGF (Paul and Rosado-Serrano 2019; Dzikowski 2018; Nardali 2017; Pawęta 2015, 2016). Additionally, it is observed that there is a gap regarding integrated and synthesized knowledge about BGF in Turkey. Thus, the aims of this chapter are to provide knowledge stock and provide research agenda about the BGF in Turkey through a systematic literature review. In this chapter, the profile and barriers of BGF in Turkey are examined and described. This review is expected to help to present insights about the BGF based on literature by demonstrating integrated viewpoint, providing the basis and knowledge reserve for future research, encouraging the understanding about the internationalization process in a global setting and to give suggestion for implications requiring strategic decisions. In the beginning, the theoretical infrastructure about the BGF is given. This is followed by the methodology of the study, and then specifically major findings in literature are reported. Finally, the findings are discussed and strategic suggestions are offered.

2 Theoretical Background

The concept of BGF has been introduced by McKinsey and Rennie in a survey done for the Australian Production Council in 1993. Knight and Cavusgil (1996) stated that the firms which have many characteristics of the BGF had been included in numerous previous researches conducted since the 1970s. Many definitions have been presented for BGF in the literature. One of the most used definitions is made by McKinsey and Co. in 1993 as "*firms that view the world as their marketplace from*

the outset and see the domestic market as a support for their international business" (transferred by Hosseini et al. 2019: 55). The BGFs are also defined by Knight and Cavusgil (2004: 124) such that "*as business organizations that, from or near their founding, seek superior international business performance from the application of knowledge-based resources to the sale of outputs in multiple countries.*"

The common notion in the literature indicating the main features that determine the BGF consists of the following: being small- and medium-size business, starting to export with foundation or within 3 years after its foundation, the share of exports in total sales should be at least 25% (Knight and Cavusgil 2004; Karra and Phillips 2004) and also be continuous (Faiz and Uner 2015). The basic features of BGFs are also as follows (Cavusgil and Knight 2015): they have a tendency related to value-added marketing offerings which are innovative, cutting edge, exclusive, and also founding effective global network relationships. The tendency of emerging BGF can be observed more in countries with a small national market. The leadership in BGF is frequently supported by change agents who promote export enterprise. It is also driven by customers spreading around the world. The change agents mentioned above hold entrepreneurship orientation and mental models reducing the risk of internationalization. The BGF find out that it is possible to reach global customers. Furthermore, there are many differences between the BGF and traditional firms including the subject of firm strategies, experiences, extent of internationalization, psychic distance, technology usage, network relations, internationalization time, and business in the domestic market (Chetty and Campbell-Hunt 2004) which are illustrated in Table 1.

The BGF has emerged and been successful in the business environment because of the reasons that global market conditions and strong competition around the world lead small firms to global niche, products can be tailored by specific demand thanks to the advancement in production technologies, communication technologies enable smaller firms to reach the foreign market via less expensive ways, being quicker, flexible, and adoptable caused by the nature of being a small business, and internationalization concern (Knight and Cavusgil 1996). In addition, globalization of market, technological development, conditions of local markets, and capability improvements in human and small business are also factors that encourage and accelerate the BGF in the global setting (Gabrielsson and Kirpalani 2012). Recent research argue that young firms in emerging markets utilize some of the competencies for being BGF. Globalization is one of the essential contributors in dealing with foreignness and newness in exporting efforts. Digital technologies and internet usage stimulate the internationalization process and is helpful to cope with the challenges regarding the internationalization disadvantages. Mobile human capital, managers having experience abroad, and governmental services are found to give more opportunities in foreign market environments (McCormick and Somaya 2020). Having and building global network connections facilitate not only emerging the BGFs but also stimulate their activities (Falahat et al. 2018; Kalyoncuoglu and Uner 2010). Entrepreneurial features and proficiencies are asserted to be essential in early internationalization, and dyadic strategic partnerships are determined as key assets for driving internationalization sustainability (Hagen and Zucchella 2014).

Table 1 Differences between BGF and traditional firms

Internationalization attributes	Traditional stages view	Born-global view
Home market	Domestic market developed first	Domestic market largely irrelevant
Prior internationalization experience	None expected	Founder has extensive experience in relevant international markets
Extent of internationalization	İnternational markets developed serially	Many international markets developed at the same time
Pace of internationalization	Gradual	Rapid
Psychic distance	In order of psychic distance	Psychic distance irrelevant
Learning to internationalize	At a pace governed by the ability to learn from (slowly) accumulated experience	Learning occurs more rapidly because of superior internationalization knowledge
Firm strategy	Not central to the firm's motivation to internationalize	Realization of competitive advantage requires rapid, full internationalization; product-market scope focused/niche
Use of information and communications technology	Not central to internationalization	Key role as enabler of global market reach and learning
Networks and business partners	Used in early stages of internationalization and gradually replaced with the firm's own resources	Rapid development of global reach requires a rapid, comprehensive network of partners
Time to internationalize	Not crucial to firm success; slow	Crucial to firm success within a few years of inception (e.g., 2 years)

Source: Chetty and Campbell-Hunt (2004)

Furthermore, it is found that previous knowledge, having networks, systematic research and their entrepreneurs' vigilance skill stimulate the recognition regarding the first international opportunity in these firms (Kraus et al. 2017).

Entrepreneurial and network skills are also determined as motivators of performance in BGF emerging markets (Rossato et al. 2020; Falahat et al. 2018). Additionally, technological capability and niche-focused orientation are suggested to decrease the negative effect of competition intensity on performance in these firms (Efrat and Shoham 2011). Strategic orientations such as entrepreneurial orientation, learning orientation, market orientation (Evers et al. 2019; Kocak and Temi Abimbola 2009), and technology orientation (Evers et al. 2019) are asserted as more critical drives that encourage BGF's performance. They can use different strategies based on the circumstances due to their highly dynamic completion environment and their limited resources. This also explains why they engage in niche market strategy more (Evers et al. 2019). In addition, their performance in an international setting is found to be driven not only by such orientations regarding entrepreneurial (Falahat et al. 2018; Gerschewski et al. 2015) competitor but also concentrate on quality (Gerschewski et al. 2015). In addition, dynamic capabilities like exploration and exploitation are also important strategic factors in BGF's

internationalization progress. Exploration and exploitation capabilities have been found to encourage strategic renewal to digital BGF in research in emerging markets (Rossato et al. 2020). These capabilities are also investigated to have a significant effect on the internationalization speed of these firms. The negative effect of exploration on internationalization speed is found while its interaction with exploitation is determined to have a positive effect on this speed (Lin and Si 2019). Attracting potential customers and maintain resources in the stage of pre-start-up/venture creation accelerate the progression to international growth/consolidation in BGF. On the other hand, educating activities for potential customers, speedy entering in several foreign markets, and physically access remote markets are the factors that decelerate their advancement to international growth/consolidation (Trudgen and Freeman 2014).

3 Method

Data have been obtained through a systematic literature review which is inclusive of the researches about the BGF in Turkey in the literature. This type of review has some favorable potential for researches. It provides deeper methodological approaches, integrates major findings of the literature, and helps to enhance understanding of the given topics. Moreover, Tranfield et al. (2003: 207–219) revealed that it can be useful to "*produce a reliable knowledge stock and enhanced practice by developing context-sensitive research*" and also present "*a means for practitioners to use the evidence provided by research to inform their decisions*." In other words, it is useful to combine and synthesize current knowledge, illustrate the gap in the given research field, and present future search directions and essential new insights (Hulland and Houston 2020). It has also some advantages such as gathering from a wide range of resources, presenting interdisciplinarity, reinforcing transparity and replicability, supporting a sense of rigor (Easterby-Smith et al. 2012).

Thus, the systematic literature review is selected to be applied for utilizing these advantages in this chapter. This review conducts by using eight steps suggested by Okoli (2015) covering: identify the purpose, draft protocol, apply practical screen, search for literature, extract data, appraise quality, synthesize results, and write the review. The research focuses on the primary data, published in both Turkish and English language between 2000 and 2020 in the academic literature are chosen for this review. Also, "born global," "marketing," and "Turkey" were used as keywords for filtering this research. These keywords are used in the topic covering the searches in title, abstract, author keywords, and keywords plus. The researches were collected through the Web of Science, Turkish Academic Network and Information Center (ULAKBIM), The Council of Higher Education (YÖK) Thesis Center, and Google Scholar. After the required steps, the researches (total 17 papers and 8 thesis) with given quality that conducted qualitative or quantitative research and have also peer review/jury assessment were analyzed in this chapter.

4 Findings

The findings of this review are reported by using its research purposes and thus, they are presented under two subtitles: the profile of the BGF in Turkey and the barriers for BGF in Turkey.

4.1 The Profile of the BGF in Turkey

After necessary analysis, 11 articles, 2 conference papers, and 7 theses have been used to produce the findings related to the profile of BGF in Turkey. It is observed that the theses are used to produce the articles and conference papers that are analyzed in this chapter. As to research methods, 9 of them used qualitative methods and 4 of them utilized quantitative methods, except the theses. The papers analyzed are published mostly after 2015.

There are many features determined for BGF in Turkey in the given literature. Many previous researches have revealed that the BGFs in Turkey focus on niche markets (Yalcın and Uner 2019; Nooshabadi and Ozsahin 2017; Yıldırım and Erdem 2016; Senguler 2013) which leads to focusing on specific field in return to be specialist and more satisfying customer needs and wants. It is argued that BGFs emphasize more on customer needs and wants and determine their goals depending on their customers' needs and wants, communicate with customers closely, and produce their product based on customers (Yalcın and Uner 2019). In this manner, customer orientation is also found as one of the main characteristics of these firms (Yalcın and Uner 2019; Nooshabadi and Ozsahin 2017; Yıldırım and Erdem 2016; Karatepe et al. 2016) and boost these firms' technological capacity, relationship quality, and information process. This orientation with advanced technology can encourage entering international markets early (Yıldırım and Erdem 2016) and make BGF more innovative (Karatepe et al. 2016).

The previous researches also demonstrated that having technology orientation/capability is one of another crucial features of the BGF (Karatepe et al. 2016; Yıldırım and Erdem 2016; Faiz and Uner 2015). Technological capability is found to provide some advantages such as capturing customer information and feedback which turn into market offerings that stimulate innovativeness (Karatepe et al. 2016). Furthermore, innovativeness is declared as one of the essential factors that have an effect on born globals in a previous research performed in BGF with high technology (Aktepe et al. 2011). This characteristic is also confirmed by many previous research conducted on other types of BGF in Turkey (Erdem 2019; Yalcın and Uner 2019; Yalcın 2018; Nooshabadi and Ozsahin 2017; Begendik 2017; Senguler 2013). Furthermore, the BGFs are argued to be small and to have a flexible structure (Konaklıoglu 2011).

