

DETERMINANTS OF FUTURES PRICE VOLATILITY: A STUDY OF AGRICULTURAL MARKET

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Cite as: Amit, S. (2022). *Determinants of futures prices volatility: A study of agricultural market*, *Ekonomicko-manazerske spektrum*, 16(1), 1-11.

Available at: dx.doi.org/10.26552/ems.2022.1.1-11

Received: 22 February 2022; Received in revised form: 18 March 2022; Accepted: 16 April 2022; Available online: 30 June 2022

Abstract:

Research background: Volatility in agricultural prices is a concern for producers and other stakeholders along the food chain for a developing country like India where a significant percentage of population is directly dependent on agriculture for their livelihoods. Price volatility can have a long run impact on the income of producers as it makes it difficult to plan production for future. It affects economically weaker consumers who spend a major portion of their income on food items. Therefore, it is essential to study the determinants of volatility of agricultural commodities.

Purpose of the article: The objective of the study is to identify the determinants of volatility in the futures market traded at NCDEX.

Methods: Eight agricultural commodities which are traded at NCDEX is selected for the study based on trading volume and open interest. The volatility in the futures prices of the selected commodities were tested for presence heteroscedasticity. The futures price volatility was first estimated using conditional heteroscedasticity models and then regressed with identified variables like time to maturity, volume, open interest, and past volatility.

Findings & Value added: From the results it was observed that for five commodities the relationship between time to maturity and volatility is negative and significant. This means as the contract nears maturity, volatility increases which support the presence of Samuelson hypothesis. Further it was found that there is positive and significant relationship between volume and volatility for all the commodities supporting the mixed distribution hypothesis. The relation between open interest and volatility was negative and significant for all the commodities except for soya oil and turmeric. Past volatility has positive and significant relationship with present day volatility that means if the past volatility is high then it is expected that present volatility will also be high. The findings support in risk management of agricultural commodities

Keywords: Futures market, Volatility, GARCH, Spillover, DCC, MDH

JEL Classification: O13; G32; E44

1. Introduction

Price volatility is one of the most critical and important measures in both theory and practice of finance as it indicates the uncertainty of a financial instrument's distribution of returns over a time period. This measure was described as "central element that influences financial behaviour" by Nobel Laureate Robert C. Merton as it imbibes the fundamental concept of risk. Daly (1999) discussed the ill effects of volatility in a financial market. First, the absence of a concrete explanation of the reasons for price fluctuations might result in erosion of confidence in investments, leading to the erosion of capital. Second, the volatility of the company is a significant factor in determining the probability of bankruptcy, and higher the volatility higher is the risk to default. Third, volatility has a significant influence on bid-ask spread, higher the volatility, the wider is the spread, affecting the liquidity in the markets. Fourth, it affects the risk by increasing uncertainty in the financial markets. Volatility can therefore affect efficient capital allocation by forcing organisations to allocate resources to manage increased volatility. Hence, it is important for investors for risk management, portfolio selection, valuation, and designing trading strategies. For regulators, it is useful to draft policies and reduce uncertainties in the market. Therefore, it is necessary to identify the factors affecting volatility.

Volatility in agricultural prices is a concern for producers and other stakeholders along the food chain for a developing country like India, where a significant percentage of the population is directly dependent on agriculture for their livelihoods. Price volatility can have a long run impact on the income of producers as it makes it difficult to plan production for future. It affects economically weaker consumers who spend a major portion of their income on food items. For a commodity surplus country, this influences national income and for an agricultural commodity deficit country, it influences the budget allocation. This adversely affects developing countries, which do not have adequate mechanisms to reduce or manage risk originating from volatility, which results in an overall welfare loss (Aizeman and Pinto, 2005). There should be a distinction between normal and extreme volatility since price movements may be excessive relative to changes on account of shocks to demand and supply. The Efficient market hypothesis (EMH) states that in an efficient market, all the public information currently available is instantaneously incorporated into the current prices. This means that any new information arriving tomorrow is independent of the price today (Fama, 1969). However, the excess volatility is attributed to stakeholders' psychological behaviour, which can change prices as an outcome of a market wide cognitive process that can only be explained by its thoughts and beliefs about future events (Shiller, 1981).

Although futures markets were established with the objective of price discovery and risk management, they act as a system to transmit information about the future course of action to decide what to produce and how to produce it or how to employ resources. When the price levels on an average are stable or changing at a steady rate, the information is clear and easy to extract for future action, but when the prices are volatile, it becomes hard to extract information or inefficient information is observed, which has an adverse effect on returns of production. A highly volatile price system can undermine economic decision-making, resource allocation, and ultimately the efficiency of the price system. Consequently, measures of volatility must explicitly account for uncertainty (Friedman, 1976). The volatility prevailing in the prices can be natural or artificial in order to gain from price uncertainty. Therefore, an understanding of the nature of volatility is required in order to mitigate its effects in agricultural commodities for a developing country like India.

1.1 Contagion Effect of Spot and Futures Prices:

Contagion is usually correlation between market excess which is implied by economic fundamentals (Bekaert et.al, 2005). This effect results from certain fundamental links that exist amongst the financial markets. When one market suffers shock then it is transferred to other markets like subprime mortgage crisis which originated in United States and consequently spread around the world destabilising the other financial markets. Contagion effect was initially used to study the transfer of shocks and volatility spill-over from one nation to another but later on this effect was studied for closely related variables like industrial output and prices (Lee, 2005), price of energy commodities (Vacha and Barunik; 2012), index returns and stock returns (Kearney and Poti, 2003), portfolio management (Peters, 2008).

Spot prices and futures prices are bounded with lead-lag relation between the two with futures prices performing the function of price discovery. So, when futures market receives a shock then it will be passed on to spot market making subsequent adjustments in the prices of the two. Studying contagion effect between spot prices and futures prices will assist in understanding transfer of shock from one to another. From this one can comprehend the relationship and response of volatility of prices of one commodity to another.

This study provides information for developing nation where the financial market is evolving. The study is novice as the research on volatility of agricultural commodities is minimal with the latest data as the financial market is evolving. The work is original work carried by himself.

2. Literature Review

Studying variables affecting volatility has been a subject matter of extensive research which is influenced by the factors, (i) development of econometric tools to estimate volatility (ii) variables that affect volatility (iii) asset class for which the study is done like exchange rates, futures prices, agricultural prices, index etc. Samuelson (1965) in his seminal paper proposed that “volatility of futures price increases as it approaches maturity” which is known as Samuelson hypothesis or maturity effect. Clark (1973) found that assets’ returns are drawn from joint distribution of volume and prices which are conditional on current information. Hence, price changes (returns) and trading volume are driven by the same information signifying positive relation between them. Later on, these variables were studied formally with modern statistical tools for various commodity futures. Samuelson hypothesis or maturity effect was first examined by Rutledge (1976) by considering volatility as absolute daily price change using linear regression, found the hypothesis to be valid for silver and cocoa but not for wheat and Soy-bean oil futures. Dusak-Miller (1979) computed correlation between volatility and time to maturity and found significant negative relation between the two variables for live cattle futures contracts for the period 1964-1972. Castelino and Francis (1982) found empirical evidence towards maturity effect for Wheat, Corn, Soy-bean, Soy-bean Meal, Soy-bean Oil and Copper Contracts for the period of 1960 to 1971. Volume-Volatility dynamics were studied in a more formal way by Tauchen and Pitts (1983) terming this relationship as Mixed Distribution Hypothesis (MDH) by assuming information arrival rate is independently identically distributed.

Maturity effect was studied by Anderson (1985) using both nonparametric and parametric tests and found it to be present in Oats, Soybean oil, Live cattle, and Cocoa futures but not in wheat, corn, soybean and silver contracts. Chamberlain (1989) found that Samuelson hypothesis was applicable to debt instruments but not for commodities. However, in the

studies of Leistikow (1989), Board and Sutcliffe (1990) and Yang and Brorsen (1993) for stock index futures support for Samuelson hypothesis was weak. Bessembinder and Seguin (1993) studied open interest as proxy for market depth along with time to maturity and volume as factors influencing volatility for currencies, metals, agricultural commodities, financial contracts. Chen et.al (1999) found contradictory results to Samuelson hypothesis and observed decreasing volatility as contract approaches maturity. Walls (1999) who studied maturity effect and volatility volume dynamics together for electricity futures found maturity effect to be present in contracts but no relation between volume and volatility. Allen and Cruickshank (2000) found the hypothesis to be applicable for majority of futures contracts traded at Sydney, London and Singapore futures exchanges. Black and Tonks (2000) used multi-period futures model to test Samuelson hypothesis and found the hypothesis did not hold when the output uncertainty was resolved before maturity. Girma and Mougoue (2002) studied open interest and volume separately as determinants of volatility using GARCH models. They observed that the lagged volume and open interest provide significant explanation for futures volatility. Xin et.al (2003) found that past volatility and trading volume had positive effect while open interest had negative effect on volatility with seasonal effect in the Chinese futures market. Gao and Wang (2005) developed a new framework to study volatility dynamics of commodity futures maturing at different delivery dates. The framework incorporated time-to-delivery, storability, seasonality and conditional volatility effects. The corn futures provided evidence in favour of the theory of storage and the presence of the Samuelson effect. Kenourgios and Ketavatis (2011) in their study on index futures found positive relationship between volatility and volume and negative between volatility, open interest and TTM. Jongadsayakul (2015) studied determinants of silver futures price volatility in Thailand Futures Exchange based on conditional volatility estimates and found no significant relationship between volatility and TTM, negative relationship with volume and positive relationship with open interest. Kadioğlu et.al (2016) in their study on determinants of volatility for currency futures traded at Istanbul exchange found support for maturity effect and mixed distribution hypothesis.

Pati (2006) studied relation between volatility, volume, time to maturity (Samuelson hypothesis) for nifty index futures. He concluded that the Samuelson hypothesis did not hold for futures price volatility but rate of information arrival proxied by volume and open interest were important determinants of volatility. Balcombe (2009) found that volatility in oil prices, exchange rate and stock level and yields influenced agricultural prices. Karali and Thurman (2010) investigated the volatility in grain prices and found it to be significantly influenced by seasonality and time to maturity. Verma and Kumar (2010) studied Samuelson hypothesis for wheat and pepper futures and found the hypothesis to be applicable to majority of contracts. They cited negative co-variance between spot price and net carry cost as the reason for this effect. Past volatility, stock and yield were found to be affecting volatility in a study by Balcombe (2011). Gupta and Rajib (2012) tested Samuelson hypothesis with trading volume and open interest for commodities traded at MCX and failed to find support in favour of the hypothesis for majority of contracts. They found that volatility was influenced by trading volume but there were other factors which influenced volatility other than time to maturity and volume. Chauhan et.al (2013) found volatility spillover effect from spot price to futures price for Chana and Guar seeds futures. Taskin and Kapucugil-ikiz (2013) investigated determinants of volatility for currency futures and found time to maturity, trading volume and open interest influenced the volatility of the contracts. Regardless of the definition of volatility there is ample empirical evidence that the volatility of time series keeps fluctuating.

Sekhar et al (2018) studied the agricultural commodity price volatility in relation to the inflation for the Indian market. The volatility- inflation dynamics shows that the commodities with higher elasticity demand and lack of storage capacity have high volatility in their prices. Vu et al (2020) studied the volatility spill over effect between the oil and agricultural prices. The panel data analysis shows that bio fuel production and exchange rate affects the agricultural prices. Bouri et al (2021) studied the volatility among the fifteen agricultural commodities. The results supported strong to moderate level of volatility between the energy and agricultural commodities. Moderate connectedness between agricultural commodities. They argued macroeconomic variables to affect the volatility interconnectedness. Maréchal (2021) rejects Samuelson hypothesis but supports the theory of storage for study on the agricultural commodities.

The review of literature indicates number of studies on financial futures but limited studies on commodity futures.

3. Methodology

3.1 Data and Series formation

The study considers the most liquid eight agricultural commodities being traded at NCDEX. The selected commodities are Barley, Chana, Coriander, Jeera, Gur, Soyabean, Soya Oil and Turmeric. The source of data is the NCDEX website which is the warehouse of the data. The variables which are considered are daily closing spot prices, futures prices, trading volume and open interest of selected commodities for the time period of financial year 2009-10 to financial year 2014-15. In the futures market more than traded at the same time, there is issue of overlapping of the data. To avoid this issue pooling of the data is done where the futures prices closer to expiration date will provide better estimate for future spot prices is taken as it considers more information.

3.2 Statistical techniques:

This study considers conditional volatility to estimate the historical volatility. The main advantages of conditional volatility are that it can estimate volatility clustering wherein large changes tend to be followed by large changes and small changes tend to be followed by small changes (Mandelbrot; 1963). This method is proposed by Engle and Bollerslev (1986). It is a measure of historical volatility which is estimated as conditional variance of residuals. In time series analysis the variance of error terms is not constant which is violation of the assumption of Classical Linear Regression Model (CLRM). In such situations conditional volatility is used to estimate the various parameters. The acronym ARCH stands for Auto Regressive Conditional Heteroscedasticity wherein the term "heteroscedasticity" refers to changing volatility. However, it is not the variance itself which changes with time according to an ARCH model; rather, it is the change in the conditional variances. The ARCH (q) model for the series is defined by specifying the conditional distribution of error terms given the information available up to time $t-1$. It consists of the knowledge of all the available values of the series and anything which can be computed from these values like innovations. In principle, it may even include the knowledge of the values of other related time series and anything else which might be useful for forecasting and available by time $t-1$.

Development of conditional heteroskedastic models by Engle (1982) captures the time varying volatility which is a common feature of commodity futures. As per autoregressive conditional heteroskedasticity (ARCH) conditional volatility is simple quadratic function of the lagged values of the innovations.

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 \quad (1)$$

Where $\varepsilon_t = \sigma_t z_t$ and z_t is i.i.d random variable with zero mean and constant variance.

This ARCH model was extended by Bollerslev (1986) to overcome the requirement of many parameters and higher order q . A general GARCH model is

$$h_t = \omega + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^p \beta_j h_{t-j} \quad (2)$$

Where ω is mean ε_{t-1}^2 is the news about volatility from the previous period measured as lag of the squared residual (ARCH term) and h_{t-j} is past period estimated variance.

These models were further modified to capture the informational asymmetry and leverage effect. Asymmetric GARCH models are applicable to understand the informational asymmetry and leverage effect where a positive shock has less effect on the conditional variance compared to a negative shock. This was introduced by Glosten et.al (1993), they showed that asymmetric adjustment was an important consideration with asset prices. The model is of the form

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta \sigma_{t-1}^2 + \lambda u_{t-1}^2 I_{t-1} \quad (3)$$

Where, I is a dummy variable that takes the value of 1 when the shock is less than 0 (negative) and 0 otherwise.

The exponential GARCH (EGARCH) was developed by Nelson (1991), the model was given as

$$\log \sigma_t^2 = \omega + \beta \log \sigma_{t-1}^2 + a \left| \frac{\varepsilon_{t-1}}{\sigma_{t-1}} \right| + \gamma \frac{\varepsilon_{t-1}}{\sigma_{t-1}} \quad (4)$$

The logarithmic form of the conditional variance implies that the leverage effect is exponential and forecasts of the variance are non-negative. The presence of leverage effects can be tested by the hypothesis that $\gamma > 0$. If $\gamma \neq 0$, the impact is asymmetric.

APGARCH model was developed by Ding (1993). This specification introduces asymmetric effects in the transitory equation which is given by

$$\begin{aligned} R_t &= x_t \pi + \varepsilon_t \\ q_t &= \omega + \alpha(q_{t-1} - \omega) + \gamma(\varepsilon_{t-1}^2 - \sigma_{t-1}^2) + \theta_1 z_{1t} \\ \sigma_t^2 - q_t &= \beta(\varepsilon_{t-1}^2 - q_{t-1}) + \beta_1(\varepsilon_{t-1}^2 - q_{t-1})d_{t-1} + \beta_2(\sigma_{t-1}^2 - q_{t-1}) + \theta_2 z_{2t} \end{aligned} \quad (5)$$

Where, z_{1t} and z_{2t} are the exogenous variables and d is the dummy variable indicating negative shocks. $\beta_1 > 0$, which implies transitory leverage effects in the conditional variance.

4. Result and Discussion

Adopting the methodology of Johnson (1998) and Allen and Cruishank (2002) the nearest contract to maturity was included to study volatility determinants. Conditional volatility requires heteroskedasticity or ARCH effect to be present in the data. ARCH-LM test is used to examine the presence of conditional heteroskedasticity. For conditional volatility modelling, it is necessary to estimate exact lags in the mean equation and order of ARCH (p)

and GARCH (q). The residuals should not exhibit serial correlation, conditional heteroscedasticity and non-linear dependence.

4.1 Conditional Volatility model

The model selection criteria for a variety of GARCH (p, q) for futures prices of Commodities are given in table 1. The conditional volatility model has been selected based on the Akaike Information Criteria (AIC). The selected model of the commodities are presented in the table below (Table 1).

Table 1: AIC values of the selected conditional volatility model (authors calculation)

Barley	AR (1)-EGARCH (1,1)	8.93
Chana	EGARCH (1,0)	10.43
coriander	EGARCH (2,2)	12.3
Gur	EGARCH (2,2)	8.3
Jeera	AR (1) EGARCH (1,1)	
Soya bean	EGARCH (2,1)	6.64
Soy oil	EGARCH (2,2)	13.63
Turmeric	EGARCH (2,1)	13.46

Source: Processed by author

4.2 Summary Statistics of Volatility

Table 2: Summary statistics of estimated volatility (Source: author's calculation)

	Volatility- Barley	Volatility- Chana	Volatility- coriander	Volatility- Jeera	Volatility- Gur	Volatility- Soyabean	Volatility- Soya oil	Volatility- Turmeric
Mean	481.31	2388.27	27448.13	303.21	2309.75	45.20	76342.92	46910.20
Median	411.4	1889.39	11160.22	267.92	2202.45	44.61	39838.37	40287.08
Max	23016.3	7898.06	1594640.00	6435.15	16742.10	231.68	412539.20	163256.60
Min	238.51	501.95	1439.42	42.81	2047.71	25.73	4910.90	9748.77
Std. Dev.	609.56	1485.91	69099.59	297.60	537.08	8.42	84159.62	25527.16
Skewness	31.19	1.09	13.88	10.47	17.87	8.07	1.94	1.15
Kurtosis	1125.64	3.41	259.64	169.29	437.30	154.83	6.11	4.10
Jarque-Bera	88.33	4110.21	4445222.00	1927782.00	1340.94	164.66	1283.70	436.51
p-value	0	3.80E-09	0.000	0.000	0.000	0.000	0.000	0.000

Source: Processed by author

Table 2 reports the descriptive statistics of open interest, volume and conditional volatility estimated by selected model. Volatility for barley futures has high range with minimum volatility of 238.51 and maximum of 23016.33 for the period. It is highly leptokurtic and positively skewed. Volatility for Chana futures has high range with minimum volatility of 501.95 and a maximum of 7898.06. The series is highly leptokurtic with positive skewness. Volatility for coriander futures has high range with minimum volatility of 1439.4 and maximum of 1594640.00 which is highly leptokurtic with positive skewness. Volatility for

Gur futures has high range with minimum volatility of be 42.80 and maximum of 303.20 units. It is highly leptokurtic with positive skewness. Volatility for Soya oil futures has high range with minimum volatility of 4911.00 and a maximum of 412539.20 units. Volatility for soya bean futures has high range with minimum volatility of 25.73 and a maximum of 231.68 units for the period. Volatility for turmeric futures has high range with minimum volatility of 9748.77 and a maximum of 163256.6 units. All the variables are non-normal as per Jarque-Bera statistics rejecting the null hypothesis of normality ($p = 0.00$).

Table 3: Results of the multiple regression (source: authors calculation)

	coeff.- (Barley)	coeff.- (Chana)	coeff. - (Coriander)	coeff.- (Jeera)	coeff.- (Gur)	coeff.- (Soyabean)	coeff.- (Soya oil)	coeff.- (Turmeric)
intercept	213.53** (105.10)	45.15 (60.54)	-894.02 (666)	3006.06*** (189.60)	47.85 (59.34)	0.36 (2.89)	-0.378 (2.89)	808.96 (2.89)
TTM	3.17*** (0.83)	4.60*** (0.97)	205.98** (16.37)	- 12.48*** (2.59)	- 1.87* (1.10)	- 0.03* (0.02)	- 136.06* (0.02)	- 45.47* (30.17)
log Volume	41.47*** (13.39)	50.01*** (8.35)	2920.98*** (116.28)	81.21 *** (17.08)	42.98 *** (10.03)	0.63 *** (0.212)	1314.70** (553)	447.85** (422.2)
open Interest	28.55* (17.17)	55.09* (9.43)	2202.62* (151.37)	152.35*** (22.35)	21.03** (10.71)	- 0.59* (0.344)	- 44.70* (60.5)	- 294.57* (349.2)
Vol (-1)	0.33*** (0.02)	0.98*** (0.00)	0.82*** (0.01)	0.01 *** (0.02)	0.23*** (0.02)	-0.98*** (0.004)	-0.970*** (0.00)	-0.96*** (0.008)

Source: Processed by author

Samuelson (1965) proposed that futures price volatility will increase as the futures contract maturity date approaches. He further asserted that a stock's price is a set of discounted value of future dividends, generated by stochastic process. The futures price fluctuation is martingale process, as the contract approaches maturity there is little information about the future spot price of the commodity or future weather conditions which result in more transactions and price fluctuations as current market price must converge to the spot price. The findings of this study provide evidence in support this hypothesis.

The positive relationship between volume and volatility can be attributed to sequential arrival of information which supports a dynamic relationship wherein past volume provides information on current absolute returns changes and past absolute returns change contains information on current volume (McMillan and Speight, 2002). As per MDH positive relationship between volume and volatility can be explained through information innovation. Tauchen & Pitts (1973) explains that returns are generated by combination of distribution and information arrival. This combination of the two causes momentum in the squared residuals of the daily returns and autoregressive nature of conditional volatility. Since information arrival cannot be observed, trading volume is considered as a proxy to information flow in the market. Any unexpected information affects both trading volume and volatility contemporaneously. Therefore, it is expected to have positive relationship between volatility and volume. In general, both sequential arrival hypothesis and MDH support positive and contemporaneous relationship between volume and volatility. The findings of this study support the theoretical positive relation between volume and volatility. Volume is a determinant of futures price volatility for all the commodities under this study similar to the findings of Balcombe (2009); Asche et.al. (2016)

Open interest is the number of unsettled contracts at the end of the day. It is considered as proxy for market depth as it reflects the willingness of traders to risk their capital in futures market. A high level of open interest creates a situation that reduces pressure from prices

where trading provides new information, so theoretically relation between open interest and volatility should be negative. This relation is supported by the findings of this study wherein all the commodities under study have statistically significant negative relation with volatility. Open interest is a determinant of futures price volatility for all the commodities under this study similar to the findings of Allen and Cruickshank (2000).

5. Conclusion

There have been considerable efforts on understanding the price dynamics of storable commodities. The relationship between prices and the fundamentals of demand and supply remains a challenge for policy analysts and market participants. The volatility in agricultural commodity prices is a major concern for the welfare of the farmers who are highly vulnerable and face long term disruptive consequences even on account of short-term crop price fluctuations. It has been observed that irrational speculative-driven bubbles create price volatility in futures market that affects spot prices.

Determinants of futures price volatility are studied for eight selected agricultural commodities, namely, Barley, Chana, Coriander, Gur, Jeera, Soyabean, Soya oil and Turmeric. The price series are non-stationary and do not have trend unlike Buccola (1989) who observed a trend in agricultural prices. The returns on the prices are stationary and show presence of heteroscedasticity that is estimated with GARCH (p, q) and EGARCH (p, q) models with different combinations of p and q. To select the appropriate conditional heteroscedasticity model AIC values have been considered. The estimated values indicate presence of leverage effect in the volatility of all the commodities under the study. Hence, volatility is asymmetric for all the commodities wherein the magnitude of impact of negative news on volatility is higher than impact of positive news, further it shows clustering effect in all the commodities.

Regression method has been used to study the relationship between volatility and time to maturity, trading volume and open interest and the results support the theoretical relationship. It is found that volatility has negative relationship with time to maturity and open interest supporting Samuelson hypothesis or maturity effect. The positive relationship between volatility and volume as explained by MDH is applicable to all the commodities under study. The future volatility is higher than current volatility except for turmeric. The findings of the study show that the risk in Indian commodity futures market is inherent and not subject to manipulations considering open interest, volume and time to maturity.

Author contributions: The author listed has made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The author declares no conflict of interest.

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CAPITAL STRUCTURE THEORIES: REVIEW OF LITERATURE

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Cite as: Cerkovskis, E., Gajdosikova, D., Ciurlau, C.F. (2022). Capital structure theories: Review of literature, *Ekonomicko-manazerske spektrum*, 16(1), 12-24.

Available at: dx.doi.org/10.26552/ems.2022.1.12-24

Received: 12 April 2022; Received in revised form: 17 May 2022; Accepted: 31 May 2022; Available online: 30 June 2022

Abstract:

Research background: Capital structure is a broad topic in the field of financial management of a company, which describes the composition of sources of financing for a particular enterprise. This issue has not been given much importance in the past. However, financial theorists have begun to address this topic due to the modernization of the financial system and efforts to make the business more efficient.

Purpose of the article: The main focus was on financial resources that the enterprise chooses to finance its business activities. The theories of the capital structure began to develop during this historical development, and their main essence is to capture the relationship between the structure of liabilities and the enterprise value. In 1958, there was a principal breakthrough in this area, as Miller and Modigliani published timeless work for the time. In this publication, the authors set out the basic assumptions and statements that shaped one of the first capital structure theories.

Methods: Many authors were inspired by Miller and Modigliani publication in creating new theories because these two authors introduced the idea of the independence of the capital structure. The long-term enterprise survival is conditioned by its ability to generate profit. The question is how important the liability structure itself is in achieving this goal.

Findings & Value added: The capital structure and decision-making in corporate financing are essential for the operation of an enterprise. The principal aim of this review paper is to explain and clarify the basic definition of the term "capital structure" and, subsequently, to evaluate the historical development of capital structure theories.

Keywords: capital structure; capital structure theories; literature review

JEL Classification: G32; L25; O16

1. Introduction

The financing sources of the enterprise affect the structure of its balance sheet. The balance sheet on its right side shows the structure and state of liabilities and shareholders' equity (Shygun et al., 2020). The capital structure theories solve how many resources an enterprise

should borrow and how many resources its owners should invest in the business. The issue of capital structure optimization is one of the most discussed issues in the theory of corporate finance, to which modern corporate finance theory has not yet found a convincing answer (Michalkova et al., 2021). The development of views on the optimization of the financial structure has led to a number of theoretical concepts that differ in methodological approaches to the evaluation of individual theories, despite it is necessary to proceed from changes in institutional conditions of economic processes that significantly affect the explanatory power of specific approaches (Kucera et al., 2021). The traditional optimization criterion of minimizing the cost of capital is gradually being abandoned (Ranosz, 2017), and a new unconventional view of the equity and debt structure is coming to the fore (Ayala and Blazsek, 2021; Mouandat, 2022). Financial managers should know the theoretical approaches together with their practical modifications to the creation of the capital structure and to apply them creatively to the conditions of their own company (Kumar and Bindu, 2021). According to Bensoussan et al. (2021), the primary objective of financial decision-making is to select a structure or to find a combination of equity and debt that is most reliable for investors and simultaneously maximizes the market value of the enterprise.

In a market economy, the optimal capital structure is not only one of the principal areas but one of the most complex tasks of financial management (Paun and Pinzaru, 2021). In deciding on the optimization of the capital structure, the financial manager should, in addition to theoretical approaches and models and their practical modifications, take into account and respect several other factors that result from the generalization of empirical capital structure research.

The principal aim of this review paper is to explain and clarify the basic definition of the term "capital structure" and, subsequently, to evaluate the historical development of capital structure theories.

2. Theoretical Background

In the professional literature, it is possible to encounter a double view of the description of the terms financial and capital structure. Some authors identify these concepts of financial and capital structure, and others, on the contrary, distinguish these two key concepts. Sierpinska (2021) states that the capital structure represents the structure of the resources from which the undertaking's assets arose. As reported by author, it indicates the capital structure from which the property is financed (Bukalska, 2019). According to this definition, the capital structure includes all liabilities shown on the right side of the balance sheet, and the concept of the capital structure is equal to the financial structure. Karanovic et al. (2020), in turn, refers to capital structure as the structure of resources from which are financed not only fixed assets but the fixed part of current assets. This definition therefore refers to a capital structure, a structure composed exclusively of the long-term financial resources of an enterprise. According to the authors, the term capital structure is a subset of the term financial structure, which also includes short-term financial resources of the enterprise (Dufour et al., 2018). In the international literature, Gupta et al. (2020) define capital structure as a combination of different securities and do not include, for example, retained earnings and various types of loans, thus totally ignoring resources other than the securities issued. The authors state that the financial structure has a broader scope than the capital structure. It thus includes not only the long-term capital of the enterprise, but also short-term loans (Nicolas, 2021), whose main task is to cover short-term needs and bridge the temporary shortage of means of payment. The capital structure is needed to finance the assets located in the enterprise. The decision on the appropriate ratio between

equity and debt depends on a several factors. Unfortunately, empirical research in this area lags behind theoretical knowledge because financial analysis is based on abstract concepts that are not directly observable (Kruk, 2021). Each enterprise moves in a different environment and has various competition. Thus, the resulting capital structure is influenced by income diversity (Gregova et al., 2021), expected growth, firm size (Thakolwiroj and Sithipolvanichgul, 2021) and the classification of the industry in which it operates (Nguyen et al., 2021).

Every enterprise should use just as much capital as is necessary and optimal for its efficient business operation. If the business unit operating in the market has a higher capital ratio than it can efficiently use, the enterprise is overcapitalized. This situation occurs when the ratio of shareholders' funds and non-current liabilities to fixed assets is higher than 1, and part of current assets is financed by equity. On the other hand, an enterprise may have less capital than its efficient operation requires, and this can cause problems for the business. Undercapitalization occurs when the ratio of shareholders' funds and non-current liabilities to fixed assets is lower than 1. In this case, the fixed assets are financed by shareholders funds and non-current liabilities, and the enterprise becomes insolvent (Foulis et al., 2019).

The ratio between equity and debt depends mainly on the industry in which the enterprise operates (Batrancea, 2021), the structure of the assets (Quintella and Coelho, 2021), the interest rate of banks (Saif-Alyousfi et al., 2020), and other factors. It is not possible to determine clearly whether it is better to use equity or debt to finance a particular business activity. The question of capital structure and the choice of the appropriate method of financing is an issue that enterprises are constantly dealing with. In general, the use of foreign capital increases the return on equity if the interest rate is lower than the profit of the enterprise. This effect of foreign capital is referred to as financial leverage. However, with the involvement of foreign capital, its risk also increases (Akhtar et al., 2021). The question of determining the optimal capital structure of the enterprise, hence, becomes very important. In the 20th century, the authors of financial management gradually developed several theories of capital structure optimization. Appropriate models of capital structures have been the subject of research for decades. In historical financial ideology, several capital structure theories have gradually developed, while these are variously accepted in the academic, professional sphere, and in practice.

An enterprise has to decide the proportion in which it should have its finance and outsider's finance, particularly debt finance. Based on the ratio of finance, the weighted average cost of capital (WACC) and firm value are affected. There are four capital structure theories: net income approach, net operating income approach, traditional approach, and M&M approach.

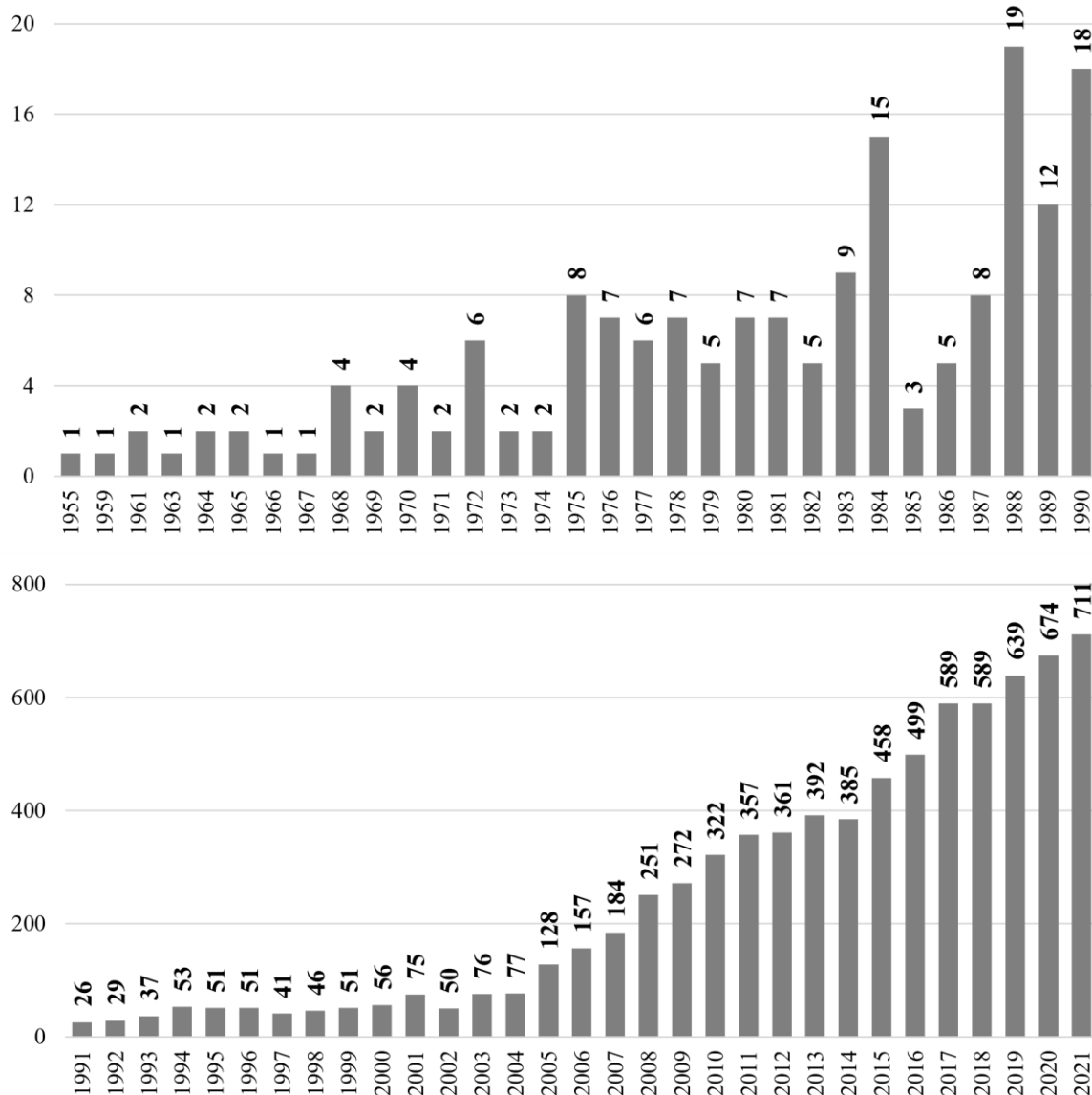
At present, many capital structure theories speak to its details, i.e. what capital composition an enterprise must have, assuming the existence of an optimal capital structure (Myers, 1984), as well as whether taxes influence the choice of an appropriate capital structure (Durand, 1952, 1959; Modigliani and Miller, 1958, 1963; Friedman, 1962, 1970), whether the risk of possible bankruptcy affects the capital structure (Baxter, 1967; Kraus & Litzenberger, 1973; Jensen, 1986), as affected by asymmetric information (Mandelbrot, 1963; Samuelson, 1965; Fama, 1970), or who implements the decision to use equity or debt financing (Donaldson, 1961; Ross, 1977; Myers and Majluf, 1984).

3. Methodology

As the main idea of the paper is the research of the literature, standard scientific methods such as excerpt, abstraction, analysis, synthesis, induction, and deduction were used, working with secondary data sources including available literature sources.

The theory of capital structure plays an important role in the internal processes of enterprises, especially in the context of its financial performance, risk management assessment as well as many other processes evaluating the corporate value. The interest of researchers and academicians in this issues has been unceasing which is declared in the following figure (Fig. 1).

Figure 1. Annual growth of documents related to the issue of capital structure in the period 1955-2021



Source: own processing based on data in the scientific database Web of Science

Capital structure refers to the specific mix of debt and equity used to finance corporate assets and operations. From a corporate perspective, equity represents a more expensive, permanent source of capital with greater financial flexibility. Debt, on the other hand, represents a cheaper, finite-to-maturity capital source that legally obligates the company to fixed, promised cash outflows with the need to refinance at some future date at an unknown cost. A corporate capital structure is the result of such financing decisions that may be guided by capital structure policies or targets set by management and the board to set an optimal mix of debt and equity - this can be achieved by an application of different capital structure theories, which are revealed based on the analysis of relevant literature sources and documents.

4. Results and Discussion

Net Income (NI) Theory

In the past, Durand (1952) was one of the first authors who describe the capital structure and its impact on the firm value. According to the NI theory, the change in capital structure is reflected in the enterprise value. In support of this claim, the indebtedness of the enterprise increases as the weighted average cost of capital decreases. The result is an increase in the enterprise value. Therefore, the capital structure is optimal when the weighted average cost of capital is minimal.

The NI theory is based on the following assumptions: (i) there is no taxation of profits, (ii) does not take into account transaction costs associated with the issue of shares or the acquisition of foreign capital, (iii) the entire profit is divided into dividends, (iv) earnings before interest and taxes does not change in individual periods and does not change even with a change in the capital structure, (v) the distribution of the probability of expected returns is the same for all investors, (vi) shareholders demand a constant percentage of the return on their capital, and creditors similarly demand the same interest rate regardless of the enterprise capital structure.

This theory has a relatively absurd result: a capital structure with 100% foreign capital is the most appropriate because the cost of debt is lower than the cost of equity, and, therefore, the weighted average cost of capital will decrease as the share of debt in the capital structure increases. This capital structure theory ignores tax shield effects and transaction costs. The NI approach is relevant for deciding on the appropriate combination of equity and debt. The decision on the suitable capital structure thus affects not only the weighted average cost of capital of the enterprise but the value itself (Chen, 2021).

Net Operating Income (NOI) Theory

A few years later, the proposal of the NOI theory to capital formation was republished by Durand (1959), which, however, differs diametrically from the NI theory. This theory suggests that a change in the value of a debt or in its leverage does not affect the overall enterprise value. Based on this theory, the weighted average cost of capital and the firm value are independent of an appropriate equity and debt financing combination.

The NOI theory is based on the following assumptions: (i) there are no corporate income taxes, (ii) debt costs remain constant at all levels of debt, (iii) total debt costs remain constant, (iv) the value of the enterprise depends on the expected net operating income and the overall capitalization rate, (v) weighted average cost of capital and the net operating income of the enterprise are not affected by the degree of leverage, (vi) operational and business risk is constant when changing the combination of equity and debt.

According to this theory, the cost of debt, the enterprise value, and the market value of the shares are constant regardless of the financial leverage modification. The advantage of low debt costs is offset by the increased rate of return on equity with the increase in debt in the capital structure. As the weighted average cost of capital is constant at any level of debt, the capital structure is thus optimal for any combination of equity and debt. Under these circumstances, the optimum level of a capital structure composed of equity and debt composition becomes indeterminate because the impact of financial leverage is counter balanced by a corresponding change in the cost of equity in the opposite direction (Kling et al., 2021).

Traditional Theory

Four years later, Solomon (1963) proposed and published a traditional theory that is a compromise between the NI theory and the NOI theory, and rejects both extreme prepositions of relevance theory of NI theory and the irrelevance theory of NOI theory.

According to this approach, an enterprise can borrow at the lower interest rate until creditors consider the debt ratio as increasing their risk. Consequently, they are willing to lend only at a higher interest rate, and so the average interest rate that an enterprise pays for foreign capital begins to rise. Even the shareholders do not attend to this issue to a certain extent. If they start to feel the risk to their debt, they require an increase in its return as compensation, and the equity costs rise. As a result, to a certain proportion of foreign capital, the weighted average cost of capital of the enterprise decreases and then begins to increase. Under these assumptions, it is possible to determine the optimal capital structure at the point where the weighted average cost of capital is minimal. At this point, the optimal enterprise value is achieved (Navas, 2021).

In the past, the question was how the cost of financial distress could affect the optimal capital structure. Some theorists have not mentioned the cost of financial distress in their publications, and this has led to the misconception that enterprises should be in debt as much as possible. However, experience has shown that these costs significantly affect the cost of the debt and, therefore, the weighted average cost of capital. The optimal capital structure is described in terms of maximizing market value (Bank et al., 2020).

Modigliani and Miller (MM) Theory

The initial concept of the best known and most debated model, known as the MM model, dates from 1958. The MM model is considered a fundamental element of economic theory that forms the basis of modern thinking about capital structure. The authors of this theory are Modigliani and Miller (1958).

Brusov et al. (2021) state in their publication that the MM model is based on the following assumptions: (i) the capital market is perfect, (ii) the information is free of charge and available to all investors, (iii) does not take into account transaction costs, (iv) investors behave rationally, (v) all current and future investors expect the same future profits of the enterprise (characterized by homogeneous expectations of future profits and their riskiness), (vi) enterprises are financed only by shares and bonds, (vii) the corporate debt is not risky, and the interest rate is also considered risk-free (from this point of view, it is not examined how much foreign capital the enterprise uses), (viii) the costs of financial difficulties are not taken into account, (ix) profit taxation is not taken into account (the benefit of the tax shield does not apply), (x) net income (profit and interest) does not change in individual periods, and the probable yield is the same for all investors in the given profit class, (xi) the possibility of obtaining a loan and the conditions for obtaining it are the same for all capital market entities (for enterprises as well as for individuals).

MM proposition I (without taxes)

Johnstone and Tulig (2021) present the basic principle of this model, which is statement I: under certain assumptions, the total cost of corporate capital, and thus the market value of the enterprise, is independent of the capital structure and depend solely on the return on total capital. This statement summarizes that the enterprise value is determined by corporate assets in the balance sheet, but not by the ratio between equity and debt. In fact, if there are two cash flows (A and B) in an enterprise, with flows from equity (stocks) and debt (bonds), then mathematically, the present value of the sum of those cash flows $A + B$ it must be equal to the

present value of the cash flow from equity A (issued stocks) plus the present value of the cash flow from foreign capital B (issued bonds).

MM proposition II (without taxes)

Qi and Xie (2016) mention the statement II: the expected rate of return on the common stock equals to the realization rate of return of the class plus premium (derived from the financial risk), which equals to the ratio of debt-to-equity multiplied by the difference between the realization rate of return of the class and the interest rate of the debt. In simple terms, the requests of shareholders for a higher return on their capital do not appear suddenly with the increasing share of foreign capital but grow gradually. However, the interest rate on foreign capital increases from a certain level of indebtedness. The growing demands of shareholders outweigh the financial benefits of the increasing share of foreign capital, although the average costs to raise and tie up capital remain the same in any capital structure.

From the above, it is clear that in the risk debt, the rate of return on equity is growing more slowly, as the expected return is becoming less and less sensitive to further debt increases. On the contrary, a gradual increase in the rate of return on foreign capital can be observed. The reason is the gradual assumption of business risk by creditors, i.e. the more an enterprise borrows, the more risk is transferred from shareholders to creditors.

The authors interpret the following: the expected return on equity in an enterprise with foreign capital increases in direct proportion to the ratio of foreign capital to equity expressed in market values.

MM proposition I (with taxes)

In 1963, the authors of the model published a correction in which they recognized the impact of income taxation on the weighted average cost of capital and the market value of the business. According to this correction, with increasing indebtedness, the weighted average cost of capital decreases due to the effect of the interest tax shield. Consequently, not only the return on equity but the enterprise value increases, and therefore the enterprise should increase the share of debt in its capital structure. However, this does not mean that the enterprise should maximize the amount of its debt at all costs, as in some circumstances other financing forms may be cheaper. The authors considered the impact of personal income tax, increased requests of creditors, and the costs that are realistically associated with the business operation in the market and which cannot be included in the static equilibrium model.

Li et al. (2021) state that due to the repetition of the interest tax shield every year, its value can be determined by capitalization. The newly capitalized tax shield increases the market value of an enterprise that uses foreign resources.

MM proposition II (with taxes)

From the previous proposition, the enterprise should use the highest possible share of foreign resources because the present value of the tax shield is maximized as well as the enterprise value. However, financial practice has not accepted this model correction because it does not consider another crucial factor, the cost of financial difficulties. In 1976, Miller decided to include individual taxes in the model in addition to corporate taxes. Following the introduction of personal taxes, the aim of an enterprise is to choose a capital structure that maximizes the overall after-tax income and thus minimizes the overall taxation not only of the enterprise but of individuals (Elkhal, 2019).

Trade-off Theory

The trade-off theory, written by Brealey and Stewart, combines the best of MM and Miller's model with market conditions. While the MM model is considered the highest indebtedness of an enterprise optimal, according to Miller's model, the optimal indebtedness is achieved when the debtor's benefits are equal to the personal tax expense of the marginal creditor. The trade-off theory realizes this assumption because it argues that the tax savings from the tax shield are uncertain. According to this theory, only a few enterprises operating in the market can be sure that they will report accounting, i.e. taxable profit. If an enterprise recognizes a loss, its interest tax shield cannot be used in a given year but only in subsequent tax periods when it makes a taxable profit.

The authors of the trade-off theory took into account not only the impact of taxes but the costs of the financial difficulties of a possible bankruptcy. They define an optimal capital structure as a compromise between the benefits of an interest tax shield and the cost of financial distress. This theory accepts the validity of individual differences between firms in the level of indebtedness and admits that firms should have as much debt as they can handle.

Sanfilippo-Azofra et al. (2016) state that the costs of financial difficulties are caused mainly by the high level of indebtedness. The costs of financial distress consist of direct costs (include various fees for lawyers and experts that a company has to pay if it goes bankrupt) and indirect costs (include expenses that result from the complexity of managing a failing enterprise).

The optimal capital structure is determined by the relationship between tax benefits and the cost of financial difficulties. As debt grows, the present value of the interest tax shield grows. With moderate indebtedness, the probability of financial distress is negligible, and the benefits of the interest tax shield prevail. However, at some point in debt, the probability of financial difficulties increases rapidly, and the cost of financial distress begins to reduce a substantial part of the enterprise value. The theoretical optimum is reached by the enterprise when the present value of tax savings from additional debt is offset by an increase in the present value of the cost of financial difficulties.

The quantification of direct and indirect costs of financial difficulties caused by the high corporate indebtedness was discussed by Altman (1984), who estimated through detailed analyses that these costs in industrial business units in the USA range from 12-17% on average. Weiss (1990), who in his empirical study of 37 enterprises that went bankrupt between 1979 and 1986, also summarized, that the average costs of bankruptcy accounted for 3% of the total book value of the assets of the enterprise and 20% of the market value shares in the last year before the bankruptcy. Other authors, Levy and Sarnat (1970), gave a specific example for calculating the impact of financial difficulties on the enterprise value. They assumed that the enterprise had the opportunity to insure against bankruptcy and subsequently identified the annual premium with the costs of financial distress.

Flor (2011) states that the trade-off theory of capital structure can be extended by costs arising from conflicts of interest, i.e. agency costs incurred between managers, owners and creditors. In connection with the decision on the optimal capital structure with significant two types of agency costs: agency costs of equity, which are the result of conflicting interests of managers and owners of the enterprise, and agency costs of debt resulting from conflicting interests between owners and creditors and between managers and creditors.

Lin and Chang (2011) state that the optimal capital structure is in terms of agency costs for equity and agency costs for the debt at the point where the agency costs per additional debt unit equal the agency costs per equity unit.

Signaling Theory

Signaling theory is based on information asymmetry and thus expresses the belief that information about the financial health of an enterprise is not available to all market participants at the same time. In 1977, the signaling theory was developed by Ross (1977), and the author hypothesized that leverage might be affected by a positive sign of an increase in debt, which may lead to future business profits. Managers are trying to send investors a positive signal about the enterprise by adopting a capital structure with a high share of the debt. Only a prosperous enterprise can afford a higher debt in its capital structure. Investor interest will subsequently increase the prices of corporate shares. On the other hand, the additional issue of shares is a negative signal for investors. According to the author of this theory, the manager maximizes the return on incentives by choosing a financial package that would be a compromise between the current value of the broadcast market signal and the stimulating consequences. The enterprise value will increase with increasing indebtedness unless this growing indebtedness ceases to increase the market's perception of the firm value.