Technological ability and network are determined as distinctive features for BGFs (Atlı 2017); thus, another important characteristic is having network for

BGFs (Berber and Can 2019; Atlı 2017; Nooshabadi and Ozsahin 2017; Faiz and Uner 2015; Tekin 2016; Atlı and Kartal 2014). The previous research based on a case study has indicated that both social and business networks present many utilities to the BGF in early internationalization. On the other hand, business networks are found as a more common type of network compared to social type. It is also observed that network relationships provide market information and opportunities, financial sources, physical resource, operational support, access to important actors, moral support, and trust to the responded born global firm (Berber and Can 2019). Although the notion that more common types of network is business one, in another previous research it is indicated that having a social network is one of the important personal characteristics for managers in BGF. Thanks to this characteristic, these firms take many advantages for both providing more connection and building strong relationships with foreign partners (Nooshabadi and Ozsahin 2017). Also, network is found to be a more important factor that affects being proactive for BGF. It is argued that these firms take advantages such as facilitating export, obtaining the right data at the right time, and reach the opportunities before competitors on account of having network (Faiz and Uner 2015). In addition, the BGFs are also determined as proactive business. The BGF's proactiveness is found to be affected by network, data sources, features of managers, trust, and fairs (Faiz 2013), and also it affects the innovativeness of the organization (Erdem 2019).

Many previous researches have exhibited the characteristics of founders in BGF in Turkey. They generally are sufficient in foreign languages (Ozyuksel and Ulutas 2018; Tekin 2016; Atlı and Kartal 2014, Kalyoncuoglu and Uner 2010), experienced in foreign markets (Yıldırım and Erdem 2016), well educated (Ozyuksel and Ulutas 2018; Yıldırım and Erdem 2016), proactive (Demirdas 2017; Senguler 2013; Kalyoncuoglu and Uner 2010), having risk tolerance (Begendik 2017; Kalyoncuoglu and Uner 2010), young (Tekin 2016), and also these features facilitate operations in foreign markets. As to gender, according to the research in BGF that the survey is applied, the ratio of women for both founder and senior executives draw the attention opposite to general literature in which common findings offer male founders for BGF (Ozyuksel and Ulutas 2018).

Entrepreneurship orientation is one of the main features that provides an explanation of the reason for the early and quick internationalization of BGF (Faiz and Uner 2015). The characteristics examination for the BGF's entrepreneurs has also been uncovered (Begendik 2013, 2017). The entrepreneurship orientation's dimensions namely proactiveness, risk taking, and innovativeness as entrepreneurs' characteristics have been found to have effects on the internationalization process of BGF. It is argued that the characteristics regarding the proactiveness such as focus on competition, being pioneer, innovation edition, understanding the competition in global measurement, seeing the world as a market, and be dominant in world market have positive effect on the participant BGF's internationalization processes. These processes are also found to be stimulated by risk taking as entrepreneurship characteristics that consist of being optimistic and courageous, determination, develop alternatives, learn from mistakes, and have more tolerance for risk. As to innovativeness, the characteristics which comprise of performing market research, being

original, determination, find a way for doing better, acceptance of innovation, behave rationally, and understand the competition in global measurement, and passion are also observed as positive influencers in encouraging internationalization process of them (Begendik 2017).

It is also demonstrated in a case study that the founders of these firms have a global vision, tolerance to high risk, love for their business, and ability to follow up on the opportunities sustaining their professional development (Atlı and Kartal 2014). In a previous study about the BGF which examined the differences between the manufacturing and service businesses by using face-to-face interviews, it is declared that manufacturing firms take more risk. On the other hand, both types of business are equal in having many features. More specifically, the responded firms' founders/senior managers are found to be more proactive, have a global vision, and innovative approaches (Demirdas 2017; Senguler 2013), pay more attention to technological knowledge, and also focus on niche market (Senguler 2013). These findings are also supported by the recent qualitative research conducted in the furniture sector. The research argues that the managers in responded BGF take more attention to niche market and also customers' needs and desire shape their products (Nooshabadi and Ozsahin 2017).

In addition, top managers' characteristics are one of the research topics that take consideration in the Turkish literature. The manager in BGF is determined as having more tolerance for risk (Konaklıoglu 2011; Kalyoncuoglu and Uner 2010), more customer oriented, have required knowledge about foreign markets, more proactive, more innovative in previous research (Kalyoncuoglu and Uner 2010). In addition, the senior executives in BGF are found to have foreign languages (Tekin 2016; Konaklıoglu 2011), be young, have high-level social capital and international network connections in the study based on the survey (Tekin 2016). The managers in BGF are also exhibited in quantitative research to have a global vision, have global thinking, focus on quality, have leadership characteristics, be well educated, and have experience abroad (Konaklıoglu 2011).

4.2 The Barriers for BGF in Turkey

There are four current articles out of which two of them have quantitative and two of them have qualitative research and 2 theses related to barriers of BGF in Turkey. Thus, it can be said that relatively few studies have examined the barriers faced by BGF in Turkey.

Uner et al. (2013) revealed that BGF are exposed to procedural and marketing barriers in Turkey. The authors conducted the research based on the survey with top managers of the BGF. The findings of the research demonstrated that the responded top managers perceived problems specifically in communication with foreign customers and were unfamiliar with export procedures. It is also explored that they have perception about marketing barriers for exporting due to the lack of excess capacity. In addition to these, providing technical and after-sales services as marketing

(product) barriers are also found to cause problems for these firms (Uner et al. 2013). In addition, the qualitative study which mentioned that cloud computing enables firms to transform into BGF has suggested that cloud computing utilization is helpful for overcoming informational and marketing barriers as internationalization barriers (Hosseini et al. 2019).

A qualitative research conducted in Konya, Turkey has found that legal challenges and the presence of powerful competitors are factors that have negative effects for BGF (Yıldırım and Erdem 2016). Another qualitative study has also indicated that the innovativeness of BGF has been affected by a lack of financial resources negatively. Furthermore, the fact that deficiencies in resources in these firms cause unsatisfied consideration for R&D is also observed in that study (Yalcın and Uner 2019). Moreover, some obstacles for born global family firms are also declared to be differences between domestic and foreign price, and fluctuations in domestic cash flow in a previous research (Erdem 2019). Furthermore, it is also exhibited in a previous research that although the many participant BGFs have e-marketing strategies, websites and associated internet functions in these firms are limited to interaction tools that are mostly used to interact product and business information (Kaplan 2015).

5 Discussions and Conclusion

The profile and barriers for the BGF in Turkey have been examined based on the systematic literature review in this chapter. Major findings reveal that the main common properties of the BGF in Turkey can be listed as follows: having a global vision, focusing on a niche market, being customer and technology oriented, having network, being innovative, having high-level risk tolerance, and having proactive approaches. On the other hand, they face some obstacles regarding the financial and nonfinancial barriers. Procedural and marketing barriers, stronger competitors, inadequate technological tool usage, and price fluctuations are the challenges for these BGFs.

The analyzed results have also shown that many previous researches used qualitative research methods. This situation can be explained by the fact that the BGFs are a relatively new phenomenon and have limited number, so qualitative methods can be appropriate methods for gaining a deep understanding of these firms.

The main properties mentioned before can be determined as strategic tools to gain competitive advantages. Focusing on niche markets can encourage these firms against powerful competitors who hold the more and most market share, due to the fact that niche market can be profitable for firms that are small and having special market offerings for targeted customers. In these markets, customers most likely have a willingness to pay more for valuable market offerings and also build relationships. However, special and unique value offerings must be submitted to the targeted customers in niche markets. This difficult task is more likely to be achieved by presenting innovative and customer-oriented products. Understanding targeted

customers' needs and wants and also giving appropriate responses to the given customers requires proactive approaches and technology orientation. The review results indicate that these properties are available in BGF in Turkey. Thus, it can be said that these firms have the necessary equipment for global competition and also can become key actors by encouraging these properties in global markets. In this sense, some of the issues such that finding a niche market, determining which niche market is more profitable and have the potential to satisfy the organizational objectives, entering appropriate niche markets for BGF, and obtaining required firms' skills and resources should be examined deeply. Furthermore, necessary responses should be provided by not only these firms but also civil society organizations and governmental organizations to stimulate and encourage BGF in a global setting.

This study has some limitations although it presents integrated knowledge for researchers and practitioners. The BGFs in Turkey have recently entered the marketing environment; thus, number of the researches in this field have not reached a satisfactory amount. Therefore, this research field is fruitful for researchers who hope to contribute to understanding the BGF in emerging markets. For future research, it is also suggested that comparative competitive advantages, profile and barriers changes over time can be investigated through longitudinal research and also by triangulation methods. Other suggested research fields by this chapter are partner relationships and value delivery network in BGF. In addition to these, the customer side is also important to gain a detailed understanding of these firms. Thus, examination of BGF's customers profile and customer response to these firms' activities can produce interesting and favorable findings for both literature and businesses.

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Part VI
Eurasian Business Perspectives: Marketing

The Effective Management of Social Campaigns: Planning and Assessing the Media Message

Anna Borawska

Abstract Social campaign is a complex undertaking, and as such, it needs to be planned and managed well to achieve its goals. One of the first planning decisions is to choose activities that would be included in the campaign. Among the most popular activities within the social campaigns' framework is promotion through different media types. They can reach many potential recipients and initiate many constructive changes. However, media messages could accomplish their goal only if they are adequately prepared. In their planning process, it is vital to assure the effectiveness of the message during pre-testing. Therefore, the chapter aims to present a framework for assessing media messages' effectiveness in social campaigns using cognitive neuroscience and diagnostic survey methods triangulation. A literature review was conducted to determine the methods and techniques used in advertising research to obtain this goal. The proposed framework is based on experiments described in the literature and personal research experience. It can be used as a primer for designing various studies focused on media message assessment.

Keywords Social campaign · Media message · Effectiveness · Cognitive neuroscience · Diagnostic survey

1 Introduction

The concept of marketing campaign management is understood as managing elements of the marketing mix. As a part of it, management of promotion and its components, including advertising, is distinguished (Rossiter et al. 2018). The concept of advertising management itself was influenced by the dynamic development of management and marketing science, the increase in competition, the

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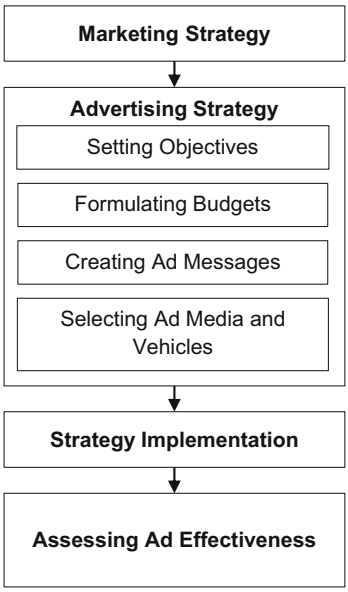

Fig. 1 Marketing plan elements. (Source: Andrews and Shimp 2017)

importance of advertising in business, and the media's dynamic development. Although this idea is primarily connected with business-related marketing, it is also valid for social campaigns promoting positive conceptions and practices. Such campaigns can be considered as complex undertakings, and as such, they need to be managed well to achieve their goals. In general, the significant activities of advertising management are planning and decision-making. All campaigns, both commercial and social, should start by creating a plan that would concern all their aspects. Planning in this context is focused on finding feasible alternatives, and decision-making involves choosing from these alternatives (Batra et al. 2008).

The marketing plan (as shown in Fig. 1) should include the following essential elements: marketing strategy, advertising strategy, strategy implementation, and assessing advertising effectiveness (Tyagi and Kumar 2004). As a base of this plan, marketing strategy determines the role of advertising and promotion to produce an effective promotional campaign. At this level, in social campaigns, a so-called strategic marketing intervention mix is established, and appropriate activities for the specific campaign are chosen (Lee and Kotler 2020).

The first step in actual advertising management is to set the objectives. In the case of a social campaign, such a goal may be some behavior we want our target audience to accept, reject, edit, abandon, switch, or continue. There can also be something that the audience needs to believe or know to be motivated to act (Lee and Kotler 2020). The objectives determine the subsequent steps—budgeting and developing a message strategy. Whether it is commercial or social, the campaign's effectiveness depends heavily on the communicated message. A higher budget does not ensure success if the message is not well prepared. Therefore, it is advised to generate some alternative messages and pre-test them to discover the best one. This is particularly

important for social advertisements because they require remembering the presented content and recognizing the significance of the behavior that is being advocated. An effective message should attract the recipient and influence his consciousness, as it can considerably increase the social campaign's impact. The pre-test allows us to determine which appeal is the strongest and should be shared with the audience during the campaign. To obtain this information, many different methods are used. They are based mostly on respondents' declarations and their neurophysiological reactions. Neither of these types of methods alone can provide complete insight into audience perception. Therefore, there is a need to combine the two approaches mentioned above to acquire as reliable information as possible. The chapter aims to present a framework for assessing the effectiveness of media messages generated for social campaigns using the triangulation of cognitive neuroscience and diagnostic survey methods. The presented proposal is based on experiments described in the literature and personal research experience. It intends to gather a comprehensive research tool. Advertising investigators can use the proposed procedure as a primer for designing various studies focused on media message pre-testing and assessment in social campaigns. The structure of the chapter is following—first, the methods of social advertising assessment are presented. Next, a framework for evaluating the media messages' effectiveness in social campaigns is introduced, and its following steps are described in detail. The chapter ends with some concluding remarks summarizing the main topic.

2 Methods of Social Advertisement Assessment

Assessing effectiveness is essential for advertising management. However, it is a complex and costly task—both for social and commercial advertisements. Most advertisers try to measure the communication effect of an ad on awareness, knowledge, or preference. An effective message must capture the target audience's attention, be easy to understand and remember without any further explanation (Raab and Rocha 2011). To provide these qualities, advertising research using various methods, measures, and techniques is used. Usually, such research is performed at four different stages of message development: (1) at the copy development stage; (2) at the "rough" stage; (3) at the final production stage, but before placing the ad in magazines, on TV, or in other media; and (4) after the ad has been run in media (Baldinger and Cook 2006); (Pechmann and Andrews 2010). In other words, it involves both pre-testing messages before actual placement in media and post-testing messages for effectiveness after they have been broadcasted. Because of the cost of advertising production and broadcasting, the most valuable from the advertiser's point of view is to perform a pre-test of the ad. Such research allows selecting the best advertisement for actual media placement and determining whether or not there are particular elements of the ads that need to be revised or improved (Baldinger and Cook 2006). Therefore, the framework discussed later in this article is adjusted for pre-testing the advertisements.

In general, advertising message research can be qualitative and quantitative. The first type is based on words, obtained from conversations with people, while the second is based on numbers, which is from counting things that occur in the environment (Basil 2019). Among the most popular qualitative methods, one can mention in-depth interviews, focus groups, and ethnographic research (Belk 2017). They were also used in the case of studying social campaigns (see Hong et al. 2005; Terblanche-Smit and Terblanche 2010; Sharma 2012; Thomas et al. 2014; Nicolini et al. 2017). All these approaches provide a profound understanding of consumers' meaning from advertisements and the mental models that drive their thoughts and behavior (Andrews and Shimp 2017). However, they also have substantial limitations—they are subjective, difficult to replicate, and not representative for a larger population (Daymon and Holloway 2011). Due to these issues, the focus of this chapter is put on quantitative research methods.

The commonly used methods in this scope are basing on self-report questionnaires (Gibson et al. 2014). They are mainly used to measure recognition and recall (Thrasher et al. 2011; Glasson et al. 2013), emotional reactions (Glock et al. 2013; Kaye et al. 2016) and persuasiveness (Loroz 2007; Turner et al. 2018) of media messages. The results obtained this way are not commonly considered fully reliable because the subjects of the experiment cannot always evaluate media messages in accordance with their real attitudes (Zaltman 2003). Furthermore, such research depends on proximal measures, e.g., perceptions of effectiveness (Noar et al. 2010). Even though perceived effectiveness is believed to be antecedent to real effectiveness (Dillard et al. 2007), it is important to identify the methods of measuring effectiveness more straightforwardly and not only based on declarations. For this purpose, the tools of cognitive neuroscience can be used (Plassmann et al. 2007; Ohme et al. 2009; Craig et al. 2012; Plassmann et al. 2012). The most popular approaches in this scope are functional magnetic resonance (fMRI), electroencephalography (EEG), measurements of galvanic skin response (GSR), and heart rate (HR), and eye-tracking (Harris et al. 2018). They have been already tested in various studies concerning both social campaigns and social advertising effectiveness (see Mauri et al. 2014; Zelinková et al. 2014; Falk et al. 2016; Meernik et al. 2016; Gordon and Ciorciari 2017; Pham et al. 2018). These tools enable access to information that cannot be obtained from the survey. Their benefits in social advertising's assessment arise from the nature of social campaigns. Beyond message memorization, they also require understanding the importance of behavior that is being advertised. According to the theory about the two "modes" of thinking—rapid (intuitive), and slow (logical) (Kahneman 2012), during assessing the effectiveness of media messages, the activation of this logical mode is more relevant. Considering the current state of knowledge, this kind of activation can be recognized using cognitive neuroscience techniques. However, such tools have their limitations. Experiments that register neurophysiological data require technical competencies and skills—the meaning of registered signals may be challenging to interpret (Lindstrom 2010). Considering these drawbacks, some scholars encourage using cognitive neuroscience together with other methods to supplement data collected for a more informed interpretation (Glimcher and Rustichini 2004; Vecchiato et al.

2013). Therefore, a framework presented in the following part of the article is based on the triangulation of cognitive neuroscience and diagnostic survey methods.

3 Framework for Assessing the Media Messages' Effectiveness in Social Campaigns

The presented framework is focused on pre-testing media messages, regardless of their form and media, in which it will be broadcasted. The procedure is intended to be as general as possible to be applied in many various settings. The following steps are illustrated in Fig. 2. The starting point in each case is to prepare different variants of media messages that will be tested. Depending on their form and goal that they aim to achieve, the appropriate experiment scenario is then prepared. This stage requires the most attention and consideration. It is decided how the message will be shown to the participants, e.g., how many times they will watch it, how long will last the exposure to the message content, and if it will be presented by itself or with other related or unrelated advertisements and media materials.

At this stage, also the measures of advertisement effectiveness need to be chosen. This choice will be the basis for questionnaire design and for selecting cognitive neuroscience tools applied in the research. Very often, self-report and neurophysiological measures are very similar (see Vecchiato et al. 2014) to compare the conscious and subconscious responses of the participants. The experiment scenario

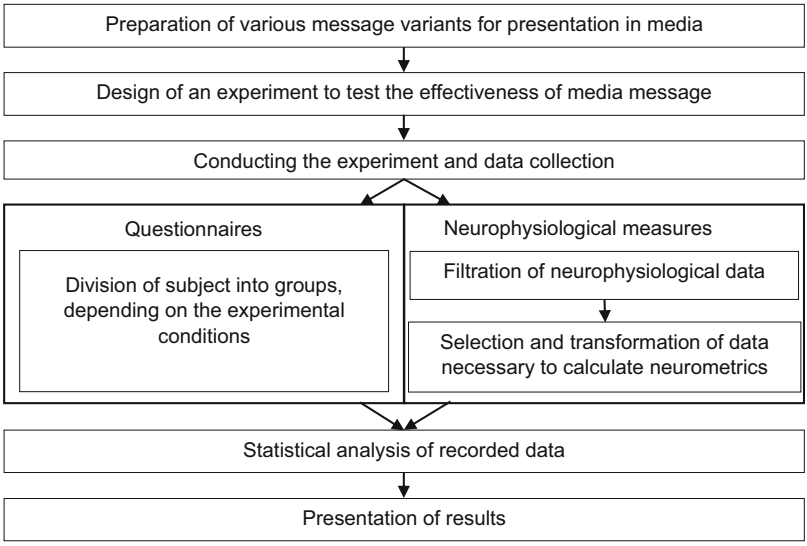

Fig. 2 Framework for assessing media messages effectiveness. (Source: Borawska and Łatuszyńska 2020)

prepared in this phase will also allow us to determine how many participants will participate in the study and into what subgroups they will be divided.

After careful consideration of the issues mentioned above, the experiment can be carried out. It is advised to test the study's scenario first on a few persons before the large group of participants will be examined to avoid possible mistakes and oversights. At this level, if the cognitive neuroscience tools are involved, it is necessary to obtain informed consent approved by the ethical committee, signed by each participant. Such consent ensures that the subjects were informed about the experiment conditions, and they agreed to participate. Experimenting itself requires careful preparation—all the devices that gather neurophysiological data need to be appropriately mounted. The participant should be isolated from the surroundings outside the experimental stand to avoid the noise and possible artifacts in the registered signal. Data of this kind are susceptible to any external electromagnetic signals and the examined person's movements. If such noise is too intense, data recorded during the experiment are useless.