Market Efficiency Theory

The idea that financial market returns are difficult to predict dates back to Mandelbrot (1963) and Samuelson (1965), but above all, it is closely linked to Fama (1970), in part because of his influential review of theoretical and empirical research in the 1970s. The market efficiency theory offers a completely different view of exchange rate movements. According to this theory, it is unnecessary to analyze enterprises, securities, prices, trading volumes, stock audiences, or other factors to determine future price developments because stock prices perform random movements according to this hypothesis. For this reason, financial economics recognizes this approach as well as the theory of random walks. The market efficiency theory further argues that it is not possible to achieve above-average profits in the market after adjusting for risk. Above-average profits represent higher profits adjusted for risk and transaction costs. If an enterprise achieves these above-average results, it is probably due to the use of non-public information. According to the theory, the price of each financial instrument (stock, bond, derivative, etc.) fully reflects all available relevant information, i.e. the financial market is efficient in terms of relevant information. It is not possible to find incorrectly valued financial instruments on the market. Conversely, if this situation occurs, the reason for the price change is only new information because stock prices change randomly, and stock returns are random. The market efficiency theory is the opposite of theories based on symmetric information. The efficient market hypothesis provides crucial logic for modern risk-based asset pricing theories and frameworks for how consumer-based asset valuation and consumer asset valuation can be considered a combination of the risk model with this hypothesis. Pandya (2014) states that the market efficiency theory is often considered only an academic theory, especially by fundamental and technical analysis, which often contradicts the conclusions of these analyses and tries to rationally explain the behavior of market participants and thus price movements. At the same time, it currently solves many unclear capital market problems and shows the path that the market should take.

Pecking Order Theory

Pecking order theory was first suggested by Donaldson (1961), who was the first to find that an enterprise favors internal funds as a source of capital investment. In 1984, this theory was modified by Myers and Majluf (1984), and authors suggested that the use of internal funds to finance business be preferred to external ones due to the emergence of information asymmetry.

This term expresses the inequality between the knowledge of external investors and the knowledge of managers who have far more information about the economic situation of the enterprise. Pecking order theory is based on the following assumptions: (i) inflexible dividend policy, (ii) preference for internal sources of financing, (iii) aversion to the issuance of shares, (iv) asymmetry of information between managers and investors, (v) managers act by the interests of shareholders.

Pecking order theory does not define an optimal composition between equity and debt. It is crucial to divide equity into two categories: internal and external equity. The problem is that the pecking order theory recommends the enterprise to use the internal component in the first place and the external one in the last. If it is necessary to use external financing, the enterprise should use the debt first, then hybrid securities such as convertible bonds, and use the shares only as a last resort. This situation explains why less profitable enterprises borrow more. The reason is the need for more external financing, and also because the debt is in line hierarchically as soon as the internal funds are exhausted. As stated by Su et al. (2022), this theory does not explain what the optimal capital structure of the enterprise is but only determines the ideal order of sources of financing.

Agency Costs Theory and Free Cash Flow Theory

Agency cost theory deals with the division of enterprise management between managers and enterprise owners. Jensen and Meckling (1976) considered two types of conflicts: conflict between shareholders and managers and conflict between shareholders and corporate bondholders. The authors argued that the conflicts lead to an agent problem, which involves an asymmetry of information between the owners and their agents (managers). Asymmetric information is a common term in capital structure theories, as it also occurs in the pecking order theory or in the signaling theory. The authors of the theory stated that managers tend to borrow due to the existence of the tax shield, but on the other hand, claim that indebtedness raises three types of agency costs that need to be taken into account. These three types include control costs with the costs of justification for creditors, the high risk costs of remunerating creditors and the costs of financial distress. Therefore, the enterprise should be in debt until the marginal increase in its value is higher than the marginal cost of the debt. Agency theory serves as a theoretical basis for the free cash flow hypothesis, which explains dividends as a means to mitigate the agency cost of free cash flows. The free cash flow hypothesis is based on the argument that a conflict of interest between managers and shareholders exists. According to Jensen (1986), debt is more likely to reduce the agency costs associated with free cash flow due to the required payments for debt contracts generally reduce the freely available cash flows that managers can use. The corporate debt draws attention to the manager's willingness to pay out future cash flows and to monitoring from creditors and the debt capital market.

5. Conclusion

The capital structure theories are an internationally accepted topic among an erudite group of experts. Their contribution to the financial management of the enterprise is growing due to the increasing number of empirical studies being conducted in different countries and sectors. Many years have passed since the publication of Miller and Modigliani's ground-breaking work in 1958, and many other experts have offered their views on the issue by creating new theories.

The different approaches of capital structure theories to the firm were interesting because each of the theories tried to describe this relationship differently. Miller and Modigliani's original theory spoke of the independence of the capital structure, being indifferent between the

collection of equity and debt as a tool for financing an enterprise. Net income theory sought the optimal ratio between equity and debt, considering the amount of the tax shield and the cost of financial distress. Achieving consistent profitability and the share of tangible assets were crucial factors in trade-off theory. All these capital structure theories with the traditional theory were among the static theories, which sought the optimal level of indebtedness compared to dynamic theories. The individual static approaches were based on simplified assumptions, and since the reality was different, their applicability to the financial practice of enterprises was considerably limited. Most capital structure theories consider only a few determinants affecting the debt ratio. Empirical studies created in the past have shown that the capital structure besides the interest tax shield, the cost of financial difficulties, agency costs, etc., other determinants also affect the composition of corporate capital to varying degrees. Supporters of dynamic theories, such as pecking order theory, on the other hand, deny this idea and try to look at the problem from a different perspective.

The issue of capital structure optimization is one of the most discussed issues in the theory of corporate finance, to which modern theory of corporate finance has not yet found a convincing answer. The development of opinions on the optimization of the financial structure has led to several theoretical concepts, which differ in the methodological approach to individual theories. The traditional optimization criterion of minimizing the cost of capital is slowly being abandoned, making noticeable an unconventional view of the structure of equity and debt together.

Author contributions: All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding

Data Availability Statement: Data sharing is not applicable to this article.

Acknowledgments: This research was supported by the institutional research 1/KE/2021: The use of quantitative methods to assess corporate indebtedness of the Faculty of Operation and Economics of Transport and Communications, University of Zilina.

Conflicts of Interest: The authors declare no conflict of interest.

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EFFICIENCY PERFORMANCE OF SELECTED MANUFACTURING FIRMS IN NIGERIA

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Cite as: Tijani, A. A. (2022). *Efficiency performance of selected manufacturing firms in Nigeria*, *Ekonomicko-manazerske spektrum*, 16(1), 25-34.

Available at: dx.doi.org/10.26552/ems.2022.1.25-34

Received: 4 September 2021; Received in revised form: 15 December 2021; Accepted: 13 January 2022; Available online: 30 June 2022

Abstract:

Research background: The study examined the technical efficiency of quoted manufacturing companies in Nigeria selected at random. This study adopted Data Envelopment Analysis (DEA) with input-oriented variables of inventory, while the output variable is the revenue of the selected quoted manufacturing firms.

Purpose of the article: The study analyzed technical efficiency of thirty-one (31) selected manufacturing firms for the period 2013 to 2018 using the input and output oriented data envelopment analysis (DEA) approach.

Methods: The study findings shows that three firms account for 9% of the sampled firms, this indicates these firms operates at a positive level of efficiency. The result break down shows that twenty-eight (representing 91%) of the firms during the period operates at a low efficiency level. This was indicated and made more evident by the presence of recession occasioned in the period under review ending in 2016.

Findings & Value added: The study concluded that quoted manufacturing firms in Nigeria are not operating at optimal level of mix variables, this is as a result of high input costs then worsened by low patronage, rising inflation, increase in exchange rate, and stifling government policies. It is recommended that the firms that are operating at decreasing efficient levels needs to do the needful by scaling down their input and output variables, while those at the efficiency level needs to scale up their input and output variables. Also, government should do the needful in order to mitigate the challenges facing these manufacturing sector.

Keywords: technical efficiency, data envelopment analysis, firm efficiency

JEL Classification: M1, M10, M2, M21

1. Introduction

The manufacturing industry has attracted scholarly attention in recent times, based on the inept level of efficiency and export performance in developing countries especially in Sub-Saharan Africa (Lundvall and Battese, 2000; Tybout, 2000; Chapelle and Plane, 2005; and Faruq and Yi, 2010). The manufacturing sector is vital for the economic development of any country. The strategic sector roles involve creating backward and forward connections in the

economy, value addition, trade, and employment effects; all these are channels for economic growth (Lavopa and Szimai, 2012). The Nigerian manufacturing industry in the last four decades is encapsulated with some technical problems, which has affected the sector growth (Nigerian Stock Exchange, 2010). The Nigeria stock exchange (2010) indicates that about thirty percent of industries (manufacturing industry inclusive) were shutdown, sixty percent are considered indisposed or ailing, while only ten percent are effective and are at sustainable level. The implication holds that most quoted manufacturing industry is in doubt of survival and sustainability for lack of efficiency (Osamwonyi and Imafidon, 2016). Thus, making firm efficiency evaluation a critical issue for managers, scholars, and businesses in Nigeria based on current economic turbulence. Efficiency measures firm's performance. This indicates that efficiency is a business strategic approach that is encapsulated in minimizing use of input resources to achieve greater output, by leading to been competitive for a longer period in the industry (Mosfafa, 2007). A firm is regarded as efficient if it is able to employ small costs to generate higher revenue; and on the other hand, a firm is facing inefficiency when it is inefficient in terms of technical and allocative efficiency and that implies it is still not operating at its optimal level (Coeli et al., 2005).

Often efficiency performance in firms is proxy in terms of efficiency levels (Lombardi, Bruno, Mainolfi & Tartaglione, 2015). In particular, efficiency performance represents firm's successfully allocating inputs resource in ways to optimize output. Efficiency indicates firms producing at the optimal level and contextually delineate firms' ability to employ input resources at minimums level to achieve the highest level of productivity, for a considerable period (Al-tit, 2016). Greene (1997) argue that manufacturers are considered efficient if they produce at the maximum achievable production given the inputs employed at the least cost. From a microeconomic view, efficiency is contextualized from two different perspectives: allocative efficiency and technical efficiency. The study focus is on technical efficiency, which is the firm's ability to produce maximum output from a given set of factor inputs.

Koopmans and Debreu (1951), and Farrell (1957) are credited with the discovery of efficiency performance and its measures for firms. Technical efficiency delineates the systematic means of resources utilization and as the building block to enshrine further improvements (Yu et al., 2014). Similarly, technical efficiency denotes if a firm produces at optimal capacity based on employed inputs. At the same time, technical efficiency measures determine if input resources provide the highest achievable output, given applied technology (Farrell, 1957). The manufacturing efficiency of output is a reflection of the recent level of technological know-how. Therefore, firms with operating frontlines that is characterized by efficient output level are adjudged to be technically competent. The Nigeria manufacturing industry is in recent times with painful stagnation without technical efficiency. If the trend continues to 2030 and beyond, the likelihood of the projected annual growth rate of 10 percent will be a mirage. Therefore, these challenges call for the urgent interventions of the sector, to at least have average technical efficiency and tackle factors affecting its nonperformance. It has been found that the manufacturing sector is key to sustained growth and performance, thus making impacts on the social, economic life of a state (Tybout, 2000). This is seen as most imperatives given Africa Nations reliance on heavy imports. That is why there has been considerable attention to the evaluation of efficiency within the region (Lundvall and Battese, 2000; Adeoti, 2013; Chirwa, 2001; Graner and Isaksson, 2007). Therefore, technical efficiency is mostly estimated using two approaches; Stochastic Frontier Analysis (SFA) and the Data Envelopment Analysis (DEA). Yu et al. (2014) indicate that data envelopment analysis (DEA) is an approximate measurement tool to handle efficiencies by using multi-inputs and

multioutput variables. However, Stochastic Frontier Analysis (SFA) and the Data Envelopment Analysis (DEA) have some areas of similarities and differences. Hence, data envelopment analysis (DEA) represents a non-parametric measure of efficiency, while the SFA represent a parametric technique to measure efficiency. A non-parametric approach assumes that the production frontier is deterministic. Essentially, non-parametric does not emphasized handling disturbances, while the parametric deals with how disturbances would be handled. This involves choosing specific production function procedure through which problems of estimation and model specification are likely to emerge (Coelli et al., 2005). The paper adopts Data Envelopment analysis (DEA) based on its precise measure of efficiency and lesser inadequacy compare to other approaches (Eriki & Osagie, 2014). This paper seeks to determine the technical efficiency of Nigeria manufacturing sector using the input and output mix variables.

2. Literature review

An efficient manufacturing sector is an important solution to resolving the problems of unemployment and sustainable economic growth (Asaleye et al., 2018). This indicate that efficiency measures the level of process which produces the maximum quantity of output using the lowest quantity of inputs (Kea et al., 2016; Singh, Narayanan and Sharma, 2019).

The study of technical efficiency has received considerable discourse across different disciplines, which are; engineering and economics as it is fundamental to the survival of a firm. The term technical efficiency (TE) is conceptualized as measures the ability of producers in manufacturing firms to produce the maximum amounts of output using available inputs and technologies (Kea et al., 2016). TE is also useful to estimate allocative, production, and economic efficiency of manufacturing firms (Rajesh, 2007; Bhatia and Mahendru, 2015; Kea et al., 2016; Fahmy-Abdullah et al., 2017; Singh et al., 2018).

Thus, the measurement of TE and its elements in firms or industries is a vital concept in production theories (Fahmy-Abdullah et al., 2017). However, there are studies carried out to unearth the factors possibly affecting the technical efficiency of firms. The survey by Osamwonyi and Imafidon (2016) empirically studied the technical efficiency of the Nigeria manufacturing industry on the Nigerian Stock Exchange. The study used the output-oriented data envelopment analysis approach. The study concludes that out of the fifty-eight companies selected for the study, only thirty-one is considered to be operating at a frontier, while twenty-seven companies were found not to be operating maximally. The study recommends the need for an organization within the region of the low boundary to integrate more efficient towards scaling down their inputs. That those within a positive experience should scale up their experience. In the study of Usman, Hassan, Mahmood, and Shahid (2014) that conducted a survey of Pakistan textile industry, using the use of data envelopment analysis to measure the technical efficiency of the sector from 2006 to 2011. The study findings show Pakistan textile firms are close to being efficient.

In this case Sen and Das (2016) examined the TE of various enterprises in the India manufacturing sector using the DEA approach. It shows that estimated TE varies across firms in India. Kumar and Sharma (2016) have assessed the influence of patenting on an estimated TE of Indian high and medium technologies firms. It has appeared that research & development (R&D) has a little impact on TE of high and medium technology firms in India.

Furthermore, Faruq and Yi (2010) estimated the TE of manufacturing firms in Ghana using the DEA technique. It observed that the firm's size, age of the firm, foreign ownership and labours are the critical factors affecting the TE of firms in Ghana. Alvarez and Crespi (2011)

have evaluated the firm's efficiency affecting factors in the Chilean manufacturing sector. It observed that the efficiency of firms is positively associated with the experience of workers, modernization of physical capital and innovation in products. Haran and Chellakumar (2012) explored the technical efficiency of Kenya manufacturing sector. The study concludes that the ability of smaller firms has greater efficiency compared to other medium and larger firms from 2009 to 2011 in the Kenya manufacturing sector.

In contrast, the study conducted by Chen and Tang, (1987) holds that sizes and structure of firms affect their efficiency, especially the large firms are deemed to have efficiency than other medium and larger firms based on the capacity to produce much more than smaller firms. In addition, firm's ownership is found to be relevant to locally developed firms, ahead of foreign firms. However, it was discovered that ownership and structure could affect locally made firms, especially where the management is inept to drive new use of technology for production. Lundvall and Battese (2000) research estimated the translog stochastic frontiers of production function using for 235 manufacturing firms in Kenya. The study concludes that technical efficiency has positive relationship with firms' size and age. In specific, the study affirms that firm size had a significant favorable influence on firms, especially those in the wood and textile sectors. The effect of these became apparent for as the business grows, especially to other sectors except those in the textile industry.

Moreover, Arig (2011), Altin (2010), Yalama and Sayim (2008) also examined the efficiencies of manufacturing firms including the textile, apparel and leather industry quoted in the Istanbul Stock Exchange. The study employed financial ratios as input and output measures for different periods. Although the study did not evaluate these sectors separately, this, however, could mislead other researchers based on the cumulative result found. Also, the survey by Graner and Isaksson (2007) examined the relationship between efficiency and export position of Kenya manufacturing firms from 1992 to 1994 using a stochastic frontier analysis framework. The study discovered that the mean average technical efficiency of Kenya manufacturing industry, and it was established that firms with exporting orientation are better off in terms of efficiencies, then those with less exporting firms. In particular, it was discovered that exporting firms command high values in technical efficiency for textiles firms, more than the wood industry. Likewise and Asid (2010) carried out a study to determine the technical efficiency of manufacturing firms in Malaysia. The study adopts a stochastic frontier model. The study findings show that technical efficiency of the selected firms was on snowballing at 0.01 percent annually. The factors responsible for the increase is the input-driven mode of production used by the firms. Also, the study state that the rising rate was at a decreasing rate. Ngeh (2014) examined the technical efficiency using the stochastic frontier analysis technique to determine the efficiencies levels of Cameroon's manufacturing industries.

The findings discovered that firms operating for above 20 years were found to be technical efficiency with a mean score of 35.97 percent. Olatunji (2002) research investigated the efficiency of manufacturing firms in Nigeria and discovered that firms with massive investment in technology are technically efficient. However, it was discovered that firm's inefficiency was as a result of firms' characteristics. Also, the study concludes that firm's efficiency increased alongside their size. While the study established that local firms decline alongside growth as against foreign firms. Hence, the study found that workers skills contribute to firm's technical efficiency. Fahmy-Abdullah et al. (2017) estimated the TE of selected 130 transport manufacturing firms in Malaysia using SFPFA. It perceived that employees' wage rate and cost of information are significantly associated with TE of transport manufacturing firms in Malaysia. The study conducted by Dogan et al. (2019) assessed the determinants of performance of companies operating in manufacturing industries in Turkey. It perceived that

the performance of manufacturing firms is significantly associated with innovation, R&D, and exports, this drives them to be technically efficient.

3. Methodology

Data Envelopment Analysis (DEA) was used in this study to measure the sampled firms' technical efficiency. DEA is one of the non-parametric tools to determine firm's efficiency. A panel DEA approach was employed to determine the sampled firms' technical efficiency for the period. Malmquist with input-oriented approach was adopted in this study. Malmquist Productivity Index using DEA frontier in Stata was employed in this study for the analysis. Since all the firms operate under the same environment and conditions, and have existed for a long period, Constant Return to Scale was adopted to test their technical efficiency.

The population consists of manufacturing firms listed on the Nigerian Stock Exchange for the period covered by this study. The researcher employed a non-probability sampling technique to select the final firms used for the analysis. A quota sampling method was used. In this sampling method, the researcher uses his or her own discretion in the final selection of samples from the population, thus, 31 firms with consistent annual financial reports for the period 2013 to 2018 were selected.

4. Results

The Malmquist DEA approach was applied using Stata 15 statistical software. Below is an extract from the results obtained. Malmquist efficiency INPUT Oriented DEA: The data sourced from the financial reports of the selected firm was analyzed using The Malmquist DEA approach based of Constant Return to Scale (CRS) was applied using Stata 15 statistical software. The table below shows an extract from the results obtained.

The result obtained from table 1 above indicated that for year 2013 based on constant return to scale (CRS) only one firm was super-efficient (Eternal Oil and Gas), while two had relatively fair efficiency scores (Dangote Cement Plc with 52% and Oando Plc with 77%). The remaining twenty-eight firms were not efficient with scores as low as 4% efficiency score. This could be as a result of high input cost and relatively low sales during that period in Nigeria.

From table above, the result for 2014 based on CRS, only Eternal Oil and Gas Plc. was super-efficient during that period, while Forte Plc. (54%), MRS Oil Nigeria plc (94%), Nestle Nigeria Plc 51% were relatively efficient. The remaining twenty-seven firms had low efficiency scores. The low efficiency trend recorded in the previous year continued in 2014 due to high cost of input factors of production coupled with low patronage of these products during the period 2014.

Table 1 shows the result for 2015, only Oando Plc. had super efficiency score for that period, while Eternal Oil and Gas previous efficiency scores dropped to 84% due to high input cost for that period then competitions from firms like Oando Plc. would have led to low patronage of their products. Beside those two firms, no other firm had good efficiency score for the year 2015; a result of high input costs and low patronage for the period

Table 1: DEA of firm efficiency scores for the year 2013-2018

SN	Firms	2013	2014	2015	2016	2017	2018
1	A.G. Leventis Nigeria Plc	0.090351	0.097314	0.029837	0.074523	0.09025	0.081054
2	Berger Paints Plc	0.176279	0.229747	0.073234	0.128411	0.196935	0.172926
3	Cadbury Nigeria Plc	0.5531	0.497952	0.160001	0.091335	0.584084	0.446224
4	CAP plc	0.357107	0.470139	0.115694	0.204994	0.408601	0.343738
5	Cement Company of Northern Nigeria plc	0.027677	0.03175	0.026408	0.075448	0.019625	0.030663
6	Dangote Cement Plc	0.524869	0.399457	0.112954	0.214364	0.495614	0.398172
7	Dangote Flour Mills Plc	0.100005	0.305452	0.096067	0.141451	0.173501	0.166697
8	Dangote Sugar Refinery Plc	0.307511	0.261548	0.079409	0.103034	0.307211	0.243565
9	Eternal Oil & Gas plc	1	1	0.847536	0.742603	1	0.962261
10	Flour Mills Nigeria plc	0.183318	0.211437	0.053391	0.186919	0.180853	0.169073
11	Forte plc .402901	0.402901	0.544376	0.137936	0.896851	0.334205	0.420237
12	Glaxo Smithkline Consumer Nigeria Plc	0.173062	0.157014	0.045984	0.091007	0.170346	0.14177
13	Guinness Nigeria Plc	0.331611	0.316549	0.122733	0.220022	0.327016	0.28473
14	Honeywell Flour Mill Plc	0.152096	0.190546	0.043539	0.255921	0.135855	0.149013
15	International Breweries Plc	0.237362	0.322837	0.082107	0.193689	0.264761	0.235021
16	Lafarge Africa Plc	0.277911	0.271449	0.081028	0.108569	0.289506	0.23363
17	Learn Africa plc	0.047628	0.058254	0.013419	0.030972	0.051789	0.044205
18	Livestock Feeds Plc	0.107316	0.066535	0.029757	0.051099	0.094491	0.078057
19	May and Baker Nigeria PLC	0.143088	0.217421	0.053638	0.138565	0.164781	0.150593
20	MRS Oil Nigeria plc	0.37855	0.942971	0.154757	0.440128	0.569624	0.521345
21	Neimeth Pharmaceuticals Nigeria Plc	0.092649	0.075062	0.021138	0.077473	0.081499	0.073542
22	Nestle Nigeria Plc	0.449815	0.510781	0.155763	0.247645	0.48523	0.408308
23	Nigerian Breweries plc	0.433379	0.365196	0.115195	0.282118	0.40454	0.348237
24	Nigerian Enamelware Plc	0.318316	0.124006	0.030684	0.17875	0.239742	0.19878
25	Oando plc	0.770498	0.134503	1	1	0.49315	0.61747
26	Presco plc	0.132866	0.263508	0.105227	0.310821	0.146768	0.176815
27	PZ Cussons Nigeria Plc	0.210234	0.1999	0.061493	0.1362	0.206033	0.177192
28	Seven-up Bottling Company Plc	0.244517	0.321454	0.09595	0.209305	0.267477	0.240986
29	Total Nigeria plc	0.088762	0.119327	0.133191	0.234204	0.076342	0.112358
30	Unilever Nigeria plc	0.28597	0.252695	0.106824	0.198452	0.272249	0.239575
31	Vitafoam Nigeria Plc	0.148732	0.162932	0.05563	0.105236	0.153801	0.134778

Source: Stata15 DEA output

The result for 2016 as shown in table above, Oando Plc had a super efficiency score for the period, while Forte Plc (89%) and Eternal Oil and Gas Plc (74%) other firms sampled during the period had low efficiency score. The result signified that the costs of inputs were still high for most of the firms and the patronage of their products were not encouraging as well.