Moreover, some devices, e.g., eye-tracker, need to be calibrated before the data registration begins to provide high-quality data useful in the analysis. The second important issue is synchronizing signals, which is crucial, primarily when more devices are used simultaneously. The further analysis of neurophysiological data requires access to signals recorded at the specific moment (e.g., when the studied media message is shown), and millisecond accuracy is needed.

In parallel, during the experiment, survey data are also collected. The questionnaire itself can be conducted just before, during, or after the presentation of the stimuli. The choice in that matter is a consequence of the experiment scenario and the nature of gathered data. Questions about the declared preferences or some previous experiences connected with the campaign can be asked just at the beginning. The conscious assessment of presented media messages can take place during or after the exact stimuli presentation. The data about recall and recognition are collected afterward, even a few days later. Survey data are collected in electronic form to facilitate further processing.

Data is appropriately managed at the next stage of the proposed framework to obtain useful information needed for the statistical analysis. In the case of questionnaires, it involves the division of participants into groups of interest. It depends on the experiment scenario, but the most common grouping is based on gender (Vecchiato et al. 2014) or age (Cartocci et al. 2016). However, other variables can often be used, especially when they relate to the content of media messages or social campaigns. For the message promoting safe driving, it can be, for example, the division of participants into two groups of safe and risky drivers (Borawska and Maison 2018). It helps differentiate the target audience and answer the questions about a possible response that message can receive from its recipients. The pre-processing of neurophysiological data is much more complicated. It involves the application of advanced algorithms that depend on the device used to collect the data. The first step is always data cleaning. Primarily it means filtering and artifact removal. The common methods in that scope applied for data obtained by the most popular cognitive neuroscience tools are included in Table 1.

Table 1 Data cleaning methods for cognitive neuroscience tools

	Cognitive neuroscience tool				
	EEG	fMRI	GSR	HR	ET
Methods	Band-pass filtering to remove power line noise as well as to preserve the 5 EEG frequency bands (delta, theta, alpha, beta, gamma) (Chanel et al. 2006) Artifact removal: blind source separation, independent component analysis (Colomer Granero et al. 2016)	Slice timing correction: interpolation or the Fourier shift theorem. Motion correction: rigid-body transformation. Spatial smoothing: convolving the functional images with a Gaussian kernel (Lindquist 2008)	Motion artifact removal: low-pass filtering (Hernandez et al. 2014); supervised (support vector machines, k-nearest neighbor, random forests, etc.) and unsupervised classification (1 class SVM, kNN distances, isolation forests) (Zhang et al. 2017)	Denoising and baseline wander correction: empirical mode decomposition (Blanco-Velasco et al. 2008), exclusion of abnormal peaks	Removing systematic error: required fixed locations (Hornof and Halverson 2002)

Source: Own elaboration

After data cleaning, the selection and transformation stage begins. Again, the methods used to perform these operations are dedicated to the specific tools. Some examples are presented in Table 2.

When the neurophysiological data are already prepared, appropriate measures, chosen at the experiment design stage, can be calculated. Then, altogether with survey data, they are analyzed using statistics. The standard toolbox applied in this analysis includes hypothesis testing, parametric and non-parametric tests, statistical inference, and variance (ANOVA). These calculations allow us to check whether, for example, there were significant differences between the media message variants and which message is the most effective.

The last step of the framework focuses on the presentation of the analysis outcomes. Among the variety of tools used in this scope, one can mention box plots, scatter plots, 3D-cubes, data distribution charts, curves, volume visualization, surfaces or link graphs, and many others (Grinstein and Ward 2002). Moreover, neurophysiological data and neurometrics can be shown as color-coded brain activity maps (Anwar et al. 2014) in the case of EEG and fMRI applications or as attention maps, scan paths, and heat maps (Blascheck et al. 2017) for the eye-tracking. It helps the decision-makers to visualize the results and choose the best variant of the media message.

Table 2 Data selection and transformation methods for cognitive neuroscience tools

		Cognitive neuroscience tool				
		EEG	fMRI	GSR	HR	ET
Methods	Data selection	Selection of specific frequency bands: discrete wavelet transform (DWT) (Murugappan et al. 2011), genetic algorithm (Mohammadi et al. 2015)	Voxel selection: principal feature analysis (Lu et al. 2007)	Feature selection: time-domain features (descriptive statistics), discrete wavelet transformation, empirical mode decomposition (Ayata et al. 2017)	Detection of QRS complex: Pan-Tompkins algorithm (Colomer Granero et al. 2016)	Feature selection: efficient evolutionary algorithm differential evolution (Mala and Latha 2014)
	Data transformation	Change to frequency domain: Fourier transform, wavelet transform, Hilbert transform) (Bruns 2004)	Change of the distribution to normal: logarithmic transformation (Lewis et al. 2005)	Change to frequency domain: power spectrum calculation (Nourbakhsh et al. 2012)	Change to frequency domain: power spectrum density (Guixeres et al. 2017)	Offline correction of data: the linear transformation of the coordinates of fixations (Vadillo et al. 2015)

Source: Own elaboration

4 Conclusion

The presented procedure aims to show a possible sequence of social advertising pre-testing and effectiveness research. It considers both survey and neurophysiological data to obtain more comprehensive information about the examined media messages. As a framework, it does not include detailed guidelines on designing, conducting, and analyzing the experiment. Still, it intends to give an overview of the obtainable options by triangulating two different data acquisition methods. It suggests some hints on the process of managing such research. Adjusting the procedure to pre-testing the specific form of a media message could present more specific suggestions. As mentioned earlier, this proposal was intended to be as general as possible to ensure its universality. However, further research on the refinement of the procedure's steps is advised to bring it closer to people who do not have previous cognitive neuroscience experience. Expanding the group of possible users of the presented framework will propagate this approach and improve social advertising research in the scope of pre-testing the advertisements.

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Theoretical Approach of Subliminal Advertising

Angela Madan, Mihai Ioan Rosca, and Mirela Bucovicean

Abstract Subliminal advertising is one of the most controversial topics in marketing for several decades and sparks interest among the general public and marketers. This is an interesting phenomenon that needs to be studied, explained, and understood in order to destroy the myth among consumers. This paper aims to explore most of the definitions and concepts associated with subliminal priming and subliminal techniques in order to test and develop a theoretical approach to subliminal marketing and its effects. This chapter, through a case study based on secondary sources, reviews how subliminal advertising influences consumer behavior. Studying subliminal priming represent interest among marketers, as a notoriety topic, not enough studied. Since its beginning, subliminal effects was investigated in marketing applications, of the question of effects on behavior. We evaluate subliminal techniques and establish the existence, or nonexistence, of the subliminal priming and persuasion. The implications and findings of this research suggest that the subliminal stimuli field needs continued research and also, this chapter helps to place this subject, in a proper perspective and clarifies much of its confusion.

Keywords Subliminal stimuli · Priming · Embeds · Subliminal technique · Advertising · Marketing

1 Introduction

The technology to deliver subliminal stimuli has emerged relatively recently. Historically, only after the technology existed, unconscious was, for the first time, defined in terms of "subliminal-strength stimuli" (Bargh 2016). The term of subliminal, firstly, appeared early in 1957. The researchers indicated Vicary's experiment at

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the time, this was the first announcement about subliminal. At that time was developed tachistoscope, a device that emitted a fast light pulse, with a speed of 1/60,000th per second, which was imperceptible to human consciousness. This phenomenon was named subliminal. Moore (1982) mentioned the first experiment with tachistoscope used by Vicary in a scientific test, in which unknowingly theatre audience (45,699 persons) was subliminally invited to "Eat Popcorn" and "Drink Coca-Cola" during movie in progress. The results were encouraging; the sales of popcorn had increased by 57.5% and sales of Coca-Cola by 18.1% (Rogers 1993).

In this chapter, we were motivated to establish exploratory research to define the notion of subliminal stimuli, subliminal techniques and their marketing role, as well as their effects on consumer behavior. Over the years, this field is studied tangentially. This research aims to explore most of the subliminal stimulation definition and subliminal techniques in order to evaluate its marketing importance and its influence on consumer behavior. This chapter is one of the few that examines the definition of subliminal stimuli, its techniques, and its marketing importance, in such an extensive theoretical research, from its beginning and till present time. This study brings a contribution to the scientific literature by extensive theoretical explanation and clarification of the main concepts and definitions associated with subliminal stimulus and techniques, is one of the few to examine the main studies of subliminal marketing from its appearance until now. This research specifically addresses to effects of subliminal messages on consumer behavior. On the basis of this chapter result, the main finding is that subliminal marketing is a tangentially studied field, which needs more studies and researches by marketers in order to elucidate consumers fear and become a well-studied and transparent subject, despite tiny evidence and the mysticism of subliminal advertising.

2 Definition of Subliminal Stimuli

Over the years, researchers have noted several definitions of subliminal stimuli. By definition, this stimulus can influence people's behavior. This is an interesting phenomenon and its perception is important as it can impact action, choices, and behavior. By the definition, any stimulus which is not consciously noticed can be subliminal. An important part of the controversy of subliminal techniques concerns the misuse of the word; it is below the threshold of perception of a person.

According to Zanot et al. (1983), subliminal stimuli were studied for over 100 years. The definition of subliminal perception perceives "exposing subjects" to stimuli of which they "are not consciously" aware. The interest of researchers is represented by the effects of these stimuli.

Rogers (1993) mentioned that subliminal advertising is closely related to the appearance of the tachistoscope. The tachistoscope, with the exceptionally fast "light pulse," makes the image or message which is transmitted "imperceptible" to human consciousness. Also, in his research, he noted that subliminal is the stimulus that is perceived unconsciously, because it was "below (sub) the threshold (limen)" of

human perception. Rogers defined subliminal projection as a form of hypnosis, which in motivational research does not have a positive impact and gives a negative name to the whole field.

Hawkins (1970) in his definition of subliminal perception referred to stimuli that are not consciously perceived because they are below the threshold. He, also, stated that stimuli that are recorded "below the threshold" define subliminal perception. Beatty and Hawkins (1989) argued that subliminal represents significant interest to advertisers and markers. At the same time, it was mentioned that subliminal stimuli and study of priming effects, as a result of using a "constant and low" (below threshold) stimulus, is more "meaningful" than studies using "individually-designed" stimuli levels.

Bargh (2016) reported that subliminal stimuli involve unconscious influence. In order to be perceived as subliminal, priming must be absolutely unknown to the observer and even more so, "the person must be unaware" of the presence of primed stimuli. In his research, he stated that "the unconscious is rather dumb," motivating that the unconscious does not cope with "subliminal strength stimuli" and "it cannot do very much" effectively with them.

Moore (1988) approached the subliminal stimulus and noted that if they are not identified in optimal conditions of attention, they can be interpreted unconsciously, provided they are not supervised. Earlier definition of Moore (1982) was that subliminal means stimulus "below the threshold." Over the years, taken literally, subliminal means stimulus "below threshold" (Broyles 2006); below ("sub") the threshold ("limen") of human perception (Rogers 1993) and the subject cannot identify the stimulus (Moore 1982).

Strahan et al. (2002) argued that the effectiveness of subliminal stimuli is directly related to a person's motivation. By definition, the buyer's behavior can be influenced, as well as persuasive effects can be registered through "subliminal priming goal-relevant" perceptions only when the consumer was motivated "to pursue the goal."

Silverman (1976) approached the subliminal more with an advertising or marketing interest. The subliminal is defined as a stimulus that is not perceived but is felt by an individual. Subliminal stimulus is felt by a person who has no evidence about an embedded stimulus effect and is not aware of priming. Theus (1994) confirmed that, by definition, the subliminal stimulus can be any stimulus that is not consciously perceived by the observer. It is one of the broadest definitions that imply a wide perception of subliminal priming. Subliminal perception refers to the registration of a stimulus (Hawkins 1970), which the observer is not consciously attending to (Theus 1994) and have no evidence of the priming, before its effect is felt (Silverman 1976).

Synodinos (1988), in his study, analyzed the threshold to determine which stimuli reach the threshold and which are subliminal. By definition, subliminal stimuli are defined as stimuli below the threshold or below the arbitrary limit (to see, hear, etc.). But, in fact, what is the threshold or how can it be reported? The threshold is a "statistical abstraction." The absolute threshold can be defined as the value of a stimulus that influences consumer behavior 50% of the time, when it is present.

Subliminal stimuli by definition are weaker than the threshold when they are detected, they can be as effective as powerful stimuli that exceed the threshold. The analysis showed that subliminal stimuli that are below the threshold were reported less than 50% of the time, while more than 50% of the time strong stimuli that are actually above the threshold were reported.

Klass (1958) by his definition brought a clarity related to the perception of stimuli, the threshold and fears of consumers related to subliminal stimuli. He noted that it is natural for people to be frightened if they perceive subliminal stimuli as "messages or forces" that are able to reach directly into the buyer's "unconscious mind to influence his behavior." By definition, threshold "means simply" that some of the stimuli "affect the organism" of the observer, while other stimuli do not. In fact, both odors and lights have a threshold. Namely, some smells "are too weak" to be detected, but as the "intensity of smell" increases, "a point is reached" at which it is smelled. As for lights, there are lights "too faint" to be seen, but once the intensity of light increases, it is detected by the observer. This point of perception was defined as "the threshold point (or limen)." Stimuli that do not "reach" the threshold or are below the threshold are defined as subliminal. It is also mentioned that the same stimulus registers different perceptions, for one person it may be subliminal, but for another, it is above "the response threshold." Furthermore, the same stimulus may be subliminal for a certain person "at one time" and may no longer be subliminal "at another time," it will, already, be above the threshold for the same person.

Merikle (1988) stated that there are cases in which observers can "discriminate" some stimuli. As evidence, he indicated the "verbal responses" of people, who based on their "subjective phenomenal experiences," were not sure that "sufficient stimulus information" was perceived to influence their behavior or to guide their responses selection. By definition, he noted that, according to this view, subliminal may be noticed when the observer can "objectively discriminate" among possible stimulus states, but he is confused as to the subjectivity of the "correctness" of their decisions.

Broyles (2006) argued that "the misuse of the word" underlies the controversies of subliminal advertising, and was arguing that advertisers through subliminal messages are trying to "sneak" something past the observer. As for writers, he claimed that when they use "double entendres," they want people to achieve "both" meanings. Subliminal stimulation are below the threshold of perception (Hawkins 1970) or below the level of an individual's conscious awareness (Broyles 2006) and it cannot be perceived, felt, etc.

Trappey (1996) defined subliminal advertising as a "technique" of exposing consumers or persons, without being aware of the information presented, mainly priming brands, products, or other marketing "stimuli." He described steps, after the consumer is exposed to a subliminal "marketing" stimulus. He assumed that theoretically in an ideal form after subliminal perception "consumer decodes the information." After that, he acts according to the subliminal information assimilated unconsciously, without being able to determine a communication source or without assuming that he was influenced in some way. Some marketers believe that subliminal advertising adds "a new dimension" to the media. Respectively, it is assumed for simultaneous service and product "promotion" without consciously interfering with

the consumer's routine and without distracting him from his daily activities. This, in turn, is assumed that each one deals with his own activities, namely consumers carry out his own business without interruption, and marketers can project "repeatedly" the essence of a commercial, allowing increasing product exposure.

One widely followed approach to the study of subliminal presentation (Merikle 1988) has expanded to the misuse of the word (Broyles 2006) and the hidden pictures/words within some presented images or films. These subliminal embeds are visible only when they are pointed out (Rosen and Singh 1992).

Elgendi et al. (2018) defined priming as an increased "sensitivity" to a certain stimuli or the stimulus which influences unconsciously people as a result of "prior" exposure to audio or video messages. At the same time, when the consumer or a certain person is exposed to a stimulus "below the threshold," then subliminal priming occurs. By definition, a subliminal stimulus is a stimulus exposed below the "threshold" of perception and the observer is not aware of its existence or influence. The process of subliminally perceiving information was stated as being independent of consciousness, it occurs outside "the realm of consciousness" and it is supposed to be different from "memory," so priming involves direct "retrieval" of information.

Garofalo et al. (2020), in his recent research, defined the subliminal stimulus as any clue that is "too weak" to be explicitly because its intensity is "below the level" of consciousness, but the stimulus is still able to activate "sensitive related paths" due to as it "receives perception and semantic processing."

3 Subliminal Techniques

For a better understanding of subliminal marketing, it is important to investigate and determine subliminal techniques, which are assumed to have some degree of covert manipulation. Subliminal stimulus is below the consciousness awareness and to evoke a well-established fractional goal response involve:

1. *Tachistoscopic presentation* involves "visual stimuli" with a very short presentation of various types of subliminal stimuli, which is performed in order to have an impact on the subconscious desires of the final consumer or general public (Moore 1988). As an example of this kind of technique, Elgendi et al. (2018) noted that, during World War II, the tachistoscope was used "to improve soldiers' reading speed and test their eyesight."
2. *Backward messages*—messages that can only be perceived when playing or listening in reverse. As an example, subliminal messages can be perceived when listening to rock or country songs in reverse (Rosen and Singh 1992).

3. *Potential advertising*:

   (a) Using familiar images and words for arousal (Theus 1994).
   (b) Hidden pictures in pictorial advertisement (Moore 1982), an example of subliminal masking was used the embed "Rats" on the face of opponent in presidential election (Broyles 2006).
   (c) Using the image of a man together with a woman, in other words, happy couple.
   (d) Product "placement" in television shows or film as incidental advertising. A prime example, Elgendi et al. (2018) described the placement in the Top Gun movie of Ray-Ban sunglasses, worn by Tom Cruise. After placing a product in Top Gun movie, sales of these sunglasses considerably subliminally increased.
   (e) Repetition and suggestion (Florea 2016).
   (f) Subliminally flashing the logo. Elgendi et al. (2018) mentioned the example, when Ferrari was criticized, because on Ferrari's F1 cars "displayed" a barcode which was supposed to subtly flash "the logo of its sponsor company," Marlboro. Ferrari had to remove this design in 2010, because the barcode was recognized as violating "the ban" on tobacco advertising.

4. *Sub-audible stimuli as*:

   (a) Incorporating at lower volume speech signal, below the word is heard, masked by sounds or music (Rosen and Singh 1992). An example noted by Elgendi et al. (2018) was the British band "Judas Priest," which was suspected to incorporate suicide subliminal messages. After prosecution for probability of including some subliminal messages, which led to suicide attempts by two teenagers. The band was not found guilty, in the case against the songs "Better by You, Better than Me" and "Do It" which was alleged to have an influence on young men behavior.
   (b) Speeding up the presentation rate and masking by background speech or music, until the message could no longer be consciously understood.
   (c) Using backward messages which can be produced only at reverse playing.
   (d) Presenting different words which are at subliminal intensity levels.
   (e) Introducing a very fine stimuli which even is difficult to determine as separated words (Moore 1988).
   (f) Accelerating speech in low volume messages (Moore 1982).

4 Subliminal in Marketing

Despite the fact that the concept of subliminal message was firstly defined in 1957, by a marketer which invokes its importance in persuading final consumers, subliminal advertising is considered, at the present moment, as a controversial innovation. From the beginning of subliminal communication and persuasion appearance advertising schools and researchers had published a lot of studies about priming, and the

results were contradictory. From the beginning, Klass (1958) mentioned that subliminal advertising will not revolutionize the mass-media industry and had denied the efficiency of embeds. In his work, he affirmed that when a subliminal message is transmitted in a stimulus that is completely below the threshold level, it is not the case to expect a response and only when partial priming is transmitted, it is supposed to have some reaction. He directly related the concept of subliminal to unconsciousness.

In his research, Hawkins (1970) analyzed and developed a theoretical explanation of subliminal persuasion; he reviewed the main concepts as well as he had provided some experiments to test and understand the effects of embed. With the results of both experiments which were contradictory, he mentioned that the effectiveness of subliminal priming on people's behavior remains opened. Defining subliminal stimuli Silverman (1976) reflects an advertising and marketing interest and the question in those fields is whether or not embeds can be choice-specific interest (Theus 1994).

After a wide theoretical approach and research, Moore (1988) had concluded that subliminal priming is either "partial" available to consciousness or operatively non-existent in case when it is "far below" an objective threshold of awareness. This is why, earlier, Moore (1982) proposed to analyze more about subliminal, because, at that time, he did not find enough arguments for strong subliminal effects. Merikle (1988) was more precise in his opinion and, after research, determined that subliminal messages used in some audiotapes had no influence on a person's final decision process. He suggested that there are necessary more in-depth studies in this field.