The result for 2017 as shown in the table, Eternal Oil & Gas Plc. had a super efficiency score for the period, while other firms sampled during the period had low efficiency score. The result signified that the costs of inputs were still high amidst the rising inflation, increase in exchange rate, stifling government policies on the operations of firms.

The result for 2018 as shown in table above, Eternal Oil & Gas Plc. had fair efficiency score for the period, while other firms Oando plc, MRS Oil Nigeria plc, and A.G. Leventis Nigeria Plc sampled during the period had fair efficiency score. The result signified that lingering economic decline as a result of rising inflation, increase in exchange rate, stifling government policies is having impacts on the real sector operations and efficiency.

5. Discussion

The analyzed data indicated that most firms operating in Nigeria during the period under review operated below efficiency. An indication of high input costs then worsened by low patronage, rising inflation, increase in exchange rate, and stifling government policies. Barely three firms for each period, which account for 9% of the sampled firms, had encouraging efficiency scores. The remaining twenty-eight (representing 91%) of the firms during the period had low efficiency scores. This study differs from Osamwonyi and Imafidon (2016) study findings that show that Nigeria quoted manufacturing firms are efficient with an average return of mean score of 85%. Thus, the periods of low efficiency scores among over 90% of manufacturing firms in Nigeria was an indication of a recession within the economy. The high cost of inputs worsened by low patronage was an indication that the recession reigned through all the periods sampled. The findings are in line with existing literatures of a recession in Nigeria during the period which was evident in the year 2016.

6. Conclusion

The study was to examine the technical efficiency of manufacturing firms for period 2013 to 2016. A panel approach was chosen with the help of Malmquist efficiency Input Oriented DEA using Stata 15 statistical software, the researcher was able to analyze the data of the sampled firms. The results indicated that most of the manufacturing firms within the country during the period reviewed had similar problems of high input costs and low patronage, rising inflation, increase in exchange rate, and stifling government policies. This also indicated that an economic recession was present during this period. In this context, the study found that other firms are struggling with technical efficiency. This is in contrast to Olatunji (2002) research that that conclude firm's inefficiency was as a result of firms' characteristics, aside external factors. On the other hand, the study affirms Osamwonyi and Imafidon (2016) empirical study that Nigerian firms had the problem of being technically efficient, hence only thirty-one of the firm considered is fairly efficient, while twenty-seven companies were found not to be operating maximally. The study recommended that the firms that are operating at decreasing efficient levels needs to do the needful by scaling down their input and output variables, while those at the efficiency level needs to scale up their input and output variables. Also, Nigerian government should do the needful in order to mitigate the challenges facing these manufacturing firms with low efficiency scores so that they would not cease to exist in the nearest future.

Author contributions: The author listed has made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The author declares no conflict of interest.

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LEVELS OF EARNINGS IN THE RETURN- EARNINGS RELATION – THE VALUE RELEVANCE OF EVIDENCE FROM SLOVAKIA

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Cite as: Vevere, V., Kovacova, M., Linina, I. (2022). *Levels of earnings in the return-earnings relation – The value relevance of evidence from Slovakia*, *Ekonomicko-manazerske spektrum*, 16(1), 35-46.

Available at: dx.doi.org/10.26552/ems.2022.1.35-46

Received: 6 November 2021; Received in revised form: 31 January 2022; Accepted: 22 February 2022; Available online: 30 June 2022

Abstract:

Research background: The research on various form of earnings and earnings management has been in growing interest of researchers and practitioners in recent years. Previous studies provide various views on the explanatory power of earnings changes or earnings levels for variations of stock returns, as well as on the effects of the time-series behaviour of earnings on the value relevance of both earnings variables.

Purpose of the article: The goal of the presented study is to compare the value relevance of various forms of level of earnings with the return-earnings relations of earnings changes. We studied levels of earnings in its various forms in Slovak companies in years 2018 and 2019.

Methods: We applied methods of descriptive statistics on different earnings level according to the provided literature review. Pearson's correlation coefficient and the one-way ANOVA were used to examine the relationship between the selected indicators. Based on the provided calculations four hypothesis were tested and findings showed.

Findings & Value added: The results prove that there is a statistically significant difference between the level of earnings EAT and region, size and sector of the company. Also, the analysis of relationships between total assets of the companies and their level of earnings showed the moderate correlation, and over the years, these results did not change. The results provide a different understanding on the role of earnings levels in business decisions. The paper points out the valuation role of earnings levels in the return-earnings relations. The results of this study can be further used in the creation of the earnings management model in companies.

Keywords: levels of earnings, earnings, earnings management, Slovak companies.

JEL Classification: G00, M20, M41

1. Introduction

Earnings management has attracted extensive research in the accounting field. Most research in this area requires a proxy for the amount of managed earnings. Earnings management can be considered as the uses of various accounting techniques (Clubb, and Wu, 2014; Makarem and

Roberts, 2020). Financial statements as the main reporting documents of various types of earnings represents the results of business activity of the company. Managers of the companies have different incentives to manipulate and report earnings (Atiase et al., 2005; Tahat et al., 2021). Many accounting policies and principles require business managers to make their decisions for this purpose. Therefore, these manipulations may affect the quality of financial statements and alter their reliability. Earnings management monitors how accounting policies can be used and financial statements produced to increase or offset business income (Jackson et al., 2017; Bryan et al., 2017). The optimal capital structure connected with earnings management is the key precondition for business, even though defining the optimal capital structure is difficult (Ghosh et al., 2005).

Typically, researchers use empirical models to decompose total accruals into non-discretionary accruals and discretionary accruals. Discretionary accruals are then used as a proxy for earnings management and are linked to different potential incentives or used as a measure of earnings quality. The most widely used discretionary-accruals models are variations of the Jones model (Lo, 2008). Prior empirical studies find that discretionary accruals estimated from these Jones models are correlated with performance and expected future earnings growth. Dechow, Sloan, and Sweeney (1995) and Kasznik (1999) document that discretionary accruals estimated from the Jones model are positively related to return of assets. McNichols (2000) further shows that discretionary accruals from both the Jones model and the modified Jones model are positively related to analysts' forecasts of long-term earnings growth. The conventional explanation for the evident relationship between discretionary accruals and firms' performance and growth is that Jones models are mis-specified in identifying discretionary accruals (Lee et al., 2006; Dichev and Tang, 2009).

On the other side the amount of managed earnings should have no relationship with companies' performance or growth. Therefore, the goal of the presented study is to study the levels of earnings in the return-earnings relation. We analysed and calculated earnings levels of Slovak companies in years 2018 and 2019. We didn't take into account the year 2020, because of the situation in the world, when global pandemic COVID-19 hit the whole world and stopped all activities and companies in their businesses. Therefore, the year 2020 is strongly affected by this situation and for the correct evaluation of these effect there is a need to study at least to following years.

The research paper contains of five chapters. The first chapter, Introduction, explains the aim of the paper, focus and originality of the article. In the second chapter, Literature review, necessary information about earnings management is provided along with a detailed overview of the authors dealing with this field. In the third chapter the research objective is described, the methodology used and the method of data collection. In the next chapter, the results of the earnings analysis are described. In the last section, the discussion is provided. The results of this paper point out the relation between levels of earnings and return-earnings. The output can be valuable for all those who deal with this area, whether it's researchers or managers dealing with the issue of earnings.

2. Literature review

Earnings Management is about the use of accounting techniques in the process of financial statements creation. Financial statements are a structured presentation of the business activities and financial situation of companies. Earnings Management is thus used for the way in which accounting rules are applied and generates financial statements according to the management's wishes (Ellahie, 2021; Gashi Ahmeti and Fetai, 2021).

Gaganis et al. (2019) in their study investigated whether and how, certain country-specific characteristics shape the profitability of SMEs. Using a large sample of around 40,000 firms operating in 25 EU countries over the period 2006-2014 they argue that freedom from corruption, a better environment in terms of the conditions that could contribute to the ease of getting credit, and fewer government regulation related to the starting, operating, and closing a business, enhance profitability. The dimensions of national culture also play an important role. Their results show that individualism, masculinity, and long-term orientation have a positive impact on profitability, whereas power distance and uncertainty avoidance have the opposite effect. They also find that the magnitude of the impact of national culture on profitability depends on political stability and institutional quality.

On the other side Dang et al. (2021) examine the relation between corporate information environment and capital structure decisions, and whether this association changes with cross-country institutional environments. Using earnings management as a measure of the corporate information environment, they argued that firms with higher earnings management activities have greater firm leverage ratios. According to the effect of earnings management on leverage is more pronounced in countries with weaker institutional environments.

The relationship between CSR and earnings management was studied by Dimitropoulos (2020). The study provided a multi-country data set with various dimensions of CSR performance including indexes regarding workforce, community relations, product responsibility and human rights protection. He conducted empirical analysis with panel data regressions and proved the negative association between CSR and EM indicating that high CSR performing firms are associated with less income smoothing and discretionary accruals, thus with higher financial reporting quality.

An integrated – statistical, econometric, and economic analysis was conducted of two relevant financial performance measures-return on assets (ROA) and return on equity (ROE) by Dinca et al. (2017). They analysed almost 1000 construction companies from eight EU countries between 2004 and 2013. The methodology can be readily applied to any country, region, or even the entire global construction sector. Findings indicate that companies from Western EU countries have higher ROE compared to companies from Eastern EU countries, but the latter offered higher ROA. Inverse of short-term debt has a high explanatory capacity in the long run. Investment productivity and labor productivity are also instrumental in explaining the variance of inverse of long-term debt. These findings indicate that companies should increase their productive investments when faced with a crisis.

Similarly, Lassala et al. (2017) applied the fuzzy-set qualitative comparative analysis and offered new evidence on the relationship between both types of performance in a sample of companies listed in the Spanish capital market. Financial performance was measured by the return on equity (ROE) ratio and the corporate performance of the company was measured by its inclusion or not in the sustainability index used as reference for the Spanish capital market, the FTSEGood4 IBEX. They concluded that return on assets is a necessary condition for companies with leverage to reduce the cost of debt due to their sustainability profile and consequently boost their ROE.

Beyer and Hinke (2018) investigated the driving factors behind differences in profitability of Czech and German firms on the basis of a comparative analysis. They applied a two-step variance analysis, the first step focused on the operational differences in ROA between Czech and German ventures, which was based on deeper analyses of the asset turnover and the profit margin. In the second step, the differences in ROE were analysed, considering influences from national taxation, conditions and patterns of financing and operations of the ventures. They confirmed the hypothesis that specific drivers of profitability differ significantly between the

two countries in certain business sectors and would cause substantial differences in profitability. Due to the overlapping nature of these individual effects, they compensate each other to a great extent. Strouhal et al. (2018) also provided earnings analysis on set of Czech companies. They focused on measuring of the financial performance of businesses, mainly to determine to what extent the form of profit calculation influences value of return on assets. Based on the calculations of ROA of TOP 100 Czech companies they assessed the differences in the final values of the tested indicator showing the link to the capital structure of the analysed companies and proving that the level of indebtedness influences the difference in the ROA calculations when different kinds of profit are used. In the case of the companies with higher indebtedness, it is more appropriate to compare the ROA indicators based on the nominator containing earnings before interest and taxes.

In Slovakia Siekelova et al. (2019) conducted research on the developing of SMES companies through the profit management. They focused on the analysis of the profitability of SME companies as well as on the identification of indicators that significantly influence the rate of profit.

Similarly, Svabova (2020) conducted research in the Visegrad group's business entities with the focus on an initial dependency analysis between total assets of companies and various profit measures. Using descriptive statistics as well as a correlation analysis based on the real business data on almost 300 thousand companies in the V4 countries from the Amadeus database, covering the period from 2013 to 2017 they indicated that Slovak companies have the average values of profit measures and total assets comparable to Hungarian companies. Czech and Polish companies have several times higher average values of profit measures and also of total assets than Slovak and Hungarian companies. The analysis of the development of the profit measures and the total assets of the companies over the years showed significant differences across the four countries during the period covered by this study.

3. Data and methodology

In the presented study, we focus on the analysis of the levels of earnings in the return-earnings relation. We analysed and calculated earnings levels of Slovak companies in years 2018 and 2019. We didn't take into account the year 2020, because of the situation in the world, when global pandemic COVID-19 hit the whole world and stopped all activities and companies in their businesses. Therefore, the year 2020 is strongly affected by this situation and for the correct evaluation of these effect there is a need to study at least to following years.

For the analysis, we use data on real companies from Slovakia from the database Amadeus, a database of comparable financial information for public and private companies across Europe. Amadeus, covered by the company Bureau van Dijk, contains comprehensive information on around 21 million European companies. Overall, the dataset used in this study contains data of 27 385 Slovak companies. These companies reported positive profit; therefore, we have conducted our research on this data set of companies by using selected indicators. For variables, we use the following designation and method of calculation, shown in Table 1.

Firstly, we have looked on the value of reported profit. Some values showed a striking deviation from others. Such values are called outliers and it is recommended to exclude them from the dataset for further analysis. If these values are not excluded, they can influence the final results of the provided analysis. There are various methods for determining outliers. We applied interquartile range method of outlier detection, for the purpose of which it is necessary to know the first and third quartiles. According to this method outliers are values below Q_1 (-1,5 interquartile range) or above Q_3 (+1,5 interquartile range).

Table 1: Selected variables and their calculations

Variable	Calculation
EAT	Earnings After Taxes
EBT	Earnings Before Taxes
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings before interest, taxes, depreciation and amortization
NOPAT	Net operating profit after taxes
ROA	Return on Assets
ROE	Return on Equity
ROS	Return on Sales
ROI	Return on Investment
ROCE	Return on Capital Employed
	Financial Income + Operating Income – Taxes
	Financial Income + Operating Income
	EBT + Interest
	EBIT + Amortization
	EAT + Interest after Taxes ^a
	EAT/Average Total Assets
	EAT/Equity
	EAT/Net Sales
	EAT/Investment Cost
	EAT/Total Assets – Current liabilities

* 21 % – corporate income tax rate was used in 2018, 2019.

Source: own processing

When a dataset has outliers, variability is often summarized by a statistic called the interquartile range (IQR), which is the difference between the first and third quartiles (upper and lower quartile). The first (upper) quartile is the value in the data set that holds 25% of the values below it. The third (lower) quartile is the value in the data set that holds 25% of the values above it. Then the interquartile range is defined as follows:

$$IQR = Q_3 - Q_1, \quad (1)$$

The graphical representation of this method is a boxplot. We have tested outliers for all selected variables (Table 1) separately. Totally, we have excluded from our basic dataset 19 304 companies. Therefore, the final sample consisted of 8 081 Slovak companies.

Brief characteristics of the database is shown in following tables.

Table 2: Regional diversification of Slovak companies in the database

Region	Number of companies	Number of companies (%)
Bratislava	2,029	25.11
Trnava	773	9.57
Trencin	708	8.76
Nitra	966	11.95
Zilina	979	12.11
Banska Bystrica	736	9.11
Presov	883	10.93
Kosice	1,007	12.46
SUM	8,081	100

Source: own processing

Table 2 shows regional diversification of companies in the database from which 97% are SME companies and 3% are big companies. This is mainly caused by exclusion of companies because of extreme values. According to table 3 we can summarize the representation of companies according to SK NACE characteristic, which represents economic sector of company.

To characterize level of earnings in return earnings relation, we applied statistical descriptive characteristics. For each variable, we list the mean, standard deviation, median, minimum and maximum values. These characteristics can be used to compare groups of companies and also to monitor the development of the value of the various level of earnings of companies over the years. To compare the means of level of earnings of the companies, we conducted Kruskal-Wallis's nonparametric test and Mann-Whitney's nonparametric test.

Table 3: SK NACE categories of Slovak companies in database

SK NACE	Category	Number of companies	Number of companies (%)
G	Wholesale and retail trade, repair of motor vehicles and motorcycles	2,210	27.35
M	Professional, scientific and technical activities	1,162	14.38
F	Construction	1,029	12.73
C	Industrial production	743	9.19
Q	Health and social work	515	6.37
	Others	2,422	29.98
	Sum	8,801	100

Source: own processing

To analyse the dependencies between variables, we use Spearman's correlation coefficient, which is a measure of the linear relationship between two quantitative variables. For the determination of the degree of dependence, we will proceed from the following scale (Ratner, 2009):

- weak correlation, if $0 < |r| < 0.3$,
- moderate correlation, if $0.3 \leq |r| < 0.7$,
- strong correlation, if $0.7 \leq |r| < 1$.

In addition to the value of the correlation coefficient, we always list the p-value of the test of its statistical significance, based on which we identify the correlations that are statistically significant and the ones that are not.

Following hypothesis were tested:

H₁: There is a statically significant relation between level of earnings EAT and region, where the company does business.

H₂: There is a statically significant relation between level of earnings EAT and size of the company (small and medium-sized and large companies).

H₃: There is a statically significant relation between level of earnings EAT and sector, in which company does business.

H₄: There is a statically significant relation between level of earnings EAT and total assets.

4. Results and Discussion

As mentioned before descriptive statistics was used for analysis of level of earnings in the return-earnings relation. We set the main analysed variables defined in previous chapter. Namely we have calculated ROA, ROE, ROS, ROI, ROCE, EAR, EBT, EBIT, EBITDA and NOPAT. Results are shown in following tables 4 and 5.

Table 4: Descriptive statistics of return indicators of Slovak companies in %.

	ROA		ROE		ROS		ROI		ROCE	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Mean	7.01	6.80	16.60	17.22	4.77	4.35	7.53	7.29	16.29	16.86
Modus	3.73	1.16	56.02	31.91	2.76	10.55	3.73	1.16	56.02	31.91
Median	5.18	4.82	14.62	15.30	3.17	2.95	5.84	5.41	14.33	14.84
St. Dev.	6.24	6.16	13.54	14.29	4.77	4.18	6.21	6.13	12.79	13.59
Minimum	0.00004	0.0003	-24.04	-26.16	0.00004	0.001	0.0001	-1.07	-22.19	-22.73
Maximum	27.86	25.53	69.79	67.63	23.98	18.18	27.86	25.53	56.43	55.91

Source: own processing

The average values of selected return indicators showed similar values in analysed years 2018 and 2019. There is no significant increase or decrease in indicators. The arithmetic means,

as an indicator of descriptive statistic, is very sensitive to extreme values. "Outliers" were identified and excluded. Nevertheless, there are higher or lower values that can distort results. In these cases, it is appropriate to use a median to determine the mean location in the set. Median refers the value in the middle of our dataset. The average value of the ROA indicator for 2019 of the evaluated companies was 7.01%. We can conclude that 1€ of total assets of companies brought on average 0.07€ of profit. The median that the ensemble divides into two equally large parts was 5.18%. The standard deviation measures the amount of variation of a set of data values. A low standard deviation indicates that the data points tend to be close to the mean of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values. The lower its value is, the more likely we can assume the occurrence of values at the level of the arithmetic mean. The values of ROA indicators of the given companies differed from the average by $\pm 6.24\%$. A relatively large difference can be seen between the minimum and maximum value of the indicator, which means that the companies in the database manage their assets in different ways, some value them efficiently, while others should work to make their management more efficient.

On average, companies from the analysed database achieved a return on equity of 16.60% in 2019, which means that 1€ of equity generated almost 0.17€ of profit. The indicator should be higher than current interest rates so that the owners try to keep their capital in the company and not look for other investment opportunities. In contrast to the previous indicator, there was a year-on-year decrease. The median value in 2019 reached 14.62%. Individual companies differ from the average according to the standard deviation by $\pm 13.54\%$. As can be seen from the table 4, the values of the minimum and maximum reach quite high, respectively low numbers, due to the fact that the equity of some companies in the database was negative. This could be due to losses in previous years. On the contrary, the very high ROE's of companies could have been caused by the high profits and low equity capital available.

The average value of ROS indicator in 2019 achieved 4.77%. So, 1€ of sales accounted for 0.05€ of profits. Some literature state that the usual value of the indicator is considered to be around 10%. In our case, it is clear that the value is relatively far from the usual one. However, in the year-on-year comparison, we see that the indicator had an increasing tendency of almost, which is positive, as the ROS value should have an increasing trend over time. The most common value was 2.76% and the value of median was 3.17%. Individual companies differed from the average by about $\pm 4.77\%$. The maximum achieved value of the indicator was 23.98%, on the other side, the minimum was only 0.00004%.

The average value of ROI was 7.53%, so we can conclude that 1€ of the total capital tied up in the companies in 2019 generated 0.08€ of profit. When comparing 2019 with 2018, we recorded only a very small increase in the value of the return on invested capital. The most frequent companies achieved a return on invested capital of 3.73%. Based on the median, we can say that half of the companies achieved an ROI of more than 5.84% and the other half recorded a lower return on invested capital. The height of the indicator for individual companies differed from the average by $\pm 6.21\%$. The lowest value recorded was only 0.0001%.

The average company in 2019 reached the value of the ROCE indicator of 16.29%. This means that for 1€ of the company's long-term resources, which are equity and long-term liabilities, there was 0.16€ of profit. As part of the previous ones, this indicator also decreased year-on-year. The median in this indicator divided the group into two parts with a value of 14.33%. The standard deviation determined that the given enterprises are $\pm 12.79\%$ away from the average. The relatively high values at the minimum and maximum could be caused by negative equity in this indicator as in the ROE indicator or also by high long-term liabilities of enterprises.

Table 5: Descriptive statistics of level of earnings of Slovak companies in €.

	EAT		EBT		EBIT		EBITDA		NOPAT	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Mean	6,423.5	4,961.5	8,553.7	6,781.3	9,510.2	7,617.9	16,418.9	13,302.8	7,513.1	6,018.2
Modus	2,469.0	210.0	208.0	1,763.0	2,208.0	1,748.0	2,156.0	1,763.0	1,744.3	1,380.9
Median	3,668.0	3,330.0	5,015.0	4,564.0	5,936.0	5,170.0	11,209.0	9,505.0	4,689.4	4,084.3
St. Dev.	7,331.9	4,736.9	9,126.8	5,945.5	9662.4	6,473.6	15,892.9	11,745.5	7,633.3	5,114.2
Min.	1.00	1.00	3.00	6.00	3.00	6.00	22.00	6.00	2.37	4.74
Max.	51,171.0	26,399.0	56,880.0	28120.0	56,880.0	28,141.0	106,574.0	50,654.0	44,935.2	22,231.4
Lower Q	1,746.5	1,622.0	2,614.0	2,355.5	2,988.0	2,606.5	4,536.0	3,928.5	2,360.5	2,059.1
Upper Q	8,249.5	6,950.0	10,847.0	9,417.0	12,473.5	10,847.5	23,340.5	19,642.7	9,854.1	8,569.5

Source: own processing

Analysing the level of earnings, we can conclude that the most significant increase can be seen in the indicator EAT – 29.47%. The least significant increase can be seen in the indicator EBIT DA, 23.42%, which may be related to the unchanged depreciation policy. The average value of depreciation (added to EBIT in calculation EBIT DA) increased year-on-year.

The average net profit in the database of monitored companies amounted to 6 423.51€ which companies had at their disposal for their further activities, investments or innovations. This level of profit for the year 2019 was caused by the removal of a large number of extreme values, which mainly companies were kept as large entities, and thus companies with higher net profits. Between 2018 and 2019, an increase in net profit of more than 29% can be seen. We consider this trend to be a positive perspective for the future. We can mark 2 469€ as the most common amount of net profit. The median value of 3 668€ divides the database into two equally large parts, and the standard deviation says that individual companies differ from the average by 7 331.9€. The upper quartile determined that only 25% of the companies analyzed achieved an EAT higher than 8 249.5€, and based on the lower quartile, we can say that up to 75% of companies achieved a pre-tax profit of 1 746.5€.

In 2019, companies achieved an average pre-tax profit of 8 553.77€. Compared to the previous year, this is an increase of around 26%. As indicated by the mode, the value of 2 208€ of the pre-tax profit occurred the most. In the case of EBT can be stated that half of companies achieved EBT indicator higher than 5 015,0 € in 2019 and half of companies achieved EBT indicator lower. Upper quartile and lower quartile can be defined as the other indicators of location. Again, on the example of EBT, we can illustrate the results. The upper quartile of EBT is 10 847,0 € in 2019. It means that only 25% companies achieved EBT higher than 10 847,0 € in 2019, remaining 75% companies achieved EBT lower than upper quartile value. The lower quartile of EBT is 2 614,0 € in 2019. It means that 75% companies achieved EBT higher, remaining 25% achieved EBT lower than lower quartile value.