For decades, subliminal advertising has been a concern for many researchers and marketers. In their work, Rosen and Singh (1992) indicated that, after studies and experiment results, their findings in advertising did not indicate any, no statistically, neither any significant effect for priming. Rosen and Singh (1992), analyzing the requests of the specialist in the marketing field, proposed that it is important to take different measures at main levels of behavioral effects to determine the efficiency of various measures and to determine which are the effects of priming.

Rogers (1993) had the same opinion; he also denied the effectiveness of subliminal advertising and even had the opinion that the experiment from 1957 did not exist, and it was invented by the Vicary. He also suggested that if subliminal priming is so easy, it will solve a lot of problems in modern society, which why it is not so simple in his opinion.

After a wide theoretical approach of 117 articles and the results of several researches, Theus (1994) suggested that need-state behaviors may be stimulated by subliminal stimulation marks. He mentioned that visual subliminal stimuli are more effective than additive ones. Also, it is very important to determine the type of priming and the target audience which will be stimulated. It is important, for the effectiveness of subliminal advertising, that segmentation be based on a need-base state. In his study, it is suggested that subliminal advertising may play an important role in improving social behavior if it will be used not to manipulate consumers in choosing some brands, but through public awareness campaigns.

Strahan et al. (2002), after an office research and some experiments, had mentioned that person behavior and attitudes can be exploited by subliminal presentation. Their research suggests that subliminal stimulus can influence behavior and enhance perception only when people were motivated to pursue the goal. After some research and experiments in the theory of subliminal stimulation, Opre et al. (2002) had offered empirical support for an affirmation that subliminal messages, only if they persist relatively short, had an effect on population behavior.

The main interest represents that, according to the same researcher findings (Broyles 2006), it was confirmed that the general public has the opinion that subliminal messages are used in advertising and that subliminal advertising is an important tool, which is likely to be used in marketing to generate sales. Broyles (2006) urged consumers to trust their own eyes and confirmed that advertising which uses subliminal techniques is not effective. He indicated that subliminal advertising, from an ethical point of view, only reduces the credibility of advertisers and media companies.

Subliminal manipulation is not used to advertise valuable, qualitative, or healthy products, but rather it is imputed in advertising enjoyable, but "unhealthy" products (Voloaca et al. 2011). Anitei and Curelea (2014) had researched the efficiency of audio subliminal advertising and had experienced how it can influence people's behavior. After analyzing the results, which had confirmed, partially, their tested hypothesis, the authors proposed to extend their study on a larger scale.

Bargh (2016) conducted recent field studies following extensive research of articles and an experiment in which priming methods were used. This study suggested that subliminal impacts are effective under real-life conditions. Subliminal messages are producing changes in a person's behavior. It was also mentioned that people were not aware of the influence of priming manipulation.

After a comprehensive study in subliminal marketing, with more than 180 literature reviews, Elgendi et al. (2018) had reached the opinion that subliminal priming had positive effects and it will be necessary more efforts to provide for reaching its impact and potential. In their research, Elgendi et al. (2018) had favorable expectations regarding subliminal priming and they considered it as a growing study area. They affirmed that subliminal embeds can have an impact if the field is sufficiently studied and it is possible to maximize its potential with systematic efforts.

Lucini et al. (2019) theorized that the processes of transition from conscious to subliminal in the brain are happening through the "weakening of the interactions strength in the network." Their framework added another view about subliminal, that the "seed of the unconscious—state" are at the deepest core, "at the sell structure" of the functional networks. Despite the theory that "all external stimuli is processed in the brain unconsciously a couple of hundred of milliseconds before any voluntary act," has been demonstrated that subliminal—state activity is one of the most robust "to the weakening of the fMRI signal."

Garofalo et al. (2020) concluded that subliminal stimuli are only effective if it influences the choice to "rewards sharing" the same motivational properties and it activates a subcortical component in brain networks. Experiments result conducted that perceptible subliminal cues are more effective than unseen subliminal stimulus.

The same logo, if explicitly perceived can influence the purchase of a particular product, then when it is much lower perceived it can contribute to the purchase of "similar products." Car drivers can drive to McDonald's when are seeing McDonald's logo along the street and can drive to any fast-food restaurant when McDonald's logo is not consciously perceived in street advertising. Subliminal processing can contribute to the influence of choosing similar products and not products identical to those presented subliminally.

5 Conclusions

The boundaries of subliminal advertising are investigated in the chapter. In a changing world, marketers want to make a difference and often try to use any modality to stand out. Theoretical studies and experiments demonstrated that independently of a person's confidence about "object's attributes" it is possible to change his preferences, attitudes, and impression; formation can be developed "outside" of an individual's beliefs. Despite the fact that many researchers had demonstrated the ineffectiveness of subliminal stimuli, there are still obvious cases of using subliminal advertising in order to interfere directly in the buyer's subconscious. The efficiency or inefficiency of subliminal messages remains open and it is necessary to do more studies.

The existence of subliminal persuasion had been notated by many researchers. In this study, we mentioned a considerable part of definitions, we defined subliminal persuasion or advertising, as well as we analyzed subliminal techniques and exemplified that techniques of subliminal priming. Even if subliminal is a delicate field of marketing, it is good to inform consumers, because if people are informed they will no longer be afraid of the possibility of unconscious manipulation.

In a modern society, it is recommended in interpersonal communication and relationships to emphasize business ethics and transparency, as well as to encourage the responsibility of advertising agencies. Advertising agencies are a primary link between the consumer and the producer, without which it is difficult for consumers to find out the new trends, the new or well-known products, as well as a series of primary necessary goods. It is necessary for agencies to use legally and responsibly advertising at all informational levels.

Over the years, many advertisers are supposed to find a way to make a difference in consumer preference and are trying to use subliminal techniques for this purpose. After a wide study of extensive literature and research works, it is more relevant that subliminal advertising will continue to intrigue many marketers and investigators, who intend to study its existence and effectiveness. It is necessary to do more research and studies in this direction to determine the efficiency or inefficiency of subliminal advertising, and even more, the existence or nonexistence of this kind of stimuli. It is important to conduct more research to investigate the effects of subliminal advertising and to establish patterns for identifying subliminal marketing.

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Values of Companies Operating in the Pharmaceutical Market: Orientation Directions

Jolita Vveinhardt and Povilas Foktas

Abstract In this study, the authors seek an answer to the following problematic question: what are the values of the companies operating in the pharmaceutical market and how are they oriented: inward, that is, economic indicators of the company, or outward, where are the benefits of the social context highlighted? Therefore, the purpose of this study is the identification of values of companies operating in the pharmaceutical market, establishing the most frequently published/congruent values, and grouping them according to the chosen classification, to distinguish directions of value orientation. For the purposes of this study, 50 largest pharmaceutical companies operating in the Lithuanian market, generating 80% of all money circulating in the Lithuanian pharmaceutical sector, were selected. After analyzing the websites of the 50 largest companies, 30 of them were selected for further analysis. This study proposes a different approach when after highlighting value groups of pharmaceutical companies, attention is drawn to the directions of declared values. This helps to answer questions about which values are oriented to internal processes of companies and benefits they bring to the organization and which ones, to external entities. Such separation can serve, seeking to more precisely highlight value preferences of organizations in the information flow on their web pages.

Keywords Values · Value groups · Directions of value orientation · Pharmaceutical companies · Lithuania

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1 Introduction

It is recommended that organizations should periodically review and discuss their values and check their relation with external and internal environments (Vveinhardt and Gulbovaite 2016, 2017, 2018). It is very important that the values should be understandable, clearly defined, and suitable for all members of the organization and external stakeholders. The health care system is changing, and stakeholders' requirements are promoting pharmaceutical companies to change their established approach to the accents of the value of the proposed product (Laws 2015), all the more so that companies are strongly criticized for ethical principles (Nussbaum 2009). According to Burton et al. (2001, p. 150), there is no universal list of ethical values, but there are several universal principles that cannot be ignored: "accepting resource constraints; helping the sick; protecting the worst off; respecting autonomy; sustaining trust; promoting inclusive decision making."

The problem of the research is raised by the question: What are the values of companies operating in the pharmaceutical market and how are they oriented: inwards, that is, to the company's economic indicators, or outwards, where the benefits of the social context are emphasized? The diagnosis of organizational values was performed in private and public sectors according to the areas of professional activity/nature of organizations' activity (Van der Wal et al. 2006) in hospitals (Kalliath et al. 1999; Leiter et al. 2009; Gibb and Burns 2018), hotels (Liang 2012), surveying engineers (Laglera et al. 2013), in banks (Zhang and Bloemer 2008; Wang et al. 2012), and other activity areas of organizations; however, no studies analyzing organizational values in pharmaceutical enterprises have been found in the investigated sources.

Therefore, the aim of the research is the identification of values of companies operating in the pharmaceutical market, establishing the most frequently published/congruent values, and grouping them according to the chosen classification, to distinguish directions of value orientation. The theoretical part of the research was prepared mainly by analyzing the literature of the scientific fields of management and psychology. The empirical part of the study was prepared using the content analysis method and in accordance with the data processing sequence proposed by Neuendorf (2002) and McMillan (2000). The chapter consists of literature review, methodology, results and conclusion.

2 Literature Review

2.1 Values

The concept of values is quite complex and ambiguous. Authors in different disciplines treat values differently, but it is namely the different interpretation of the concept of values that allows us to look at this phenomenon that is difficult to

capture from different angles. Values can be treated as wishes or goals that represent a person (Pike 2012; Ren 2013). They define and show how people live, what their beliefs are, how they think, what standards and behaviors they value and adhere to (Fu et al. 2010; Osteen 2011). It is noted that values act similarly to motives, needs, and goals and are reflected in certain actions of a person. Values oriented towards the personality's promotion and development reflect spiritual or corporeal (physical) aspects, economic, ethical beliefs, and experiences, while values oriented outward reflect striving to help and communicate with other persons, etc. (Kaptein 2004; Van der Wal et al. 2006; Cardona and Rey 2008; Sverdlik et al. 2012; Ren 2013; etc.). The formation of values is influenced by family, friends, religion, education, media, technology, and many other external and internal factors (Johnson and Monserud 2012; Jing and Rounds 2012; Kalleberg and Marsden 2013; etc.). Persons who create and participate in the activities of various organizations also create organizational values that are reflected in the activities of organizations (Cowan and Todorovic 2000, Wenstøp and Myrmel 2006; Cennamo and Gardner 2008; etc.).