The profit of companies before deducting taxes and interest expenses in 2019 amounted to an average of 9 510.2€. Comparing the years 2019 and 2018, it is clear that the indicator had a growing trend of almost 25%. The highest frequency in the monitored set of EBIT indicators was 2 208€, the average value from which 50% of companies have a higher and 50% lower profit before taxes and interest expenses is 5 936€. Companies differed from the average amount of the given profit by $\pm 9\,662.4$ €.

The monitored companies in the analyzed database achieved an average of 16 418.9€ in profit before interest, taxes and depreciation in 2019, which represents a growing trend of more than 23% year-on-year. The average value of this monitored level of profit was 2 156€ and the median determined that half of the companies had a higher profit before interest, taxes and

depreciation than 11 209€. The given companies differ from the average by 15 892.9€ according to the standard deviation.

The average net operating profit after tax in 2019 was 7 513.1€. This value increased by almost 25% year-on-year. The most common amount of NOPAT was 1 744.3€. Net operating profit of 4 689.4€ is the value from which half of the companies achieved a higher amount of this profit and half a lower one. Based on the standard deviation, it can be assumed that the companies deviated from the average by $\pm 7,633.3\text{€}$.

Table 6: Hypothesis testing

Null hypothesis	Test	Sig.	Decision
The distribution of EAT2019 is the same across categories region	Independent-Samples Kruskal-Wallis Test	0.003	Reject the null hypothesis
The distribution of EAT2019 is the same across categories size of the company	Independent-Samples Mann-Whitney U Test	0.010	Reject the null hypothesis
The distribution of EAT2019 is the same across categories sector	Independent-Samples Kruskal-Wallis Test	0.000	Reject the null hypothesis

Source: own processing

To confirm the existence of statistical dependence in hypothesis presented in Table 6, the one-way ANOVA test was used. P-value was determined by using statistical analysis software SPSS. All three null hypothesis were rejected, therefore we accepted alternative hypothesis and we can state that:

1. There is a statistically significant relationship between level of earnings EAT and region, where the company does business.
2. There is a statically significant relation between level of earnings EAT and size of the company (small and medium-sized and large companies).
3. There is a statically significant relation between level of earnings EAT and sector, in which company does business.

To confirm the existence of statistical dependence in hypothesis 4 we tested the significance of the correlation coefficient. The non-parametric Spearman's correlation coefficient was determined. According to p-value the hypothesis was rejected, therefore we accepted alternative:

4. There is a statically significant relation between level of earnings EAT and total assets.

Table 7: Hypothesis testing

Correlations				
Spearman's rho	TotalAssets2019	Correlation Coefficient	1.000	EAT2019 0.515**
		Sig. (2-tailed)		0.0000
		N	8,081	8,081
	EAT2019	Correlation Coefficient	0,515**	1.000
		Sig. (2-tailed)	0.000	
		N	8,081	8,081

**. Correlation is significant at the 0.01 level (2-tailed).

Source: own processing

Based on the value of Spearman's correlation coefficient (0,515) we can conclude that there is a moderate positive correlation between level of earnings EAT and region, where the company does business, which is statistically significant. This represents the fact that higher value of the total asset, the higher the level of earnings of the company.

5. Discussion

The goal of the presented study was to study the levels of earnings in the return-earnings relation. We confirmed the significance relationship between level of earnings and various characteristics of companies. The study was conducted on the data of Slovak companies in years 2018 and 2019. During our research also some data from 2020 were available, but we didn't take them into account. This was because of the pandemic Covid-19, which started in beginning of 2020 and stopped the life and businesses all over the world. Therefore, the financial statements and reports, earnings and other variables are strongly affected by this phenomenon. We decided to take into account this limitation of the study and don't calculate with this year. It would be essential in future research to provide analysis at least two following years (2020 and 2021) to show exact impacts on the level of earnings in the return-earnings relation. However, some studies already provided analysis in this area.

Lassoued and Khanchel (2021) determined the impact of COVID-19 pandemic on earnings management practices in 15 European countries by applying three discretionary accrual metrics as a proxy for earnings management models. They confirm a reduced reliability of the financial reports during the COVID-19 pandemic, because of the significant income-increasing earnings management during 2020. Their finding suggests that firms manage earnings upward by alleviating the level of reported losses to rebuild investor and stakeholder confidence needed to support the economic recovery.

Chen et al. (2021) assume that the severity of local COVID-19 spread can capture the short-run fluctuation of macro-level uncertainty in business environments. The analysis of market reactions also showed that the manipulation of disclosure dates can influence the market price in a favourable direction for firms.

Another point of view represents Gao et al. (2021). They examined the COVID-19 pandemic effect on financial analysts' forecast dispersion. The study also hypothetically discussed and empirically excluded earnings uncertainty explanations.

In the face of crises such as Covid-19, businesses become devastated by greater risk exposure, particularly in currency exchange, supply chain disruption, and fluctuation in commodity prices that cause volatile earnings trends. Higher earnings volatility is frequently associated with greater risk. Consequently, firms could be inspired to engage in earnings management or derivative use as attempts to mitigate earnings volatility (Phua et al., 2021; Marcu, 2021). This study also found that both earnings volatility and derivative use have a positive relationship with earnings management. This implies various points of view on the selected issue and represents possibilities for further research directions.

6. Conclusions

Earnings management is becoming an increasingly popular topic and therefore is the subject of this paper. The objective of presented paper is to clarify the levels of earnings in the return-earnings relation. We focused on earnings levels of Slovak companies in years 2018 and 2019. By using descriptive statistics and hypothesis testing, we confirmed the existence of statistically significant relation between level of earnings EAT and region, where the company does business, size of the company (small and medium-sized and large companies) and the sector, in which company does business. There is also statistically significant correlation between level of earnings EAT and total assets of the company. Identification of various earnings levels in return earnings relation can be really helpful for businesses. It can help a company to identify which indicators are generating earnings for it and therefore to focus on achieving better results.

Using appropriate statistical tools, the obtained results could be further used to create a regression model for managing earnings management in the Slovak Republic.

Author contributions: All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

Acknowledgments: The paper is an output of the science project VEGA 1/0210/19 Research of innovative attributes of quantitative and qualitative fundamentals of the opportunistic earnings modelling and the Slovak Research and Development Agency under Grant number APVV-17-0546: Variant Comprehensive Model of Earnings Management in Conditions of the Slovak Republic as an Essential Instrument of Market Uncertainty Reduction.

Conflicts of Interest: The authors declare no conflict of interest.

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A MULTIFACETED PERSPECTIVE ON TRUST AMID STUDENTS: FROM THE INDIVIDUAL TO THE INSTITUTIONAL LEVEL

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Cite as: Cotîrlet, P.C. (2022). A multifaceted perspective on trust amid students: From individual to the institutional level, *Ekonomicko-manazerske spektrum*, 16(1), 47-57.

Available at: dx.doi.org/10.26552/ems.2022.1.47-57

Received: 13 October 2021; Received in revised form: 5 January 2022; Accepted: 10 February 2022; Available online: 30 June 2022

Abstract:

Research background: Scholars used to equate trust and distrust with a person's statement of trust in the intentions and motivations of others. Other studies focused on trustor conduct based on favorable expectations about a trustee's course of action. Starting from these premises, the present article aims to discuss the role of awareness and the perception of trust among students, from a multifaceted perspective, namely from the individual (i.e., representatives) to the institutional level. There is a growing awareness of the crucial role that trust plays in every aspect of life. Whether we are talking about everyday life or considering the educational process or making decisions, trust is an essential concept for the success of any type of adapting process. Amid the pandemic crisis (Covid-19), trust (in the authorities, in the messages they sent, in specialists' opinions, in the political leaders) has often made the difference between life and death. The trustor can rest assured that their expectations will be fulfilled based on confidence in the other party's benevolence, honesty, openness, reliability, and competence. Also, in the post-truth period, trust seems to matter less and less. In this context, the citizen's trust in public authorities and their own elected parliament is to a low level.

Purpose of the article: The study aims to explore the role that trust has in the relationship with relatives and institutions.

Methods: An online survey among the students from the University Center of Bacău, Romania (N=633) was conducted in November 2021. The survey aimed to highlight the role that trust plays in forming opinions among students about the relationship with colleagues, friends, and family, but also how this relates to various state authorities, such as: parliament, government, mass media, NGOs, health system, universities, specialists, army.

Findings & Value added: The findings indicated that trust could be influenced by the gender. Furthermore, there is a significant link between people with a high level of trust in the institutions and in the representatives of the institutions.

Keywords: trust, interpersonal relation, state institutions, social cohesion, student's perception

JEL Classification: I23; I31

1. Introduction

Scholars disagree on the definition of trust, its primary qualities, and methods of development, and there is a wide range of theoretical frameworks for its study in the literature. Furthermore, trust is a multi-disciplinary notion that is examined by economists, sociologists, managers, political scientists, and administrators. Each profession emphasizes different aspects of trust and its drivers, making the study more intricate and harder to understand. To disaggregate trust and understand its roots, some academics try to use an integrated framework of analysis. According to some academics, trust occurs at several societal levels (micro, meso, and macro), which might explain the wide range of trust definitions.

Scholars used to equate trust and distrust with a person's statement of trust in the intentions and motivations of others (Lewicki et al., 1998). On the other hand, other studies focused on trustor conduct based on favorable expectations about a trustee's course of action (Mayer et al., 1995). However, such a categorization is excessively narrow since it does not discriminate between the many mechanisms that might lead to trust formation or the various types of processes that can lead to trust formation. It is unclear if others' intentions or expectations are based on a rational foundation or are the outcome of a psychological process based on this concept.

2. Literature review

The literature on trust and its many manifestations is extensive. It could be divided into categories based on the theoretical framework that underpins trust development. It also can be traced the rational decision, institutional, psychological, and reflective viewpoints.

The dominance of reason in trust building processes occur within cognitive functions and are based on an appraisal of others' trustworthiness. It is assumed by rational choice mechanisms. On the other hand, psychological mechanisms are based on emotions and reflexes, and are mostly affective in nature, as trust is developed based on a positive affect towards the object of trust. While institutional level emphasizes the importance of formal and informal institutions that arose from the constraints of dominant cultural ideology and history, the reflexive mechanisms are viewed as a leap of faith that occurs because of engagement and suspension and is predicated on the trustee's future trustworthiness.

Chan, To, and Chan (2006) define social cohesion as a situation characterized by a set of attitudes and norms that include trust, a sense of belonging, and a willingness to take part and help, as well as their behavioral manifestations. In this context, the importance of trust in social cohesiveness and social capital cannot be overstated (Berman and Phillips 2012; Fukuyama 1995; Putnam 2000). Based on that, Sabel (1993) described trust as "the mutual belief that neither party will take advantage of the weakness of the other."

As a result, people must rely on others in a variety of ways to do their tasks. Some researchers pointed out that two paradigms of thought had emerged (Tomlinson et al., 2020) and developed in parallel.

The first one is clear in the literature regarding to the operationalization of trust with the most used definitions largely adopting a unidimensional stance. For example, Mayer et al. (1995) define trust as the "willingness to be vulnerable to the actions of a trustee based on the expectation that the trustee will perform a particular action, irrespective of any monitoring or control mechanism". Years later, trust was defined as "accepted risk and vulnerability based on favorable expectations of the intentions or actions of another" (Rousseau et al., 1998). Even the simplest decision is fundamentally founded on the degree of confidence.

Trust, according to this viewpoint, is an essential component of all human connections, including personal relationships, academic education, family life, economic investment, journalism, and medical treatment. Trust is an important notion. As a result, trust might be defined as a collection of actions, such as acting in ways that rely on another (Rousseau et al., 1998), or a belief in the likelihood that a person will behave in a certain circumstance (Robinson, 1996). In certain cases, trust is an abstract mental attitude toward the premise that someone is trustworthy.

Based on those approaches, trust could be imaged as two-face construct, having two important concepts: importance and danger. From one perspective, trust is crucial because it allows individuals to rely on others (for affection, wisdom, and help), especially when we know that no outside force drives them to do so. But and this is also important, trust involves also a risk. The risk that people we trust will not be fully involved. In this situation, what is the reason for trusting them anymore (McAllister, 1995).

Trust is described, at least in social sciences, as key factor that mediates various aspects of human behavior (Camerer, 2003; Fukuyama, 1996; Mitkidis et al., 2013). Definitions of trust vary but a widely accepted one is that it is "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau et al., 1998).

In other words, a person (the trustor) who depends on someone else (the trustee) expects to reduce the negative outcome in a specific situation. So, trust is the attitude someone has towards people who hope will be trustworthy. Therefore, when discussing about trust there is another concept involved (trustworthiness). Those whom we trust will be appreciated as trustworthy. Those who are trustworthy will be granted as being trusted. First, the parties to the relationship (trustee and trustor) must have attitudes toward one another that allow trust to manifest. And second, for trust to be well-grounded, both parties must be trustworthy.

A lot of variables contribute to a country's degree of social trust, which includes both interpersonal and institutional trust. There are two approaches on the factors that influence interpersonal trust (Newton 2013; Algan and Cahuc 2013). Known as the individual-oriented theory, the first approach state that interpersonal trust is an individual property linked to personal characteristics such as personality traits (including morality) and social and demographic characteristics such as age, social status, gender, education, income, and religion. The second one, known as the society-based hypothesis, point that interpersonal trust is a systematic and emergent characteristic of society, rather than a human trait.

Roud and Gausdal (2019) pointed that trust has a critical role to play such as improving coordination, communication, reliability, and learning. Trust is also described as a tendency toward positive expectations regarding the future actions of the other party (Brattström and Bachmann, 2018), deepening in-team reliance.

In this regard, interpersonal trust may be divided into two categories: trust in family, friends, and members of organizations or associations, and trust in strangers. Limited (or in-group or thick) trust is one type of trust, whereas generalized trust is another (Algan and Cahuc 2013).

On the other hand, discussing about trust involves two closed concepts such as mistrust and distrust. For Devine et. al. (2020) conceptualizing trust also includes mistrust and distrust. According to Citrin and Stoker (2018) mistrust is view as a "doubt or skepticism about the trustworthiness of the other, whereas distrust reflects a fixed view that the other is untrustworthy", while, for Bertson (2018) mistrust represents "an unfavorable attitude held by an individual against her political system or its institutions and agents".

As a conclusion, Devine et al. (2020) stated that the trust has the dynamic and contextual characteristics of a three-situation context: In a certain domain, subject A trusts/mistrusts/distrusts B, where B can be an individual or an institution.

In this regard, trust in institutions is vital for economic progress (Hwang, 2017; Sumanjeet, 2015). More investment and other economic activity can be expected if the government is viewed as trustworthy and is thought to uphold the law, protect property rights, and keep tax policy stable (Knack and Keefer, 1997).

Institutional trust is a key factor in modern state governance allowing individuals to accept government authority supports the legitimacy, effective functioning, and stability of democratic systems (Hooghe et al., 2015), particularly because democracy cannot rely on coercion to the same extent that other regimes can (Hetherington, 2005). Contrary to popular belief, the growth of democratic systems has been associated with a drop in institutional trust (Zmerli, 2012), emphasizing the necessity of understanding its drivers. Some researchers (Van Bavel et al., 2020) point to the idea that greater trust in government leads to more compliance with policies.

Some researchers have pointed out that there is a strong connection between institutional and COVID-19 mortality (Oksanen et al., 2020). In this regard, the higher institutional trust the lower Covid-19 mortality. In addition, people's trust in the government could interact with some key elements, meaning attitudes and behavior toward policies. Research has found that lockdown measures in the Netherlands during the pandemic led to an 18% increase in trust in the government (Oude Groeniger, Noordzij, van der Waal and de Koster, 2021).

Promise-keeping, accountability, efficiency, competence, caring, predictability, transparency, fairness, and honesty are all qualities that citizens value in public institutions (van der Meer and Hakhverdian, 2017). As a result, people evaluate the way that their institutions function in the public interest (Miller and Listhaug, 1990) and create results that meet their expectations (Hetherington, 2005). In this context, the institutional performance approach and the social trust approach have mostly been used to explain institutional trust, either directly or indirectly.

Some researchers appreciated that institutional trust is a result of institutional performance, according to the institutional performance method (Berg and Hjerm, 2010).

For Berg and Hjerm (2010) point of view both real performance and individual judgments are important. Therefore, institutional trust is frequently defined as an assessment of and reaction to an institution's design, performance, and results (Godfroit, Langer, and Meuleman, 2017).

Simultaneously, political sentiments, particularly trust, have been proven to differ significantly by gender (Campbell, 2012). According to studies, women have less political knowledge (Dow, 2009), less political engagement (Burns, 2008), less trust (Alesina and Ferrara, 2002), and interact less (Sartori, Tuorto, and Ghigi, 2017).

In this article, the following definition for trust will be operationalized:

1. Attachment to a person, collective of persons or institution, based on the well-founded but not certain expectation that he/she/they will act for my/our good.
2. The expectation, based on good but less than perfect evidence, that events will turn out in a way not harmful to me/us.

Based on the aforementioned arguments and standpoints, the following research hypotheses:

RH1: The level of self-awareness is influenced by the gender.

RH2: The level of trust in the institution is influenced by the level of trust in the institution's representative.

3. Methodology

During November 2021, we conducted an online survey among the students from the University Center of Bacau, Romania. The survey aimed to highlight the role that trust plays in forming opinions among students about the relationship with colleagues, friends, and family, but also how it relates to various state authorities, such as: parliament, government, mass media, NGOs, health system, universities, specialists, army.

The self-awareness indicator was measure using 5 questions regarding the perception of self-informed degree, the perception of the awareness regarding internal politics, foreign affairs, healthcare system, educational system and homeland security.

Also, through this research we aimed to highlight the way in which students are interested in issues related to issues related to domestic and foreign policy.

Finally, the research aims to capture the role that the high school graduate could play in adopting a cautious attitude towards his peers.

The Bacau University Center has two higher education institutions (Vasile Alecsandri University – UVA and George Bacovia University - UGB). The total number of students is 2.785 divided as follows UVA - 2.435 and UGB - 350. A cleaning procedure including completion accuracy was applied, resulting in a final sample of 633 individuals (N=633). The survey is based on percent of 22.72% from the total students, divided as follows 18.44% UVA and 52.57% from UGB.

The sample was diverse in respect to age (M=31.39, SD=10.83), gender (59.90% male), birthplace (65.60% from Moldova region), employment (64.50%), age below 30 (50.60%), age above 30 (49.40%), profile of the high school (science 45.3%, humanities 20.1%, vocational 6.50%, technical 28.10%) and university (29.10% UGB, 70.90% UVA). (Table 1)

Table 1: Participants' characteristics

	Frequency	Percent
Gender		
Male	379	59.90
Female	254	40.10
Age		
Below 30 years	320	50.60
Above 30 years	313	49.40
High School Profile		
Humanity	127	20.10
Sciences	287	45.30
Technical	178	28.10
Vocational	41	6.50
University		
George Bacovia Univ.	184	29.10
Vasile Alecsandri Univ.	449	70.90
Birthplace		
Moldova region	415	65.60
Outside Romania	21	3.30
Other regions of Romania	197	31.10
Employment status		
Yes	408	64.50
No	225	35.50

Source: Processed by author

4. Results

Participants were asked to answer to the question about their own level of information. In this regard, 65.70% of participants appreciate themselves as being well-informed, while 24.80% are not able to say whether they are or not. Furthermore, we investigate the

perception of the degree of how well-informed participants group of friends are, university colleagues and their own family. A percentage of 71.10% appreciated that their family members are "informed and very informed", while 63.20% appreciated that the close group of friends are "informed and very informed".

Also, 38.10% of the participants had difficulties in appreciating the degree of information of their college colleagues, opting for the neutral, "unsure" option. Regarding the family members, the data show the lowest uncertainty, 13.30% (Table 2).

Table 2: Perception of well-informed degree

	Low level	Unsure	High level	NR
Friends	9.50%	21.30%	62.30%	7.10%
Colleagues	23.20%	38.50%	27.20%	11.10%
Family	9.00%	13.30%	71.10%	6.60%

Source: Processed by author

So, based on the perception of the well-informed degree, the most trustworthy groups are those of family, followed closed by group of friends.

Another survey task was to investigate the level of participant's trust in interpersonal relationship. In this regard, they were asked to choose the answer describing them best, choosing between "We can trust nobody", "The most desirable behavior is to act with caution", "We can trust all". In front of this dilemma, 93.40% of participants appreciated that the most desirable way to act in interpersonal relations is to be behave with caution. In other words, more than 90.00% indicates the participants predisposition to a cautious attitude and a low level of confidence. However, a relatively small percentage of participants (6.30%) believe that everyone can be trusted.

Furthermore, this low level of trust in interpersonal relations could affect the level of trust in institution and the representatives of the institutions. In this regard, the participants were asked to indicate the level of trust in some institutions and also the level of trust in the representatives of the institutions.

Table 3: Level of trust in institutions

	Low level	Unsure	High level	NR
Army	33.40%	17.70%	43.40%	5.50%
Secret services	37.60%	27.30%	46.70%	8.40%
Church	46.70%	16.10%	32.50%	4.60%
Healthcare system	44.80%	13.90%	39.20%	2.10%
Local authorities	60.70%	18.50%	15.10%	5.70%
Parliament	70.10%	17.10%	6.20%	6.60%
Political parties	71.90%	16.30%	4.30%	7.60%
Govern	70.50%	15.20%	7.60%	7.00%
Justice	53.40%	16.90%	23.4%	6.30%
Mass-media	64.20%	18.20%	12.50%	5.20%
NGO's	45.50%	26.40%	22.60%	5.50%
Universities	8.70%	13.90%	73.40%	3.90%

Source: Processed by author

The highest level of trust was recorded by universities, 73.40%, followed by long distance

by secret services (46.70%) and army (43.40%) and healthcare system (39.20%) on the third place. On the other side, the lowest level of trust is recorded in political parties (71.90%) and parliament (70.10%).

In other words, universities are the most trusted of all institutions. Surprisingly, the medical system does not enjoy a high degree of trust, a plausible explanation could be that of the health context faced by the whole world.

Based on the results, participants trust in institutions is very low, especially in political system. On the other hand, the political system does not seem to enjoy the trust of the survey participants at all (Table 3).

The data showed that local authorities also recorded a low level of trust (60.70%). And this could be interpreted by the fact that citizens do not appreciate local authorities as trustworthy. It should be mentioned that local authorities (especially the mayor) are elected directly by the citizen. So, in that case, the low rate of trust conduct to the idea that local authorities are not granted as trustworthy, which is essential in the trust paradigm.

Furthermore, the results show a lack of consistency between the institutions and the people regarded as representative.

RH1: The level of self-awareness is influenced by the gender

In this section, we present our findings in answer to our first research hypothesis, meaning how citizens perceive the concepts of trust how gendered these perceptions are. Therefore, we calculated the value for Cronbach's Alpha for the 6 items about the level of self-awareness, obtaining $\alpha = .81$.

Furthermore, the data collected showed that 40.10% of female appreciated themselves as having a high degree of self-awareness in generally, while men seem to have a higher percentage (59.10%).

We noticed an important difference between various aspects of society (domestic politics, foreign affairs, healthcare system, homeland security, educational system). In this regard, 29.90% of the male and 14.40% of female can't appreciate the level of self-awareness about the internal politics. The domain of foreign politics obtained the same results (33.60% of male and 13.10% of female can't appreciate the level of self-awareness) as the healthcare (32.70% of male and 16.60% of female), homeland security (32.50% of male and 15.80% of female), education (31.40% of male and 13.10% of female). These results show a very low interest in domain essential for citizens and for society.

Table 4: Descriptive of individual's self-awareness

	N	Mean	SD
Self-awareness generally	633	1.40	0.963
Self-awareness about internal politics	633	7.01	19.615
Self-awareness about foreign affairs	633	6.09	17.884
Self-awareness about healthcare	633	3.90	8.455
Self-awareness about homeland security	633	4.15	10.670
Self-awareness about educational system	633	4.56	10.622

Source: Processed by author

A Pearson correlation coefficient was computed to assess the linear relationship between gender and the level of generally self-awareness. There was a negative correlation between

the two variables, $r = -.324$, $p = .002$ meaning that gender is influencing the level of self-awareness. In our case, female seems to have a higher level of self-awareness than male.

Table 5: Correlation individual self-awareness and gender

		Gender	SA generally
Gender	Pearson Correlation	1	-.324**
	Sig. (2-tailed)		0.002
	N	633	633
SA generally	Pearson Correlation	-.324**	1
	Sig. (2-tailed)	0.002	
	N	633	633

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Code: SA - Self-awareness

The results revealed also that there is a significant correlation between individuals having a high degree of self-awareness about internal politics and foreign affairs ($r=0.781$, $p=0.00$), healthcare ($r=0.335$, $p=0.00$), homeland security ($r=0.399$, $p=0.00$).