Organizational values are defined as one of the most important, deepest, and core elements and activity levels of the organization (Van der Wal et al. 2008). Organizational values have a more specific meaning than personal values, but at the same time, they are similar, combined with each other (Cardona and Rey 2008; Cennamo and Gardner 2008). Organizational values are very important to the organization itself and its people (Rani and Samuel 2016). They have commonalities such as permanence, longevity, and internal attitude (Hofstede 1994; Gregory et al. 2009). When the values of the individual and the organization coincide, they shape the level of work effort, the nature of satisfaction, commitment, and activity. Often, values act as motivation within the organization. Researchers define organizational values as striving for business performance outcomes (Malbašić et al. 2016); they can be oriented to development (Cardona and Rey 2008), promoting growth (Hultman and Gellermann 2002), etc.

2.2 Groups of Values

2.2.1 Economic Values

Economic values are a propensity for financial benefit and well-being (Everett 1918; Allport et al. 1960; Forest 1973; Palmer et al. 2004; Dolan et al. 2006; Edvardsson et al. 2006; etc.). They are related to the enterprise's activity and the possibility to achieve results (by effective means) (Cardona and Rey 2008). The following values can be attributed to this group: organizational development (Cardona and Rey 2008), efficiency (Van der Wal et al. 2006), enterprises' orientation to profit and its material expression (Peters and Waterman 1982; Tait 1997; Van der Wal et al. 2006), goal-seeking (Peters and Waterman 1982), innovations (Peters and Waterman 1982; Tait 1997), and effectiveness (Kaptein 2004; Van der Wal et al. 2006).

2.2.2 Social Values

Social values show the organization's propensity to teams and collaboration and value employees who are flexible and adaptable, willing to work in groups (Abram 2006; Cennamo and Gardner 2008; Van der Wal et al. 2008). The system of social values is shared by group members, organizations, communities, and societies. Members generally support them voluntarily (Durvasula et al. 2011; Ren 2013; Vecchione et al. 2016). These values express propensity to contacts with other people, communication (e.g., communication with each other, teamwork, and respect are particularly important) (Cardona and Rey 2008). Such values as communication, the importance of people as individuals; teamwork; support; collaboration; team spirit; collegiality; solidarity with colleagues, etc. are also assigned to this group of values by researchers (Peters and Waterman 1982; Fernandes 1999; Kaptein 2004; Van der Wal et al. 2006; etc.).

2.2.3 Aesthetic Values

Aesthetic values recognizing the harmony of beauty and art and their manifestation in organizations are analyzed by many scholars (Everett 1918; Allport et al. 1960; Forest 1973; Peters and Waterman 1982; Kaptein 2004; Van der Wal et al. 2006; Cardona and Rey 2008; Gibb and Burns 2018; etc.). They are aimed at making the parties related to the organization's activities more interested than it is strictly required by business relationships and needs (Gibb and Burns 2018). It can be customer satisfaction, interest in people, and added value creation that is not related to generating additional revenue (Kaptein 2004; Cardona and Rey 2008). It also includes adherence to sustainability: behavior, considering the relationship between nature and the environment (Van der Wal et al. 2006).

2.2.4 Spiritual Values

Spiritual values in organizations (Everett 1918; Allport et al. 1960; Forest 1973; Kaptein 2004; Van der Wal et al. 2006; Gibb and Burns 2018; etc.) are characterized by the interest in something higher. They indicate which spiritual objects receive human attention (Parks-Leduc et al. 2015). These values show what the person's life includes and who he/she is. They are characterized by optimism about the future combined with high expectations for themselves, a strong sense of civil spirit, and active participation in the activities of volunteers, churches, and charity (Dolan et al. 2006). According to authors, spiritual values encompass such values as reliability; motivation; enthusiasm; energy; spirituality; encouragement; honesty; participation;

loyalty; pride; dignity; and accountability (Kaptein 2004; Van der Wal et al. 2006; etc.).

2.2.5 Ethical Values

Although the importance of ethical values is well understood by all (this is especially important for organizations operating in the pharmaceutical market), the inclusion of ethical values in organizational values can be observed only at the turn of the twenty-first century (Van der Wal et al. 2006; Vveinhardt and Gulbovaite 2016, 2017, 2018; etc.). Ethical values encompass the absence of bias with regard to private interests (Fernandes 1999). Ethical values indicate how to act in accordance with applicable laws, regulations, how to use managerial instructions, and the organization's internal policy (Dolan et al. 2006). In addition, they define how to treat stakeholders and customers fairly and appropriately, how to deliver on promises and commitments properly. Researchers attribute the following values to the group of ethical values: social justice, obedience, legitimacy, responsibility, honesty, and reliability (Van der Wal et al. 2006; Vveinhardt and Gulbovaite 2016, 2017, 2018; etc.).

2.2.6 Physical Values

Physical values can be defined by what is provided by the organization itself. These values include everything related to the organization's environment, safety, physical health, and products (Vveinhardt and Gulbovaite 2016, 2017, 2018). These values include quality (Peters and Waterman 1982; Tait 1997), service, importance of implementation details (Peters and Waterman 1982; Fernandes 1999), and others.

2.2.7 Professional Values

This category specifically defines professional values related to the work carried out in the organization (Everett 1918; Allport et al. 1960; Forest 1973; Kaptein 2004; Van der Wal et al. 2006; Vveinhardt and Gulbovaite 2016, 2017, 2018; etc.), where attention is paid to professionalism, expertise, and education. Research shows that different groups of professions may have different values, and the interrelationships between individual attitudes and behavioral characteristics may differ across different groups of professions. Therefore, the professional level can be the indicator of congruence of collective values among certain people who have a similar professional identity (Hitt et al. 2011; Malbašić et al. 2016). Such values most often are experience (competencies, skills, knowledge, and other advantages) (Tait 1997; Fernandes 1999; Van der Wal et al. 2006; etc.).

Table 1 Summary of groups of values: Seven Groups of Values (ESESPAP)

Groups of values	Generalization	Authors
E-Economic	Organizational activity, processes, expected performance results, benefits obtained by stakeholders, etc.	Economic values (Spranger 1928; Forest 1973; Fernandes 1999; Bruno and Lay 2008; Edvardsson et al. 2006; Marcus et al. 2015; etc.).
S-Social	Includes a broad social context consisting of trust, contribution to public good, friendly work relationships, prestige, recognition, etc.	Social values (Spranger 1928; Bruno and Lay 2008; Edvardsson et al. 2006; Marcus et al. 2015; etc.); social-focused values (Sortheix and Lönnqvist 2014), social-psychological (Forest 1973), socio-political (Forest 1973).
E-Ethical	Reveals fundamental moral criteria, responsibility of the organization and employee, etc.	Ethical values (Zabid and Alsagoff 1993; Fernandes 1999; Koehler et al. 2000; O'Donohue and Nelson 2009; Sharma et al. 2009; Groves and LaRocca 2011; Shahriari et al. 2012; Georgescu 2012; Alleyne 2016; Martínez-Cañas et al. 2016; etc.).
S-Spiritual	Values related to personal self-fulfillment, satisfaction, conformity, benevolence, universality, mission carried out in the society, etc. Can be related to religion.	Spiritual values (Fernandes 1999; Culliford 2002; Reave 2005; Dehaghi et al. 2012; Zhang and Yu 2014; Cooper et al. 2016; Ali and Zaky 2018; Ahmed et al. 2019; etc.).
P-Professional	Career, challenges, creativity, competition, professional responsibility, knowledge and skills, etc.	Aesthetic values (Spranger 1928; Bruno and Lay 2008; Cooper et al. 2016; Ivanova 2017; etc.).
A-Aesthetic	Expresses reactions, attitudes related to the image, reputation, coherence, recognition, etc.	Professional values (Swick 1998; Stern 1998; Relman 1998; Gibbons 2004; Carroll and Quijada 2004; Rassin 2008; Weiss-Gal and Gal 2008; Osteen 2011; Iacobucci et al. 2013; Pintak 2014; Donmez and Ozsoy 2016; Kantek et al. 2017; Shafakhah et al. 2018; etc.).
P-Physical	Includes what is related to the organization's environment, safety, physical health, and healthy products, etc.	Physical values (Vveinhardt and Gulbovaitė 2016, 2017, 2018; etc.)

Source: Developed by the authors based on the literature review

Thus, after analyzing and conceptualizing scientific research, seven groups of values (ESESPAP) were further taken as a basis for the performance of the analysis of the values declared on the websites of pharmaceutical companies (Table 1).

3 Methodology

3.1 Sample and Procedures

In total, there are 149 pharmaceutical companies operating in the Lithuanian market, which together represent 749 producers (State Medicines Control Agency's Statistics 2018). Thus, there are 50 largest pharmaceutical companies operating in the Lithuanian market, whose generated turnover amounts to more than 3 million Euros per year. For the purposes of this study, 50 largest pharmaceutical companies operating in the Lithuanian market, generating 80 percent of all money circulating in the Lithuanian pharmaceutical sector, were selected. The logic behind the selection of this sample is that all 50 pharmaceutical companies selected in this sample are international and are direct representatives of their medicines; i.e., other manufacturers have only local partners operating in the Lithuanian market—other companies that can sell medicines of several different manufacturers in the market. After analyzing the websites of the 50 largest companies, 30 of them were selected for further analysis. The websites of twenty pharmaceutical companies did not publish any values.

3.2 Measures

Analyzing the problem, the content analysis method is usually chosen due to several advantages that manifest themselves by unstructuredness, the possibility to cover a large amount of data, sensitivity to the context. As well as due to investigation of not only texts but also images carrying the information (Krippendorff 1980; Bauer 2000), which is relevant, investigating the content of web pages and gaining access to a large amount of data (Kim and Kuljis 2010), which needs to be processed and systematized to obtain reliable research results. However, the abundance of data poses a number of challenges that can be coped with by employing a nine-step system proposed by Neuendorf (2002), consisting of theory and rationale, conceptualizations, operationalization, coding scheme, sampling, training, coding, final reliability, analyzing and reporting. A similar approach is followed by McMillan (2000), who proposes the content analysis approach where the researcher formulates a hypothesis and chooses a research sample. Further categories are defined for coding, coders are trained, the content is coded, the reliability of coding is checked, and the data collected are subsequently analyzed and interpreted.

This study was conducted in accordance with the following sequence of stages: (1) analysis and conceptualization of scientific literature, (2) operationalization of concepts, (3) compiled database, forming a coding scheme, (4) data collection and entering into the prepared database, (5) data processing, and (6) the analysis of research results.

In the first stage of the research, the research analyzing values were selected, the analysis of the literature and conceptualization were performed. In the second stage, after selecting the research describing value groups and values attributed to them, the operationalization of concepts was carried out. In the third stage of the research, the database was compiled, distinguishing categories and forming a coding scheme (more exhaustively, stages of research data processing). In the fourth stage of research, 50 largest pharmaceutical companies operating in the Lithuanian market were selected; the websites of the 50 largest companies selected in the first stage of research organization were analyzed and, finally, 30 websites were selected from 50 websites of pharmaceutical companies for further analysis, as company values were published only in them. Values published on the websites of 30 pharmaceutical companies were entered into the database, in which later collected information was processed and further data analysis was performed. In the fifth stage of research, data processing was carried out.

Stages of research data processing:

1. The number of values published on the websites of pharmaceutical companies (max., min., mean) was identified
2. Values that are most often published on the websites of pharmaceutical companies were identified (coincide values)
3. Published on the websites of pharmaceutical companies were grouped according to their nature, using the selected classification; i.e., into 7 groups of values (economic, social, ethical, spiritual, professional, aesthetic, physical).
4. Orientation directions of values of companies operating in the pharmaceutical market (orientation inwards, orientation outwards) were distinguished.
5. The research data analysis was performed.

4 Results

The database of values entered from the websites of 30 pharmaceutical companies contained 165 values. Table 2 shows the number of companies (A) according to the number of values published on their websites (B), for example, one company publishes two values on its website, 5 companies publish three values each, and etc. Thus, this summary of results reveals the minimum and the maximum number of published values—2 and 11, respectively, and shows that on average, pharmaceutical companies publish 5–6 values. Ten most popular values that quite often recur on the websites of pharmaceutical companies (C) are also distinguished. In Table 2, the number next to the value means that the corresponding value was recorded from a few to a dozen times on the websites of several companies, for example, the value "integrity" was published on the websites of 13 pharmaceutical companies (D). A relatively large number of companies publish three coinciding values each, such as "Environment," "Leadership," "Transparency," "Solidarity," and others.

Table 2 Number of published values and most popular values

Number of companies	Number of values in companies	Recurring values	Number of companies in which values recur
1	2	Integrity	13
5	3	Innovations	12
5	4	Respect	10
5	5	Quality	7
7	6	Community service	7
1	7	Excellence	6
3	8	Ethics	5
1	9	Trust	4
1	10	Teamwork	4
1	11	Responsibility	4

Source: Authors' own calculation

Some of the values published on the web pages coincided; therefore, before performing further analysis, the coinciding values were combined (Table 3). Thus, after analyzing the content published on the websites of pharmaceutical companies, a total of 92 values, attributed to certain groups, were distinguished for the next stage of the analysis. It should be noted that this article does not detail the values that could be assigned to several groups, as some pharmaceutical companies' websites, in addition to values, have indicated the context that is not detailed in this article. For example, the value "to work so that it is worth living" may reflect concern for both the company's customers and employees, and "respect for our environment" may mean respect for the company's environment or the environment in general. On the other hand, such value as "effectiveness" could be attributed to both economic and professional values; therefore, when the context is not given, accurate attribution is not possible. In order to determine the true meaning of the value, additional research is needed to survey pharmaceutical companies' managers and employees who have contributed to the formation of values.

Distribution by seven groups in percentage is presented in Table 4 showing preferences of pharmaceutical companies, emphasizing professional, spiritual, and economic values. In this context, aesthetic, physical, social, and ethical values as if move to the background. This shows certain value orientation directions of pharmaceutical companies, but companies' values themselves are not unambiguous and can serve different purposes, such as goals targeted to the benefits of the company itself or to entities outside the companies, responding to the expectations of the social context.

On the one hand, it is quite difficult to draw a strict distinction between inward-oriented values; i.e., values serving the organization's economic goals, and outward-oriented values—directed to communities, persons using pharmaceutical products, the society's sustainability, etc. For example, a number of declared values emphasize enterprises' social responsibility but at the same time, serve to create the organization's image, which gives it additional benefits in developed marketing

Table 3 Values of pharmaceutical companies by value groups

Groups of values	Number of values in the group	Values of pharmaceutical companies
Economic values	14	Profit reinvestment; economic care; retaining the best people; compete intensely win; financial independence; environmental care; win; taking accountability; taking risk; expand access to products; developing; being first; performance orientation; total cost of care, disability, and productivity.
Social values	12	Socially responsible; respect for people; caring for people; work in team; multicultural identity; values collaboration; community; centered around the person; communicate; focus on the patient; work to keep the natural world healthy and worth living in; the benefits to society of reducing caregiver burden.
Ethical values	12	Build the future; care employees; serving the community; dedication to patient; improving life ethic; transforming lives; improve life; appreciate each other; solidarity; be science-based; respect for our environment; be ethical.
Spiritual values	18	Proud; respect; confidence; courage; diversity; justice; trust; integrity; truth; brave; care; joy; imaginative; passion; honesty; empathy; creativity; agility.
Professional values	26	Efficiency; performance; quality; partnership and trust; achieve scientific excellence; embracing diversity; create value; driving innovation; reliability; acting with integrity; professionalism; dedication; leadership; achievement; speed; inspiring; sustainability; common sense; collaboration; commitment; responsibility; entrepreneurship; excellence; flexibility; stability.
Aesthetic values	2	Transparency; attracting.
Physical values	8	Service; high-quality standards; liveable workplace; doers team; environmental protection; longer survival; better quality of life; higher satisfaction with treatment.
Total	92	

Source: Authors' own calculation

Table 4 Distribution of values declared by pharmaceutical companies by value groups: Inward-oriented and outward-oriented values

Groups of values	Inward-oriented values (%)	Outward-oriented values (%)	Values (%)
Economic values	12	2.20	15.2
Social values	4.30	6.50	13.0
Ethical values	5.40	5.40	13.0
Spiritual values	19.60	8.70	19.6
Professional values	22.80	4.30	28.3
Esthetic values	1.10	2.20	2.2
Physical values	2.20	3.30	8.7

Source: Authors' own calculation

(Maldonado-Guzman et al. 2017). In other words, values can be inward oriented although they emphasize external preferences. On the other hand, the context of the content published on the websites, in which the declared values are presented, provides additional information that allows to distinguish which values are exclusively directed to the organization's internal processes and which to the external environment. Therefore, considering the whole context, each of the seven value groups was further subdivided into the pharmaceutical company's inward-oriented and outward-oriented values.

Dividing values of pharmaceutical companies by direction (inward/outward), three positions came to prominence, dominated by internal preference involving professional, spiritual, and economic values, while ethical values were distributed evenly. At the same time, it should be noted that physical, esthetic, and social values are more outward oriented.

The analysis of 165 values, collected from the websites of 30 pharmaceutical companies, allows the values to be viewed slightly differently. This study differs from other studies in that it simultaneously analyzes companies from the same market operating not only in one country but also worldwide. This line of research allows the disclosure of data that can be useful to a wide range of countries. The study is completely different from other studies that analyze specific companies operating on a large scale (Edvardsson et al. 2006; Michailova and Minbaeva 2012), companies operating in a particular country (Zhang et al. 2008; Howell et al. 2012), or mixed companies from various sectors (James 2014).

The study is not conducted using separate questionnaire methodologies, such as Rokeach, Schwartz (Van Rekom et al. 2006), but by establishing values are declared to the general public. At the same time, combinations of all the presented values are analyzed, rather than individually selected values, such as ethical (Groves and LaRocca 2011), spiritual (Dehaghi et al. 2012), or economic (van Buuren et al. 2015) values and their relationship to others phenomena—this is one of the main differences between this study and other studies already published.

In addition, another distinctive feature of this study can be observed in that values are divided into certain groups that are rarely used in the study of values. These groups are divided into professional, spiritual, economic, aesthetic, physical, social, and ethical values. This makes it possible to look at the nature of values differently—by dividing them into these groups and applying a secondary distinction, that is, inward-oriented and outward-oriented values. This provides even more information needed for a detailed analysis. Meanwhile, other research in this area often uses differentiation models such as the Schwartz value model (Schwartz 1992), which can divide values into 10 groups and four other subgroups, the Mission-based model of organizational values (Malbašić et al. 2015), which suggests the division of values into four groups and the Quinn and Rohrbaugh competing values framework (CVF model) (Quinn and Rohrbaugh 1983) allowing values to be placed into four groups as well, etc. However, comparing the results of this study with other research, it can be observed that very similar results are obtained when organizational values are more oriented towards the inside of the organization (spiritual, economic) and less

oriented towards the outside of the organization (social, etc.) (James 2014; Malbašić et al. 2015).

5 Conclusions

The highest number of values published in one of the pharmaceutical companies involved in the sample is identified; i.e., eleven values. The lowest identified number of values indicated by pharmaceutical companies is two. Thus, on average, organizations declared more than five values that they follow in their activities (the maximum number of values is 11; the minimum, 2; the average, 5–6 values). The following values were identified as the most commonly named values recorded after analyzing the websites of all investigated pharmaceutical companies: (1) integrity, (2) innovations, (3) respect, (4) quality, (5) community service (6) excellence, (7) ethics, (8) trust, (9) teamwork, and (10) responsibility.

Considering how and what values are declared by pharmaceutical companies, a peculiar triad of professional, economic, and spiritual values can be distinguished. Although the triad is declared to external entities, it is directed to the internal processes of companies. On the other hand, physical, social, and esthetic values, which should be no less important for people working in companies, are more oriented toward external entities, which may be associated with striving to secure their favorable evaluations. In other words, this study shows that a significant share of publicly declared values may show greater concern about solving internal issues rather than genuine concern about customers and the public.

This study proposes a different approach when after highlighting value groups of pharmaceutical companies, attention is drawn to the directions of declared values. This helps to answer questions about which values are oriented to the internal processes of companies and benefits they bring to the organization and which ones to external entities. Such separation can serve, seeking to more precisely highlight value preferences of organizations in the information flow on their web pages.

This study dealt with the values of only the largest pharmaceutical companies operating in the Lithuanian market, whose turnover reaches over 3 million Euros per year. This chapter presents only a part of the results of the study, without highlighting overlapping values; i.e., those values that apply to several groups of values. Besides, the context of the analyzed values, which was highlighted on the websites of some companies, is not presented.

The study could be continued by analyzing the values of all pharmaceutical companies operating in the Lithuanian market, which are published on websites, in order to compare values, their groups, and orientation trends according to the size of companies. It would also make sense to conduct a quantitative study, interviewing the staff of pharmaceutical companies, to find out congruence of personal and organizational values.

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