Therefore, we can conclude that gender is influencing the level of self-awareness.

RH2: The level of trust in the institution is influenced by the level of trust in the institution's representative

We structured our hypothesis in correlating the institution with the representative of institution, meaning the political system (Parliament, Government, local authorities with the politicians), the healthcare system (hospitals with physicians), mass-media (journals with journalists), educational system (university with scientists).

The results revealed also that there is a significant correlation between the trust in media and trust in journalists ($r=0.491$, $p=0.00$), health care system and physicians ($r=0.660$, $p=0.00$), universities and scientists ($r=0.450$, $p=0.00$), church and priests ($r=0.569$, $p=0.00$).

Regarding the correlation between political system and its representatives we found out the following: politicians – local authorities ($r=0.565$, $p=0.00$), politicians – Parliament ($r=0.661$, $p=0.00$), politicians – government ($r=0.670$, $p=0.00$), politicians – political parties ($r=0.691$, $p=0.00$). Surprisingly, the lowest level of correlation is between politicians – local authorities ($r=0.565$, $p=0.00$).

Based on the data recorded, the second research hypothesis is confirmed, meaning that there is a significant level of correlation between the trust in institutions and representatives.

5. Discussion

The research reveals both intuitive and counterintuitive findings, thus making for an interesting assessment of Romanian students' behavior.

First, the main issue that must be underlined is the level of trust among students. According to their opinion, the most desirable attitude toward people is to act cautious. Basically, the very high percentage (93.40%) proves that "being cautious" is not just a current of opinion. However, it can even be considered a personality trait. Or, in this context, trust not only influences the way in which interpersonal relationships are set up. Moreover, it comes to

influence the relationship with state institutions. However, in this context, the resilience of citizens to decisions because of crisis situations seems to be explained.

In this context, trust in the state and institutions is influenced by the level of individual trust. In other words, the lower the level of interpersonal trust, the lower the level of trust in the state (Bilarri, 2014).

The results also revealed that there is a significant correlation in terms of the role of the individual - as a representative of an institution - and the level of trust. In other words, the results show that in the case of institutions that enjoy a high level of trust, the role of the interpersonal relationship is defining. Surprisingly, the relationship of trust in local authorities does not seem to be so high. One of the explanations could be that the citizen-local authority relationship is a direct one that implies the satisfaction of specific, well-defined needs. And, in this context, the lack of involvement and administrative performance could be an argument.

One last counterintuitive finding is that individuals perceive themselves as having a high level of general well-awareness, but, in specific terms, on defining elements of the society, not only are they not perceived as informed, but they have difficulties in defining themselves as being informed or not. This may be a prerequisite for further research on the level of education in social skills. Due to this lack of trust in the citizens and the level of trust in the state institutions is affected. This conclusion could be the basis for explaining some situations and phenomena associated with crisis situations.

6. Conclusions

People are inherently trustworthy beings. Indeed, they have such a tendency to trust far beyond point where facts and evidence would tell them to reject. However, when distrust sets in, it does so unexpectedly and cumulatively, and it may quickly spiral out of control. When social trust is broken, it tends to reorganize into a lower-level collective, which then forms hard borders around itself. In this paper, evidence of a possible gender gap about the level of self-awareness was brought to the fore. The findings show significant differences on self-awareness perception. This could be explained by the low level of female involving in society.

The results also showed a significant level between trust in the authorities and trust in the representatives of the authorities. In other words, we can appreciate the fact that the interaction between the citizen and the representative of the institution is defining in terms of the level of trust. There are however some limitations to the current analysis, as well as scope to expand this work in the future by investigating all the regions of Romania. Future research could start from the premise that people in certain regions are traditionally influenced by the cultural background that determines a certain way of reporting both in terms of trust in interpersonal relationships and the level of trust in authorities.

Author contributions: The author listed has made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: Data sharing not applicable.

Acknowledgments: I am grateful for the support provided by the management of the Faculty of Letters for this research.

Conflicts of Interest: The author declares no conflict of interest.

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A SYSTEMATIC REVIEW OF THE LITERATURE ON INTELLECTUAL CAPITAL MANAGEMENT, TECHNOLOGY AND INNOVATION

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Cite as: Dinu, E. (2022). *A systematic review of the literature on intellectual capital management, technology and innovation*, *Ekonomicko-manazerske spektrum*, 16(1), 58-75.

Available at: dx.doi.org/10.26552/ems.2022.1.58-75

Received: 11 February 2022; Received in revised form: 16 March 2022; Accepted: 20 April 2022; Available online: 30 June 2022

Abstract:

Research background: Since no previous work was found to cover a general assessment of the literature on the relationship between intellectual capital management, technology and innovation, this study undertook a general review of the articles dedicated to the aforementioned relationships. As demonstrated by the academic literature, organizational knowledge and innovation are grounded on intellectual capital. In the past two decades, and more so during the Covid-19 pandemic, economy and society have become deeply reliant on technology, and specifically on digital information systems. It is therefore of utmost scientific interest to assess the knowledge regarding the relationships between intellectual capital management, technology and innovation, with the view to revealing the overall significant findings on these topics.

Purpose of the article: This paper provides a first comprehensive analysis of the empirical research covering the integrated studies on intellectual capital management, technology and innovation, unveiling its extent, focus, gaps and trends, for the gain of future research.

Methods: With the aim to investigate the empirical academic papers dedicated to the relationship between the concepts of intellectual capital, technology and innovation, a systematic literature review has been conducted, covering all the articles published by the end of April 2022. In the end, based on the review protocol, 37 works have been selected and further examined.

Findings & Value added: The findings of the analysis on the core body of work in the field confirm the empirically proven significant relationships that exist between technological orientation, intellectual capital management, and innovation performance. It is envisaged that post-pandemic studies will cover under-researched areas such as the relationship between technology, intellectual capital and innovation in specific industries and sectors e.g. healthcare and pharma, or in novel business models, and the impact of advanced technologies on knowledge acquisition and management. This study facilitates future research orientation by unveiling the

literature focus so far, as well as the research gaps. From the practitioner's perspective, this study offers arguments for organizational strategy development, based on the emphasized findings.

Keywords: Intellectual Capital Management; Technology; Innovation; Systematic Literature Review

JEL Classification: 034

1. Introduction

The digitalization process continuously and profoundly changes economy and society. Advanced economies already capitalize on their innovation strategies centred on the Industry 4.0 technologies - Big Data analytics, cloud computing, IoT, 3D printing, advanced robotics - (Rupp et al., 2021), and envision the "super-smart" Society 5.0 (Fukuda, 2020). More recently, in the context of tackling the Covid-19 pandemic and its effects, information and communication technology (ICT) have become irreplaceable and ubiquitous, by enabling and supporting the management of the crisis by both public and private organizations, as well as the aftermath, bringing about strategic and behavioural changes that will endure beyond the pandemic.

In the digital economy the word "technology" constantly appears in the academic literature, being positively associated with organizational innovation - when used purposefully for management processes - (Kianto et al., 2017; Cabrilo et al., 2020), organizational performance (Coombs & Bierly, 2006; Steinfield et al., 2010; Andreeva and Kianto, 2012; Khan et al., 2019; Palazzi et al., 2020) and growth (Porter & Heppelmann, 2014). However, such findings are not always fully endorsed by other sources (Aramburu et al., 2015; Usai et al., 2021), that sometimes nuance their conclusions by underlining that IT capital supports firm performance only in coordination with other intellectual capital elements, and its value depreciates quickly because of fast technological changes and large diffusion (Bharadwaj, 1999; Huang and Liu, 2005). Orlando et al. (2020) while testing the relation between intellectual property and digital technologies concluded that the latter are marginally useful for IC creation and the curvilinear function indicates that beyond a certain level, undifferentiated use of such technologies can hinder value creation.

Nevertheless, as noted by Palazzi et al. (2020), today's economy relies on knowledge and knowledge assets are supplied by the IC components. Technological capability is seen as a significant constituent of a firm's knowledge base (Renko et al., 2009) and IT has a paramount role in enabling knowledge sharing processes (Mazzuchelli et al., 2021) and R&D (Nakahara, 2001). But, according to Orlando et al. (2020), the relationship 'IC-digital technologies' has been scarcely studied. On the other hand, though the literature on IC and innovation appears to thrive, a 2017 structured literature review conducted by Buenechea-Elberdin rendered some conflicting findings.

Despite the debates, the decades-long existence of the intellectual capital research field and the societal increased dependency on IT, it has not been possible to find in the academic literature a structured overview of these topics of interest. A first search attempt on the relationship between specific concepts such as "intellectual capital", "technological orientation" or "technological capability", and "innovation performance" yielded scarce results. As a consequence, this study set out to produce a structured review of the literature concerning the association of IC, technology and innovation. Nevertheless, given the difficulties mentioned above, it has been

decided to keep the search terms more general, since the work in this field was found to be less extensive than initially assumed. Encountering a research gap, it seemed worthwhile to scrutinize the academic literature in the field, to reveal its extent, to classify its focus and findings, and to emphasize the research trends. This research endeavours a first systematic literature review of the literature concerning intellectual capital management, technology and innovation with the aim to extend the theoretical framework. Apart from its novelty and contribution to the Intellectual Capital field, this study offers to practitioners' arguments for organizational development through strategic orientation, by highlighting the empirical findings regarding the relationship between IC resources' management, technological orientation and innovation performance. In order to scrutinize and analyse the papers that cover the subjects, with the view to reveal the literature's interest, gaps and streams, the following research questions have been formulated:

RQ1: What has been the focus and the framework of the scientific literature on the relationship 'intellectual capital management-technology-innovation'?

RQ2: What are the trends in the study of the relationship 'intellectual capital management-technology-innovation'?

The paper follows the structure already established in the academic literature, by presenting a review of the concepts, explaining the research method, providing the findings and discussing them, and proposing some conclusions.

2. Conceptual framework

2.1 Intellectual capital management

The concept of IC was introduced by Galbraith already in 1969 (Bellucci et al., 2020). However, even nowadays, there is no broad, common understanding of the IC definition or its components (Choong, 2008). Nevertheless, it is accepted that IC is grounded on knowledge resources that have the potential to be transformed into value (Buenechea-Elberdin et al., 2018). Santos-Rodrigues et al. (2011) have stated that the aim of IC management is to harness the value of knowledge. According to Kianto et al. (2010), while knowledge management (KM) is concerned with the management of information and knowledge at tactical and operational level, IC management is focused at strategic level and comprises a variety of intangible resources.

Knowledge and information have strategic importance for organizations (Bratianu & Orzea, 2010; Paoloni et al., 2020) and knowledge is the fundament of value creation (Nielsen, 2019). The reiteration of the tacit and explicit (codified) knowledge processes ensures organizational innovation, where enterprises create and share knowledge that is afterwards embedded into new products and technologies (Nonaka, 2007). Heffner and Sharif (2008) have posited that knowledge creation and technological innovation are the outcome of fusion processes between knowledge, technologies and various organizational resources.

Knowledge is found in various forms and organizational areas. The tacit knowledge flow is associated with the human capital (HC), which was seen by Bontis (1998) as the fundament of innovation and strategic renewal. Knowledge is transformed into structural capital through organizational routines, that ensure efficiency and innovativeness, while information is codified into structural, explicit knowledge. Building on the model introduced by Edvinsson and Malone (1997), IC came to be traditionally seen as comprising human capital (HC), structural capital

(SC) and relational capital (RC). Information and networking systems pertain to SC (Petty & Guthrie, 2000).

Kianto (2007) proposed another IC dimension, the renewal capital. Inkinen et al. (2017) presented a model of the IC structure that includes seven components, namely trust capital and entrepreneurial capital, in addition to the previously mentioned elements, and then divides the relational capital into internal and external. Altogether, these assets provide a company the means to build new knowledge and skills, to achieve competitive advantage and to innovate, and thus to renew its knowledge resources (Inkinen et al., 2017; Kianto et al., 2010). According to Martinde-Castro et al. (2013), SC is organizational knowledge expressed through intellectual property rights, R&D, databases, structures, processes, and systems.

Quinn et al. (1996) argued that companies can capitalize on intellectual and information processes, which are the bases for profit in the new economy, i.e., through R&D and technological innovation, as well as through the use of advanced ICT, that can increase the value of IC (Murray et al., 2016). Technological and network competences positively influence innovation success in the digital economy, and they are linked to the organizational technological strategy (Ritter & Gemünden, 2004). But the impact of IC on organizational performance can be different in advanced versus emergent economies, affected by brain drain, underdevelopment of intangibles, and (IC) management (Kianto et al., 2018).

2.2 Technological capability, technological orientation and technological intensity

According to Gatignon and Xuereb (1997) technological orientation (TO) is a dimension of strategic management that refers to an organization's propensity to acquire and employ advanced technologies to sustain innovation. Halac (2015) sees TO as a multidimensional construct, which comprises top management capability, technological capability, commitment to learning and commitment to change.

Within the dynamic capabilities framework, the technological capability (TC) is concerned with competence renewal to adapt to a changing environment, where competition is fierce, especially in the high-technology sectors (Teece et al., 1997). Campos et al. (2020) view TC as innovative technologies prowess, which includes acquiring, adapting and perfecting such technologies for organizational needs. TC implies the faculty to carry out the required organizational technical functions that lead to effectiveness and efficiency, but also allow the development of new products and processes (Tzokas et al., 2015). Furthermore, developing TC is linked to exploratory and exploitative learning, relying on absorptive capacity (AC).

The digital transformation requires understanding technology, and is contingent on AC and partnership interdependencies (Siachou et al., 2021). Technological AC relies on an organization's ability to take in knowledge assets and to valorise them as dynamic capabilities. AC associated with TC that depend on advanced technologies impacts new product development (Tzokas et al., 2015; Wua et al., 2019).

Companies with higher technology intensity are better placed to innovate (Kianto et al., 2017). Technology intensity has been defined within the ISIC rev.3 framework to differentiate between four levels of technology utilization in manufacturing industries, namely high, medium-high, medium-low and low (OECD, 2011). Smart technologies can support not only the operational management (e.g. transport and distribution, quality checks, etc.), but also strategic tasks, like resource planning, staff selection, etc., (Gerst, 2019). Technological transformation inside an

organization is usually linked to enhanced IC components i.e., structural and human (Brynjolfsson & Hitt, 2000, 2002).

2.3 Innovation

Successful companies rely on innovation, whose key driver is IC (Buenechea-Elberdin et al., 2017a). Innovation has been described as the organizational capacity for renewal of products, services, processes, strategies, management activities, etc., which should permeate the entire organization (Nisula & Kianto, 2013). According to Gatignon et al. (2002) innovation can be understood within a structural framework that includes four dimensions, namely product complexity, innovation locus (core vs. peripheral), innovation type (generational vs. architectural, i.e. changes in subsystems or linkages between them) and innovation characteristics (incremental vs. radical, and new acquisition of competence vs. enhancing/destroying competence).

Subramanian and Youndt (2005) found that innovation in business has been studied from perspectives such as organizational knowledge and KM, and they stressed the link between IC and innovation. It has been posited that IC components have different impact on the types of innovative capabilities, depending on how they are combined. The innovation capability has been defined as the ability to convert knowledge and ideas into new products and processes (Lawson & Samson, 2001). More recently attention was drawn to the concept of open innovation, which is understood in opposition with the closed model, as inbound and outbound knowledge flows, to stimulate the internal innovation and to secure markets for its external use (Chesbrough et al., 2006).

The management of innovation has been analysed from the point of view of innovation degrees (incremental or radical), innovation types (product or process) and innovation sources (generation or adoption) (Dost et al., 2016). Innovation management is complex, as it has to organize and direct relationships between new ideas, multiple stakeholders, numerous and intricate transactions, while institutional leadership should ensure organizational strategies, culture, structure and systems that sustain innovation (Van de Ven, 1986). While incremental innovation improves and exploits existing technology, radical innovation is disruptive, by questioning existing knowledge and aiming for new solutions (Subramanian & Youndt, 2005). Product innovation is significantly linked to R&D in technological-intensive industries, while process innovation is more important for other sectors (Hervas-Oliver et al., 2021).

According to Verbano and Crema (2016), innovation performance is dependent, apart from the technical resources, on their management inside the company, and larger firms are favored, while small and medium size enterprises (SME) have to be more agile and to develop their IC to innovate, as they have limited resources compared to bigger companies.

Research has provided mixed empirical results on the relationship between technology and innovation (Kohli & Melville, 2018). Though IT usage was not found to have an impact on innovation processes and performance, findings showed that this association is positively influenced by higher TO (Haug et al., 2021). Carmona-Lavado et al. (2013), on the other hand have determined that IC components - particularly HC - influence innovation performance in technical knowledge-intensive business services (t-KIBS), namely in the software and R&D

industries. Unlike professional KIBS (p-KIBS) which offer consultancy, i.e., in legal, accountancy, or advertising field, and which are themselves users of technology, t-KIBS are more innovative in the IT industry. At the same time, the effect of renewal capital and entrepreneurial capital on innovation is related to the technology level (Buenechea-Elberdin et al., 2017b). Technological diversification strongly impacts innovative capability (Quintana-Garcia & Benavides-Velasco, 2008).

3. Methodology

In line with Tranfield et al. (2003) and Massaro et al. (2016) works concerning systematic/structured literature reviews, a protocol for review has been developed. Subsequently selected works have been collected for further analysis and data has been extracted in accordance with a structured framework, as to allow examination. The insights achieved after analysis grounded the answers to the research questions stated in the introductory part of this paper.

For this study the review protocol comprised the following inclusion/exclusion criteria:

- papers regarding the relationship between IC management-technology-innovation;
- articles published in academic journals, subject to peer-review, to ensure accurate and valuable insights;
- work based on empirical research that concerns management and business, with the view to provide objective, reliable and generalizable results, useful for both practitioners and academia;
- research contained in main academic databases accessible online, published until 25 April 2022;
- studies written in English, which is deemed the language employed by academia (Buenechea-Elberdin, 2017).

In the first phase, the established databases for academic purposes Scopus and Web of Science (WoS) Core Collection have been interrogated, by using the search terms “‘intellectual capital* AND innovation* AND technolog*””, the volume of returned results being comparable, 257 vs. 253 respectively, and therefore ensuring cross-checking. The search included title/abstract/key words/article and has been refined for the categories: management, business, economic, social sciences multidisciplinary, computer science. A keyword search on Scopus, using the predefined terms “‘intellectual capital””, and its components “‘human capital””, “‘social capital””, “‘relational capital””, “‘organizational capital””, as well as “‘knowledge management””, “‘technology””, “‘innovation”” led to further narrowing the results to 178 entries.

In the second phase, abstracts of the identified articles have been checked individually, and 39 articles have been retained from the WoS collection, and 35 from Scopus, for further full text examination. In the third phase, the scrutiny has extended to sources identified in the references of selected works. In the final phase, a total number of 37 documents have been included in the list of studies to be analysed for the systematic review.

From this sample, data for analysis has been extracted according to the following framework: publication year, author(s) name, article title, journal of publication, citations, author(s) country, sample's country, industry, technology type, firm type, method, sample size, findings (Appendix Table 1).

4. Results

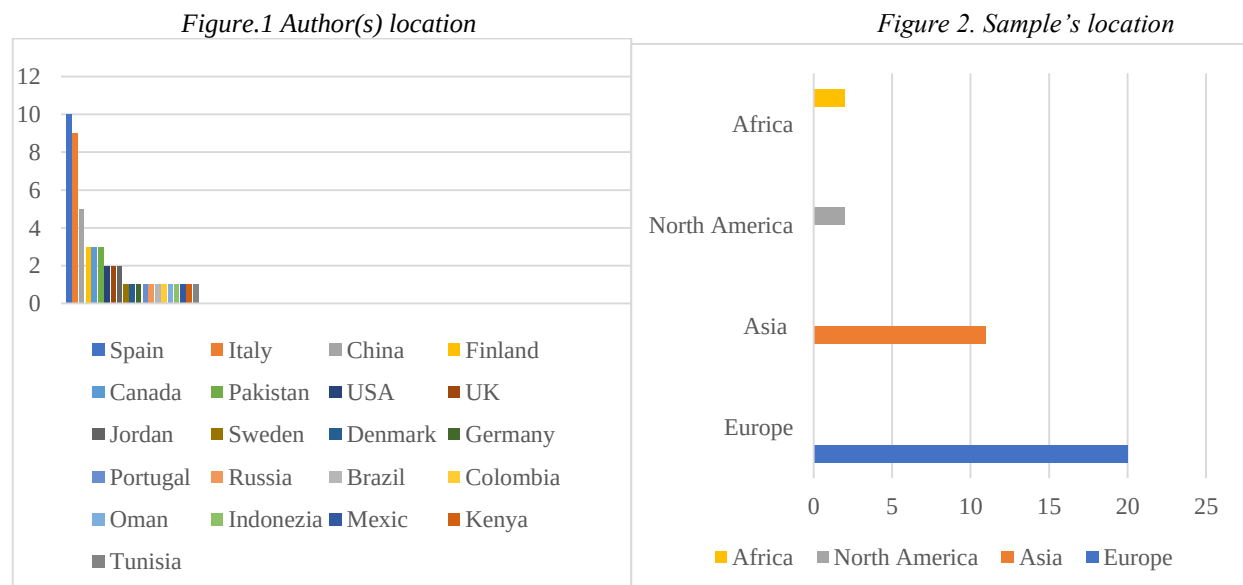
Author(s) and Sample Location

As indicated by the data plotted in Figure 1, Spain is the country with the greatest number (10) of articles testing the relationship between ‘IC-technology-innovation’. Italy is second with 9 articles. In the third position is China/Taiwan with 5 papers. Finland, Canada and Pakistan are in the fourth position, with 3 articles each, then USA, UK and Jordan with 2 articles each. Countries where IC first gained prominence - Sweden and Denmark - are represented with one article each, as do Russia, Kenya, Tunisia, Colombia, Brazil, Oman, Mexico, New Zealand and Indonesia.

In the vast majority of cases, researchers investigate local and regional companies. As a consequence, the same positions in top 3 based on sample location are occupied by the same three countries: Spain, Italy and China/Taiwan. The research focus on the local business could be justified by a better knowledge of the local business environment, facilitated access to databases within local projects, and also the location of the co-authors. It can be concluded that the topic that makes this paper’s object has been mostly researched in Europe (20 articles) and Asia (11 articles), while North America and Africa were responsible for two articles each, as reflected in Figure 2.

International cooperation

One third of the selected articles (13) have been co-authored by researchers from different countries. It can be noted that Spain is again a front runner, with 5 articles on this topic written in international co-authorship, then comes Finland. While Italy constantly appears among the top countries in the IC discipline research, Italian researchers are represented here only with national groups of authors.



Source: Author's analysis

Specialized authors

Spain is on top position once more in respect of authors that specialize on topics related to IC, innovation and technology, with two researchers that have jointly written 3 articles on the subject, namely Miriam Delgado-Verde and Gregorio Martín-de Castro (2011, 2013, 2016).

Citations

Table 2 shows the articles with more than 50 citations in WoS, Scopus or combined.

Table 2. Most cited articles

Year	Author(s)	Title	Citations	
			Wos	Scopus
2009	Renko, M., Carsrud, A., Brännback, M.	The Effect of a Market Orientation, Entrepreneurial Orientation, and Technological Capability on Innovativeness: A study of Young Biotechnology Ventures in the United States and in Scandinavia.	121	147
2005	Huang C.J., Liu C.J.	Exploration for the relationship between innovation, IT and performance.	-	125
2015	Tzokas, N., Ah Kim Y., Akbar H., Al-Dajani, H.	Absorptive capacity and performance: The role of customer relationship and technological capabilities in high-tech SMEs.	92	113
2016	Delgado-Verde M., Martín-de Castro G., Amores-Salvado J.	Intellectual capital and radical innovation: Exploring the quadratic effects in technology-based manufacturing firms.	48	56
2016	Murray A., Papa A., Cuzzo B., Russo G.	Evaluating the innovation of the Internet of Things. Empirical evidence from the intellectual capital assessment.	35	42
2013	Martin-de Castro, G., Delgado-Verde, M., Amores-Salvado, J., Navas-Lopez, J.E.	Linking human, technological, and relational assets to technological innovation: exploring a new approach.	34	40
2016	Verbano C., Crema M.	Linking technology innovation strategy, intellectual capital and technology innovation performance in manufacturing SMEs.	31	40

Source: Author's analysis

Articles & Journal of Publication

As confirmed by the analysis, articles on the relationship IC-technology-innovation are published not only in the journals dedicated to the field of intellectual capital, but also in journals that focus on innovation and technology. The number of articles focusing on this topic appears to have been increasing each year almost without exception, with a peak in 2020/2021, which is in concordance with the technological development and its impact on society. It is too early to assess the evolution for the current year, but the year 2022 has been marked in the plot, as one article has been retained in the selected articles' list (Figures 3, 4).

Industry and Technology Type

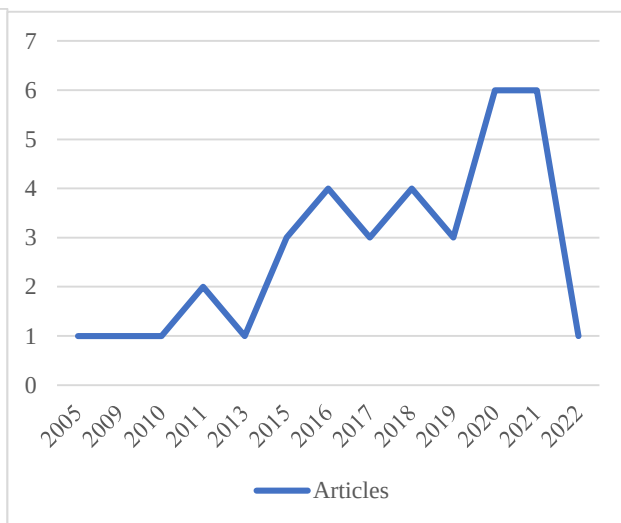
The selected articles cover a range of economic sectors, cross sector manufacturing and services being investigated the most. A couple of articles are dedicated to FinTech and biotechnology respectively, and one to pharma industry and agriculture each. As anticipated, the

overarching technology researched is ICT, even in those cases where the generic term “technology” is used, without further specification. The intended use of the term becomes apparent only after studying the constructs utilized, when content is available. In few cases the specific technology concerned by the study is described. In three cases the subject of research are specifically the digital technologies associated with Industry 4.0 (i.e. 3D printing, Big Data, cloud computing, robotics, IoT), and they have been published during 2021-2022 (Figures 5, 6).

Figure 3. Journal of Publication



Figure 4. No. of articles/year



Source: Author's analysis

Figure 5. Industry sector

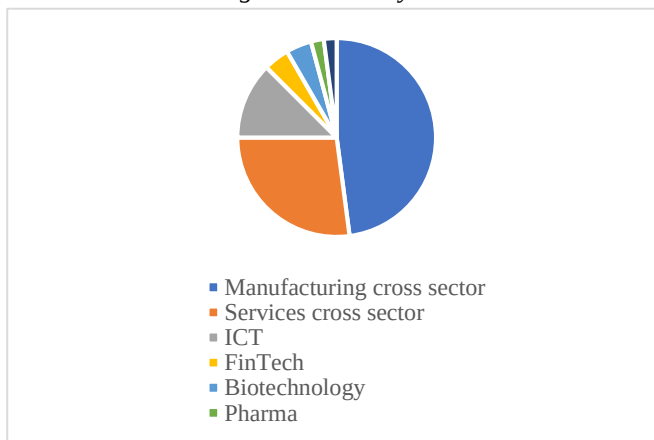
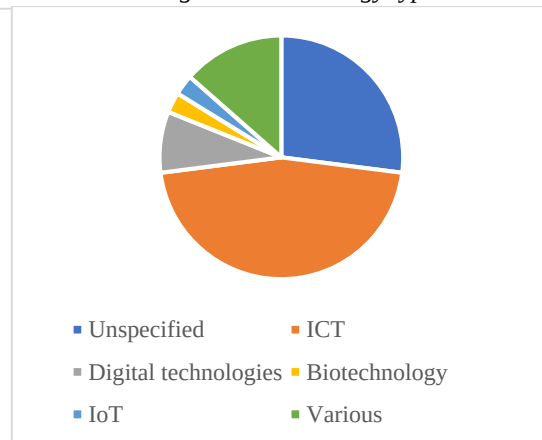


Figure 6. Technology type



Source: Author's analysis

Firm Size and Sample Size

The distribution of data shows that various firm types (SME, large, combination) have been investigated, with SMEs being predilect. The sample size ranges from one firm (case study), to vast regional (EU) data sets (Figures 7, 8).

Figure 7. Firm type

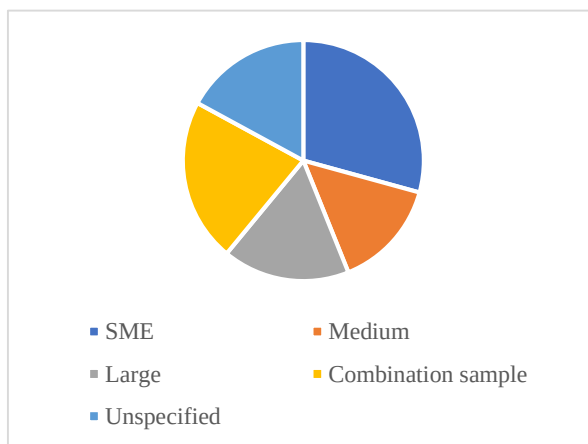
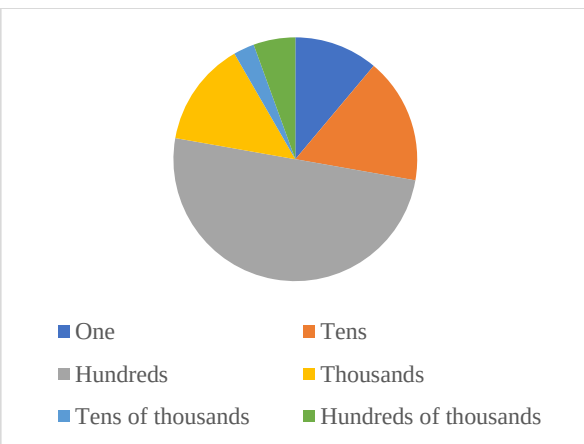


Figure 8. Sample size

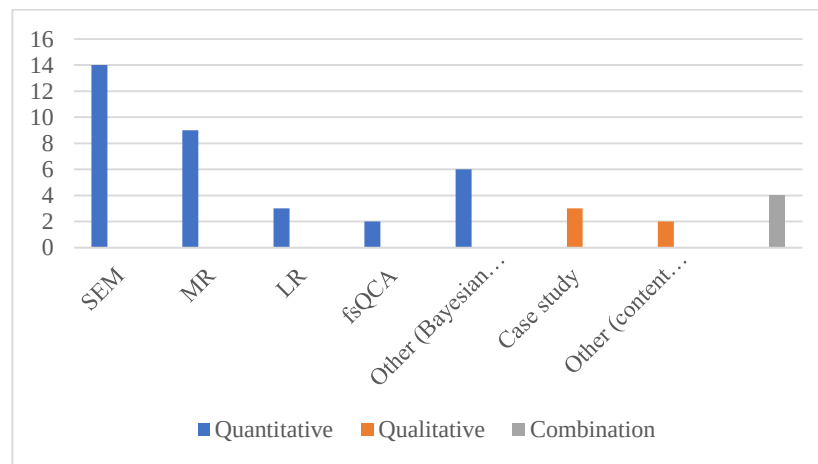


Source: Author's analysis

Method

Quantitative methods have been preferred by researchers, which indicates an inclination towards achieving empirical, objective and generalizable results. While a variety of methods have been utilized, the structural equation modelling is prevalent in 14 cases, as shown in Figure 9. Qualitative methods encountered more often were case studies and interviews. A combination of quantitative and qualitative methods was used in 4 cases.

Figure 9. Method employed



Source: Author's analysis

5. Discussion

With the view to answer the first research question (RQ1), concerning the focus and framework of the scientific literature on the relationship ‘intellectual capital management-technology-innovation’ we could distinguish between three main streams of research:

5.1 Technological orientation as enabler of IC management to leverage knowledge for innovation

According to Kipkirong Tarus and Kiptanui Sitienei (2015), while IC influences innovativeness in small firms, larger firms are better placed for harnessing structural capital through ICT systems and increase innovativeness, unlike SMEs, which have to remain nimble to substitute for the lack of extensive resources (Verbano & Crema, 2016). A proper IT infrastructure supports better synergy between business functions and improved management processes (Torre et al., 2020). Technological capital together with RC can substitute for other IC components in older firms (Martin de Castro et al., 2013). Zhang and Lv (2015) confirmed a significant relationship between social capital and supply chain learning and technological innovation. ICT usage enables IC development and innovation (Delgado-Verde et al., 2011; Murray et al., 2016; Cassol et al., 2016; Molodchik & Jardon, 2017; Andersson et al., 2021) e.g. by providing HC with advanced training and education capabilities, collaborative tools, networking opportunities for exchanging knowledge (Steinfeld et al., 2010; Cabello et al., 2011). However, as stressed by Cabrilo et al. (2020), Huang and Liu (2005) having the technological capacity is not sufficient and what is important is how organizations utilize it to manage IC and create value. In addition, an appropriate IT system can be a remedy to fragmentation of knowledge, especially in the case of geographically dispersed teams (Mazzucchelli et al., 2021). Also, according to Andersson et al. (2021), harnessing the potential of advanced technologies is dependent on the organizational absorptive capacity.

5.2 Technological capital as an organizational dynamic capability to enhance innovation performance

While referencing Gatignon and Xuereb (1997)'s work on TO, a strategic dimension leveraged to achieve innovation, Renko et al. (2009) focused their work on the technological capability, described as an organizational pledge to expand its IP and R&D, pertaining to a firm's knowledge base. The authors found that technological capability is a predictor for product innovativeness, as confirmed also by Mulyana et al. (2019). Other authors defined TC as organizational endeavours to master innovative technologies (Campos et al., 2020; Wang et al., 2020). Rehman et al. (2022) have determined a significant relation between IC, IoT, interorganizational learning and innovation performance

As Martin-de Castro et al. (2013) indicated, the technological capital comprises the blended organizational knowledge such as R&D and IP, connected to the activities and functions of the operational technical system, aimed at generating new products and services. Technological knowledge affects the innovation capabilities (Galeitzke et al., 2017). According to Najjar et al. (2020) advanced technological capital supports open innovation (OI) by integrating external knowledge, and OI is grounded on ICT platforms that enable communication and knowledge exchange. Knowledge management for OI relies on IC management and technology assimilation Terán-Bustamante et al. (2021). Unlike incremental innovations, radical ones require changes in a company's technological trajectory and associated competencies (Delgado-Verde et al., (2011). However, as underlined by Delgado-Verde et al. (2016), excessive investments in technological capital are not reflected in radical innovation performance.

5.3 Technological intensity and organizational performance

Technology intensity (TI) augments the positive effect of HC efficiency on firm performance (Palazzi et al., 2020). Buenechea-Elberdin et al. (2017, 2018), Martín-de Castro et al. (2013) established that TI mediates the relationship between IC and business performance, as well as innovation. IT knowledge and infrastructure prevail in highly innovative SMEs (Popa et al., 2021).

Mahmood and Mubarik (2020) stated that technological absorptive capacity (TAC) allows companies to adapt and grow within a dynamic industry context, and IC is paramount in stimulating TAC and innovation. OI enables organizations to enhance technological competences by assimilating external technologies and technological knowledge. TO positively affects performance (Masa'deh et al., 2018; Khan et al., 2019; Andersson et al., 2021) and the interaction between HC and SC is required in order to leverage innovative technologies (Cavicchi & Vagnoni, 2018). New technologies offer the tools for improved performance, enhanced knowledge management and are essential in generating value (Torre et al., 2020).

The positive effect of technology is not undisputed, though. According to Usai et al. (2021), Orlando et al. (2021) digital technologies increase firm efficiency, but they can negatively affect HC and RC, through reduced interactions and standardised learning. Nevertheless, digital technologies such as 3D printing, robotics, and Big Data analysis are valuable for innovation up to a certain extent.

5.4 Emergent research trends

This section aims to provide the answer to the second research question (RQ2).

As Martin-de-Castro et al. (2019) have noted, despite the fact that the study of IC has approached maturity, this field of study still has an interdisciplinary nature, and its findings are not unified and undisputable. The cited authors have also stated that, since the inception of this research field, several phases corresponding to specific periods could be distinguished, namely conceptualization and business focus (1990-1999), measurement and management models, including IC component research (2000-2009) and IC as a practice (2010-2016). In this respect, taking into consideration the evolution of ICT, which is either the driver or the enabling technology studied in relation to IC, it can be concluded that the literature reviewed for our topic corresponds to the third phase.

Looking at the analytical data presented in the previous section, while taking into consideration the current global economic and social setting, it can be suggested that the research could be heading towards the study of IC, technology and innovation in various industries and sectors, especially since some currently relevant ones are under-researched e.g. healthcare, pharma and green IC. Furthermore, the effect of technology advancement e.g. robotics and AI on HC, knowledge generation and innovation is still to be undertaken. The relationship between IC and innovative business models that rely on new technologies is another avenue for investigation. Finally, studies that employ new research methods that rely themselves on advanced technologies e.g. machine learning, vast data sets, etc., are expected to become more numerous.

6. Conclusions

Following a systematic literature review, what could firstly be stressed as a consequence is the need to build a more in-depth conceptual framework underlying the research on the relationship ‘IC management-technology-innovation’, which should also be better embedded in practice, with the aim to understand how organisations actually use technology in developing IC for operational and strategic purposes. As various investigations have brought out conflicting findings, researchers should consider the fitness of the frameworks and the methodologies used, as well as the specificities of the local business context and the proper understanding of the technology concerned.

Despite the fact that many digital technologies and other ICT enabled technologies originated or are extensively employed in North America, it appears that the focus on their relationship with IC is mainly an endeavour of European and Asian researchers, therefore a large geographical area is not covered by the current research. At the same time, certain economic sectors have scarcely made the object of IC research in the proposed paradigm, e.g., healthcare, pharma, agriculture, fintech etc. Most studies have focused on general purpose ICT applications, while technologies pertaining to the Industry 4.0 framework have just started to be considered by researchers.

As a theoretical contribution to the extant literature, the present study provides an unprecedented overview of the empirical work testing the relationships between intellectual capital, technology and innovation. Furthermore, this paper provides an integrated analysis of the research focus in the indicated fields, revealing its prevailing themes and trends, as well as its gaps. From a practitioner’s perspective, this work emphasizes the recurrent findings that confirm

significant correlations between intellectual capital, technological orientation and innovation, offering therefore an argument for organizational strategy development.

Some limitations arise. First of all, this research has considered only empirical - and not theoretical – studies regarding the abovementioned relationships. Secondly, the research involved only sources available in the online databases, and could have overseen therefore some older works which could not be retrieved online. Finally, the selection of the articles was restricted to those papers associated primarily with the fields of management and business, and could have omitted works published in journals dedicated to further-related scientific domains.

Author contributions: All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: The Appendix containing the selected list of articles can be accessed openly using the link: <https://figshare.com/s/d0caa98ac62d5294a8f9>.

Conflicts of Interest: The author declares no conflict of interest.

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MACROECONOMIC ENVIRONMENT FACTORS AND SMALL BUSINESSES CREDIT ACCESSIBILITY

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Cite as: Okunbanjo, O.I., Ojenike, J.O., & Fakunmoju, S.K. (2022). Macroeconomic environment factors and small businesses credit accessibility, *Ekonomicko-manazerske spektrum*, 16(1), 76-90.

Available at: [dx.doi.org/10.26552/ems.2022.1.76-90](https://doi.org/10.26552/ems.2022.1.76-90)

Received: 26 September 2021; Received in revised form: 29 November 2021; Accepted: 13 January 2022;
Available online: 30 June 2022

Abstract:

Research background: The importance of small businesses in developing economy like Nigeria cannot be over stressed. Small businesses need funds to actualize their objectives through operational activities. However, the conditions for accessibility of funds have been difficult.

Purpose of the article: Therefore, the study examined macroeconomics environment factors and small business credit accessibility in Nigeria.

Methods: The study adopted longitudinal research design and secondary source of data collection. The study employed robust least square as statistical analytical method. The findings showed that exchange rate does not have significant effect on credit to small businesses. Lending rate and liquidity ratio have significant effect on credit to small businesses.

Findings & Value added: The study concluded that lending rate and liquidity ratio are the predictors and determinants for credit to small business in Nigeria. Thus, the study recommended that the controller of Nigerian economy should adopt measures to stabilise the country's foreign exchange. Also, Central Bank of Nigeria should continue with the way and manner at lending rate and liquidity ratio are being maintained. Also, the government through the apex bank should establish a commission or set up a committee that will oversee and monitor the credit to small business operators if the credits are judiciously utilized. The study added that only liquidity ratio and interest rate affect the accessibility of funds by the small businesses. The findings of the study will be useful for controller of Nigerian economy and small business owners.

Keywords: Macroeconomic Environment; Exchange Rate, Lending Rate; Liquidity Ratio
Credit to Small Businesses

JEL Classification: B22; C12; E60; M00

1. Introduction

Every business organisation operates in an environment where they compete with each other to gain vantage market operation. This environment that businesses are operation has been tagged business environment. Generally, there is no certainty in business environment. This makes business environment to be unpredictable by business analysts and it is dynamic in nature because business environment is a set of forces and conditions in and outside the organisation boundaries that affect the operations of the business. Business environment has been viewed as internal and external environment but the concern of this study is the external environment. External business environment are the forces, factors, conditions, institutions, programmes, policies and variables that are outside the boundary of a business entity that affect its operations.

In today's 21st century, no businesses around the globe can survive without sound business credit accessibility and dynamic understanding macroeconomics factors as part of external business environment such as exchange rate, lending rate and liquidity rate. Small businesses credit accessibility play vital and going concerned role in the survival of small businesses amid macroeconomics environment. These macroeconomic environment factors affect business activities which the business operators do not have power to control or manipulate but manage.

According to Olufemi and Laseinde (2019), macroeconomic environment factors determines the macroeconomic policies for an economy. In the view of Ogunbiyi and Abina (2018), the stability of macroeconomic environment is a major requirement for sustainability of an economy. Macroeconomic environment enhances national saving and investment as well as international trade (Ogunbiyi and Abina, 2018; Machi, 2011).

Main objective of every nation in the globe is the sustainability of economic growth as it measures the country overall economic development (Ali, Saifullah and Kari, 2015). Ismaila and Imoughele (2015) believed that economic growth is a fundamental requisite to development of an economy. It enhances living standard of the people (Suliman and Osman, 1994). One of the sectors that contributes greatly to economic activities that could lead to growth is small businesses sub-sector. Nwakoby et al. (2017) stated that small scale businesses are the foundation and building block for sustainable economic growth. Small businesses are parts of the forces that drive accomplishment of industrial growth and development. Therefore, small businesses plays important role in Nigerian economy and they must have access to finance because finance is an important function in executing business plan and ideas. However, studies such as Ayunku and Eweke (2020), Afolabi et al. (2016), Oaya and Mambula (2017) among others pointed that most small business collapsed due to poor access to credit and unable to determine dynamic trend of macroeconomic environment such as exchange rate, lending rate and liquidity ratio. Although among several studies reviewed, there exist paucity of studies especially within Nigeria context have investigated the effect of macroeconomic environment factors (exchange rate, lending rate and liquidity ratio) on small businesses credit accessibility in Nigeria Due to the role of small businesses in Nigerian economy and identified background issue, it is important to investigate how the macroeconomic environment factors (exchange rate, lending rate and liquidity ratio) determine small business credit accessibility in Nigeria.

1.2 Statement of the Problem

Finance is one of the major factors that enhance the accomplishment of small business objectives and at the same time, finance has been one of the major challenges of small businesses in developing economy like Nigeria. Oaya and Mambula (2017); Afolabi et al. (2016) pointed that inadequate financing of operational activities of small businesses in Nigeria is a crucial factor that poses as a problem to small business operators. It is identified that that the inadequacy in the finance of small business is as result of low external source financing.

The internal sources of finance which Muo et al. (2020) termed as financial bootstrapping for small businesses is not enough for small business owners to actualized their business goals and objectives.

One could wonder what causes the low external financing for small businesses of which the predominant external source of finance for small business is credit from the financial institutions. It cannot be told if the small business owners are not even accessible to the sources of external finance available to them. Ptak-Chmielewska and Matuszyk (2019) is of the opinion that small businesses could have access to financial institution credit if there is stability in the macroeconomic environment.

Ayunku and Eweke (2020) expressed that the business environment which small businesses operate in developing economy like Nigeria is characterized with frequent changes in the macroeconomic policies of the controller of the economy. Certainly, the frequent changes in the macroeconomic policies affect the macroeconomic environment (Ptak-Chmielewska and Matuszyk, 2019). It is yet to be cleared and affirmed if the changes in the macroeconomic environment factors (exchange rate, lending rate and liquidity ratio) have an influence in small business credit accessibility in Nigeria. In addition, numerous studies on macroeconomics environment factors have been conducted (Ptak-Chmielewska and Matuszyk, 2019; Adenomon and Ojo, 2019; Johnson et al., 2018; Afolabi et al., 2017; Jenkins and Hossain, 2016) among others focusing performance of businesses despite the fact financing is needed for businesses to perform. Studies reviewed focused on small and medium businesses without considering the fact that both businesses (small and medium) do not face the same challenges. It is on this note that the study intends to see how macroeconomics environment factors influence the accessibility of credit to small businesses in Nigeria. Therefore, the study intends to investigate the influence of exchange rate, lending rate and liquidity ratio on the credit given to small businesses in Nigeria.

2. Literature Review

2.1 Macroeconomics Environment Factors

Macroeconomic environment factors refers to those elements of government designed at the aggregate economy, generally to stimulate the economic aims of full employment, stability, and progress (Ismaila and Imoughele, 2015). Sustainability of economic growth, price stability as well as full employment are among the objectives of macroeconomic. In achieving one objective of macroeconomics could results in sacrificing another objective. This, as noted by Ilugbusi (2017); Ismaila and Imoughele (2015) implies that there is potential of conflict arising among the objectives of macroeconomic. These macroeconomic environment factors measures are requirements necessary for the achievement of internal and external balance, and the promotion of long-run economic growth (Ilugbusi, 2017). Macroeconomic environment factors captured in this study are lending rate, exchange rate, liquidity ratio and inflation rate.

Exchange Rate: It is the price of one money in terms of another money. Traditionally, exchange rate is defined as the value of the foreign currency in terms of the domestic currency (Mejekomi, 2000). An exchange rate is the amount at the currency of a nation will be exchanged for another (Adeyemi and Akinbayo, 2019; Benson et al., 2019). Odili, (2014) defined exchange rate as the domestic currency price of a foreign currency.

Exchange rate is one of the actor players of macroeconomic environment used to determine the international competitiveness and it is considered as a measure of how competitive the currency of a country is (Rasaq, 2013). Exchange rate remains a veritable tool in the growth of an economy as its stability is very germane in stimulating export and private investment

(Adeyemi and Akinbayo, 2019). According to Ezenwakwelu (2017), exchange rate is determined in the foreign exchange market. It could view as spot exchange rate or forward exchange rate. The spot exchange rate refers to the present rate of exchanging a currency. The forward exchange rate refers present quoted and traded rate which its delivery and payment could be done at a stated future date

Lending Rate: Maiga (2017) sees interest as the price which equates the supply of “Credit” plus the net increase in the amount of money in the period, to the demand for credit plus net „hoarding“ in the period. Interest rate also represents the way in which banks and other financial institutions make money as they react to the return on the use of their resources (Osadume 2018; Ibimodo, 2005).

In Nigeria, Ajayi et al. (2017) expressed that lending rate is meant to moderate the inflation rate, to influence the financial savings and investment, to promote the macroeconomic stability as well as the stability in the financial sector. Lending rate as one of the measures the economy regulatory authorities used to control the economy, and to enhance allotment of limited supply of credit among the various contending demands (Maiga, 2017). Ajayi et al. (2017) posited that there are factors that determine the fluctuation of lending rate which are government interventions, market expectations amongst others. Osadume (2018) affirmed that interest rate exists to make the most efficient use of resources or more cynically, to make profit. In banking, interest rate is said to be the charge for the use or for borrowing money while in economics it is regarded as payment for the service of capital. The classical economists argued that it is only by postponing consumption that capital can be created and to abstain, however is disagreeable and painful, so the lender is paid a reward in the form of interest.

Liquidity Ratio: Liquidity is the ability of a business entity to settle its obligations with immediacy. The particular percentage that a business normally sets aside to meet its immediate needs could be referred to as the ratio; hence, liquidity ratio. Liquidity ratio can be referred to as bank regulation policy by the monetary authority that set the minimum reserves deposit money bank must hold. According to Onyekwelu et al. (2018), liquidity ratio connotes firms’ ability to possess the requirements to meet up with its short-term obligation. Generally, cash and near cash equivalents are the requirements that aid a firm to overcome challenges of short term obligation and related challenges. Therefore, liquidity ratio is one of the tools used by the Central Bank of Nigeria to control and regulate the economy in order to achieve the desired economic goals.

2.2 Small Business and Credit Accessibility

In Nigeria, small-scale business account for about 70% of industrial employment and over 50% of the Gross Domestic Product (Odeyemi, 2003). Small Scale Industry Development Plan sees small scale business in Nigeria as any business entity with an investment capital not exceeding N150,000. The small scale industries association of Nigeria (1973) defined small scale business as those having investment (i.e. capital, land, building, and equipment of up to N60, 000 pre-SAP Value) and employing not more than fifty person. The concept of small business is being seen different across the globe at different periods. A small scale business is an enterprise with capital employed that is within N1.5 million to N50million excluding cost of land and staff strength of 11-100 employees (Adebayo and Nassar, 2014). For a small business to prosper, fund is needed which must be accessible to the small business operators.

Odufuye (2017) defined credit as the course of sourcing financial aids from the financial institutions, government agencies, and individuals in form of loan. It can also be describe as a means of obtaining resources at a certain period of time with an obligation to repay in accordance with the terms and conditions of the credit obtained. Credit accessibility therefore

means the affability of credit facilities obtainable to the small business operators. Balogun et al. (2018) is of the opinion that business plan, collateral security, interest rate, government policy, cordial relationship, networking, managerial competency, past credit performance of small business owners, as well as borrower's character are among the factors that determine credit accessibility of small businesses.

2.3 Theoretical Underpinning

2.3.1 Credit Channel Theory

Credit channel theory came into limelight from the model of Bernanke and Blinder (1988) model on monetary policy transmission. Supporters of this theory include Stein (1998); (Kashyap and Stein, 1994). The theory is of view that changes in the apex bank policies in stabilizing an economy affect the amount of loan that financial institutions majority the banks will give out the public which in turn affects the real economy. According to Bernanke and Gertler (1995), credit channel theory stressed that endogenous variations in the external sources of finance for businesses enlarge the influence of monetary policy tools on the interest rate. This implied that the amount loan or credit that will be given out by the financial institution will be altered as results of changes in macroeconomics variables that makes macroeconomic environment. Macroeconomic environment are controlled by the apex bank, therefore, it is the apex bank that can cause the changes in the macroeconomic variables. Macroeconomics variables are parts of the tools monetary authorities used as monetary policy instrument to control the economy.

Credit channel Theory believed that changes in macroeconomic variables could affect credit to business operators in two ways. The first way is via balance sheet channel (BSC). Balance sheet channel (BSC) stressed on the possibility of the influence of changes in macroeconomic factors as monetary policy instruments on the balance sheets and income statements of the borrowers which are small business operators in this study. According to Sun et al. (2010), the BSC is related to the changes in borrowers' net worth that result in increment in cost of external financing. The core instrument encompasses the link between "external finance premium" (the difference between the cost of funds raised externally and the opportunity cost of funds internal to the firm) and borrowers; the net worth of potential borrowers (borrowers' liquid assets plus collateral value of illiquid assets less outstanding obligations).

The second way is via bank lending channel. Banking lending channel (BLC) focuses the possibility of loan supply by the financial institutions. The bank lending channel (BLC) concentrated on a specific role to the financial institutions. Anders (2003) mentioned that bank lending channel can be viewed from two angles-deposit explanation and capital adequacy explanation. Deposit explanation refers to the conventional bank lending channel, while capital adequacy explanation is called bank capital channel.

2.4 Empirical Review

Ptak-Chmielewska and Matuszyk (2019) examined macroeconomic factors and SMEs bankruptcy risk in Poland. The logistic regression showed that macroeconomic factors-GDP, inflation, and the unemployment rate improved the prediction to the SMEs bankruptcy. Economic growth and macroeconomic dynamics in Nigeria was investigated by Johnson, Onakoya and Akeju (2018) from 1975 to 2015. The findings revealed that inflation contributes negatively to economic growth. Interest rate, exchange rate and unemployment impact economic growth positively. Small business credit accessibility and GDP were not included in the study.

Adenomon and Ojo (2019) investigated the impact of macroeconomics variables on economic growth from 1984 to 2017. The study employed the inflation rate, unemployment rate and interest rate as macroeconomics variables on real gross domestic product per capita. The results showed that there was long-run relationship between inflation rate, unemployment rate and interest rate on real gross domestic product per capita in Nigeria. The study failed capture liquidity ratio and exchange rate as well as credit accessibility for small businesses

Jenkins and Hossain (2016) conducted a study on macroeconomic conditions and SMEs lending in emerging economies. The study employed time series and panel data analysis to conclude that macroeconomic conditions positively influence SMEs credit and gross domestic product. Akingunola (2011) found in his study on economic growth and financing small and medium enterprises in Nigeria that there is positive relationship between SMEs financing and economic growth using investment as an indicator for economic growth. Macroeconomic environment was not part of the focus of the study. Similarly, Afolabi (2013) used ordinary least square method to report that SMEs financing is positively related to economic growth. Macroeconomic environment was not part of the focus of the study The study of Afolabi et al. (2017) on credit accessibility and economic growth in Nigeria from 1981 to 2012 through Vector autoregressive model showed that a positive but insignificant effect of SMEs financing and lending rate on gross domestic product. Other macroeconomic environment proxies like liquidity ratio and exchange rate were not captured

Halim et al. (2017) conducted an evaluation of the role of macroeconomics variables on SMEs profitability in Malaysia. The study used multiple regression analysis and revealed that exchange rate and lending rate have positive effect on SMEs profitability but inflation rate has a negative impact on the profitability of SMEs. Sofyan and Primiana (2015) used a theoretical approach to conclude that external business environment which macroeconomic environment is part of has a significant effect of SMEs performance. The study was not empirically conducted. Nwekpa and Ewans (2015) studied economic factors and performance of small businesses in Nigeria from 1970 to 2013. The results from the ordinary least square (OLS) analysis showed that inflation rate, Exchange rate, Government Tax Revenue, External Finances and interest rate as economic indices have a significant effect on the performance of small scale businesses in Nigeria. However, the study failed to capture financing part of small business operations and how it has influence Nigerian economy.

Bekeris (2012) carried out the impact of macroeconomic indicators on the profitability of SMEs in Lithuania. The study employed population and firms' number in a country, exports and imports, FDI, GDP, unemployment, inflation, taxes paid, average salary as indicators for macroeconomic. The correlation results showed that macroeconomic indicators have positive relationship with SMEs profitability. Interest rate, lending rate as well as liquidity ratio were not considered as proxies for macroeconomic environment. Also, the study did not focus on small business finance. Nwoye et al. (2015) made an inquiry in Nigeria on how the macroeconomic environment has affected the economy. The OLS analysis indicated that a distinctive relationship occurs between exchange rate, inflation rates, monetary policies, and GDP growth. The study of Onakoya et al. (2013) showed that loan to small scale entrepreneurs have a positive impact on the economic performance while interest rate has a negative impact on economic growth. Small business credit accessibility was not captured. The study was on how financing the small businesses affected the economy of Nigeria. In Bangladesh, VAR co-integration analysis was employed by Ali et al. (2015) to ascertain how important macroeconomic factors have predicted the economy. It was demonstrated that economic growth is predicted in the long run by market capitalization, foreign direct investment and real interest rate. Small business credit accessibility was not captured.

3 Methodology

Longitudinal research design was adopted because it establishes the positive and/or negative direction of the variables employed in this study. The study relied on secondary source of data collection because of the quantitative nature of the study. The study collected data from the statistical bulletin of Central Bank of Nigeria from 1985 to 2019. The study collected data on lending rate, liquidity ratio, exchange rate and credit to small businesses in Nigeria.

The study adapted the model of Ebire and Onmonya (2018) on monetary policy instruments and small-scale enterprise financing in Nigeria.

$$SSEsFin_t = \beta_0 + \beta_1 BC_{1t} + \beta_2 INTR_{2t} + \beta_3 INFR_{3t} + \beta_4 EXCR_{4t} + \mu_t \quad (1)$$

Where SSEsFin represents Small scale enterprises financing; BC represents bank credit; INTR represents interest rate; INFR represents inflation rate; EXCR represents exchange rate. In line with the objectives of this study, the equation 1 is thus re-modified

$$LogCSBs = \beta_0 + \log \sum_{i=1}^n \beta_1 EXCR + \mu_t \quad (2)$$

$$LogCSBs = \beta_0 + \log \sum_{i=1}^n \beta_1 LR + \mu_t \quad (3)$$

$$LogCSBs = \beta_0 + \log \sum_{i=1}^n \beta_1 LIQR + \mu_t \quad (4)$$

Where CSB_t represent credit to small businesses in period t; EXCR_t represents exchange rate in period t; LR_t represents lending rate in period t; LIQR_t represents Liquidity ratio in period t; β_0 represents constant; β_1 - β_3 represents parameters of the variables; μ_t represents error term in period t, and Log represent logarithm. The study employed Augmented Dickey Fuller (ADF) and Phillip Perron (PP) as unit root test to ascertain the stability of the data in order to avoid spurious results. Correlation matrix was used to confirm the relationship among the variables. The study further tested the long run relationship among the variables via Johansen co-integration test. The hypotheses of the study were tested through Robust Least Square. Robust regression was used in order to detect the influential observations in the models and overcome some traditional limitations of parametric methods of analysis

4 Results

Table 1: Unit root test for macroeconomics environment factors and credit accessibility for small businesses

Variables	ADF Values	5% Critical Values	Prob	Phillips-Perron values	5% Critical Values	Prob.
Lending Rate	6.4590	2.9540	0.0000	6.4605	2.9540	0.0000
Liquidity Ratio	7.1622	3.5530	0.0000	7.8849	3.5529	0.0000
Exchange Rate	4.0526	2.9540	0.0036	3.8928	2.9540	0.0054
Credit to Small Businesses	6.7681	2.9719	0.0000	29.5683	3.5684	0.0000

Source: Researcher's Computation

Table 1 showed the results of the unit root test of the study. Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) were adopted to ascertain the stability of the data. The results indicated that the ADF values for lending rate, liquidity ratio, exchange rate, and credit to small businesses were 6.4590; 7.1622; 4.0526; and 6.7681 respectively which were all greater than

the 5% critical values- 2.9540; 3.5530; 2.9540; 2.9719; and 2.9810 respectively ignoring the sign (ADF values > 5% critical values). Also, the values of PP for all the variables- lending rate, liquidity ratio, exchange rate, and credit to small businesses were 6.4605; 7.8849; 3.8928; and 29.5683 are greater than the 5% critical values of the variables- 2.9540; 3.5529; 2.9540; and 3.5684 respectively. For a variable to be stationery the absolute ADF and PP values must be greater than the critical values given at various percentage levels ignoring the sign.

4.1 Correlation Matrix

Table 2: Correlation matrix between macroeconomics environment and credit small businesses

	Credit to Small Businesses	Exchange Rate	Lending Rate	Liquidity Ratio
Credit to Small Businesses	1			
Exchange Rate	0.2989	1		
Lending Rate	0.3573	0.3349	1	
Liquidity Ratio	0.2895	0.1662	-0.1467	1

Source: Researchers' Computation

Table 2 demonstrated the correlation matrix among the indicators of macroeconomic environment and credit to small businesses and GDP. The results showed that exchange rate, lending rate and liquidity ratio have positive correlation values of 0.2989; 0.3573 and 0.2895 respectively with credit to small businesses. Furthermore, there is positive correlation between lending rate and exchange rate of 0.3349; there is positive correlation of 0.1662 between liquidity ratio and exchange rate. However, lending rate has a negative correlation value of -0.1467 with liquidity ratio for the period under review.

4.2 Co-integration Test

Table 3: Exchange Rate and Credit to Small Businesses

Hypothesized No. of CE(s)	Trace Test Statistic	5% Critical Value	Probability	Max-Eigen Statistic	5% Critical Value	Probability
None	26.6577	15.4947	0.0007	19.8136	14.2646	0.0060
At Most 1	6.8441	3.8415	0.0089	6.8441	3.8415	0.0089

Source: Researchers' Computation

Table 3 displayed the results for co-integration test between exchange rate and credit to small businesses from 1985 to 2019. It was indicated that there is long run relationship between exchange rate and credit small businesses. The trace test statistic result at "None" was 26.6577 is greater than the 5% critical value of 15.4947. Also, the value of max-eigen statistic was 19.8136 is greater than 5% critical value 214.2646 at None. The probabilities values for the trace test statistic and max-eigen statistic were less than 0.05% significant level. This showed that there is long run relationship among the variables.

Table 4: Lending Rate and Credit to Small Businesses

Hypothesized No. of CE(s)	Trace Test Statistic	5% Critical Value	Probability	Max-Eigen Statistic	5% Critical Value	Probability
None	20.6380	15.4947	0.0077	13.0584	14.2646	0.0769
At Most 1	7.5796	3.8415	0.0059	7.5796	3.8415	0.0059

Source: Researcher's Computation

Table 4 showed co-integration test results using Johansen test between lending rate and credit to small businesses from 1985 to 2019. The results for Trace test statistic showed a long run relationship between lending rate and credit to small businesses as the trace test value 20.6380 is greater than the 5% critical value 15.4847 with p-value of 0.0077 which is less than 0.05%. However, the value of max-eigen statistic value 13.0584 is less than the 5% critical value 14.2646 with p-value 0.077 that is greater than 0.05% at None. Therefore, the study selected the co-integration results of Trace Test Statistics. Thus, there is long run relationship between lending rate and credit to small businesses.

Table 5: Liquidity Ratio and Credit to Small Businesses

Hypothesized No. of CE(s)	Trace Statistic	Test 5% Value	Critical Probability	Max-Eigen Statistic	5% Critical Value	Probability
None	16.9350	15.4947	0.0302	13.2640	14.2646	0.0769
At Most 1	0.1152	3.6710	0.0554	3.6710	3.8415	0.0554

Source: Researcher's Computation

Table 5 showed co-integration test results using Johansen test between liquidity ratio and credit to small businesses from 1985 to 2019. The results for Trace test statistic showed a long run relationship between lending rate and credit to small businesses as the trace test value 16.9350 is greater than the 5% critical value 15.4947 with p-value of 0.0302 which is less than 0.05%. However, the value of max-eigen statistic value 13.2640 is less than the 5% critical value 14.2646 with p-value 0.0769 that is greater than 0.05% at None. Therefore, the study selected the co-integration results of Trace Test Statistics. Thus, there is long run relationship between lending rate and credit to small businesses.

4.3 Robust Least Square

Hypothesis one: Exchange rate does not have significant effect on credit to small businesses

Table 6: Regression Results for Exchange Rate and Credit to Small Businesses

Independent Variable	Coefficient	Std. Error	z-Statistic	Probability
C	9.8294	0.3313	29.6734	0.0000
Log(Exchange Rate)	0.1023	0.0756	1.3534	0.1759
R-Square	0.051		Rn-squared statistic	1.8317
Adjusted R-Squared	0.021		Prob(Rn- Square Statistic)	0.1759

Dependent Variable: Credit to Small Business

Source: Researchers Computation

Table 6 showed the simple regression results for hypothesis one-exchange rate does not have significant effect on credit to small businesses. The results indicated that exchange rate accounted for 2.1% of the variations in the credit to small businesses while the remaining 98.9% is accounted by other factors not captured in the hypothesis. The results showed that exchange rate has a positive but insignificant effect on credit to small businesses ($\beta = 0.1023$, z-statistic = 1.3534, p-value = 0.1759 > 0.05% significant level). The value of Rn-squared statistic 1.8317 with p-value 0.1759 which greater than 0.05% revealed the model is not significant and exchange rate has no significant effect on small business credit. Thus, the study accepted the null hypothesis.

Hypothesis two: Lending rate does not have significant effect on credit to small businesses

Table 7: Regression Results for Lending Rate and Credit to Small Businesses

Independent Variable	Coefficient	Std. Error	z-Statistic	Probability
C	6.1931	1.3119	4.7207	0.0000
Log(Lending Rate)	1.4000	0.4540	3.0839	0.0020
R-Square	0.197		Rn-squared statistic	9.5103
Adjusted R-Squared	0.172		Prob(Rn-Statistic Stat)	0.0020

Dependent Variable: Credit to Small Business

Source: Researchers Computation

Table 7 showed the simple regression results for hypothesis two-lending rate does not have significant effect on credit to small businesses. The results indicated that lending rate explained 17.2% of the changes in the credit to small businesses while the remaining 82.8% is explained by other factors not captured in the hypothesis. The results showed that lending rate has a positive and significant effect on credit to small businesses ($\beta = 1.4000$, z-statistic = 3.0839, p-value = 0.0020 < 0.05% significant level). The value of Rn-squared statistic 9.5103 with p-value 0.0020 which greater than 0.05% revealed that the model is fit for the study and lending rate has a significant effect on credit to small business. Thus, the study rejected the null hypothesis.

Hypothesis three: Liquidity ratio does not have significant effect on credit to small businesses

Table 8: Regression Results for Liquidity Ratio and Credit to Small Businesses

Independent Variable	Coefficient	Std. Error	z-Statistic	Probability
C	6.3972	1.7978	3.5584	0.0004
Log(Liquidity Ratio)	1.0020	0.4679	2.1417	0.0322
R-Square	0.107		Rn-Squared Statistic	4.5867
Adjusted R-Squared	0.079		Prob(Rn-Statistic Stat)	0.0322

Dependent Variable: Credit to Small Business

Source: Researchers Computation (2021)

Table 8 showed the simple regression results for hypothesis three- Liquidity ratio does not have significant effect on credit to small businesses. The results indicated that liquidity ratio explained 7.9% of the changes in the credit to small businesses while the remaining 93.1% is explained by other factors not captured in the hypothesis. The results showed that liquidity ratio has a positive and significant effect on credit to small businesses ($\beta = 1.0020$, z-statistic = 2.1417, p-value = 0.0322 < 0.05% significant level). The value of Rn-squared statistic 4.5867 with p-value 0.0322 which less than 0.05% revealed that the model is fit for the study and liquidity ratio has a significant effect on credit to small business. Thus, the study rejected the null hypothesis.

5 Discussion

The importance of external environment to business activities and decisions cannot be over emphasized. Macroeconomic environment is an environment that affects all business activities in an economy because the environment embraces economic factors or variables that determine economic growth. From the findings on hypothesis one, it is identified that a change in the units

of exchange rate will cause a change in the credit given to small businesses by 0.1023. This depicts that exchange rate and credit to small businesses move in the same direction which means that there is a direct influence of the exchange rate on the credit to small businesses. However, exchange rate could not predict the volume of credit that will be given to small business owners. The findings agreed with the studies of Sun, gan and Hu (2010) but disagreed with the findings of Eric (2017)

Also, lending rate has a direct influence on the credit given to small business owners in Nigeria. A change in the lending rate will lead to rise in the credit given to small businesses and lending rate could predict and determine the volume of credit that will be given to the small business owners. It could be said that lending rate does not discourage small business owners from accessing loans from the financial institutions especially the deposit money banks. Furthermore, one of the important of macroeconomic variable is liquidity ratio. It is evidenced that liquidity ratio is a determinant to credit given to the small business owners. It determines the capacity of deposit money bank to given out credit to small businesses. The findings agreed with the findings of Ebire and Onmonya (2018); Eric (2017); Saghir and Aston (2017) but disagreed with the findings of Halim, et al (2017); Sun, Gan and Hu (2010)

The findings of the study align the assumption of credit channel theory that a change in the macroeconomic environment factors influence credit facilities to the small business owners especially via the bank lending channel. This is because the macroeconomic factors such as liquidity ratio, lending rate as well as exchange rate could determine the power of financial institutions basically deposit money bank to supply to the borrowers. It is indicated in the findings that interest rate and liquidity ratio are the only macroeconomic environment factors cause a direct change on the loan accessibility for small business operators

6 Conclusion

This study focused on macroeconomic environment and credit accessibility of small business operators in Nigeria. The study revealed that exchange rate has a positive but insignificant effect on credit to small businesses; lending rate and liquidity ratio have positive and significant effect on credit to small businesses. The study concluded that lending rate and liquidity ratio are the predictors and determinants for credit to small business in Nigeria. Thus, the study recommended that the controller of Nigerian economy should adopt measures to stabilise the country's foreign exchange. Also, Central Bank of Nigeria should continue with the way and manner at lending rate and liquidity ratio are being maintained. Also, the government through the apex bank should establish a commission or set up a committee that will oversee and monitor the credit to small business operators if the credits are judiciously utilized.

Practical Implication of the Study

The findings of the study will be significant to those that are connected to monetary policy strategies. These include the government, small business owners, the public as well as the prospective researchers. It will enable the government to review its existing macroeconomics policy in order to meet current economic condition. Also, the study will make the government to understand how effective the monetary policy strategies toward enhancing gross domestic product per capital. This study will assist the public to know the contributions of macroeconomics environment factors to accessibility of credit by businesses in Nigeria. This study will serve as a platform for prospective researchers for studies that are related to macroeconomics and credit accessibility.

Future Research Challenges

Further studies on macroeconomics environment factors can be carried out on the activities of multinational firms in Nigeria, financial sectors and with foreign direct investment

Author contributions: All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: The research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Acknowledgments: The study acknowledge Professor Olajide, Olubayo Thomas of Department of Business Administration, Faculty of Management Sciences, Lagos State University, Ojo and Dr Akingbade, Waidi of Department of Business Administration, Faculty of Management Sciences, Lagos State University, Ojo.

Conflicts of Interest: The authors declare no conflict of interest.

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APPENDIX

Data for the Study (Source: CBN Statistical Bulletin various years)

Year	Exchange Rate	Liquidity Ratio (%)	Lending Rate (%)	Credit to Small Businesses
1986	2.02	36.4	9.59	15701
1987	4.02	46.5	13.96	17,531.00
1988	4.54	45	16.62	24,602.30
1989	7.39	40.3	20.44	28,108.80
1990	8.04	44.3	25.3	32,912.40
1991	9.91	38.6	20.04	32,912.40
1992	17.3	29.1	24.76	20,400.00
1993	22.05	42.2	31.65	15462.9+E27
1994	21.89	48.5	20.48	20,552.50
1995	81.2	33.1	20.36	32,374.50
1996	81.2	43.1	19.84	42,302.10
1997	82	40.2	17.8	40,844.30
1998	84	46.8	18.18	42,260.70
1999	93.95	61	20.29	46,824.00
2000	102.1	64.1	21.27	44,542.30
2001	111.93	52.9	23.43	52,428.40
2002	121	52.5	24.77	82,368.40
2003	129.3	50.9	20.72	90,176.50
2004	133.5	50.5	19.18	54,981.20
2005	133.66	50.2	17.95	50,672.60
2006	128.65	55.7	16.89	25,713.70
2007	134.05	48.8	16.94	41,100.40
2008	132.37	44.3	15.13	13,512.20
2009	132.6	30.7	18.99	16,366.50
2010	151.09	30.4	17.59	12,550.30
2011	155.89	42	16.02	15,611.70
2012	158.84	48.3	16.8	13,863.50
2013	159.25	63.2	16.72	15,353.00
2014	164.88	38.3	16.55	22837.63
2015	195.52	42.3	16.85	11307.7
2016	253.49	46	16.86	12047.85
2017	305.79	49.1	17.55	789,227.12
2018	306.08	60.95	16.9	40,393.34
2019	306.92	75.83	15.38	57699.53

FINANCIAL LITERACY AND SHOPPING BEHAVIOUR

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Cite as: Kicova, E, Gorzelanczyk, P. (2022). *Financial literacy and shopping behaviour*. *Ekonomicko-manazerske spektrum*, 16(1), 91-103.

Available at: dx.doi.org/10.26552/ems.2022.1.91-103

Received: 15 March 2022; Received in revised form: 1 June 2022; Accepted: 16 June 2022; Available online: 30 June 2022

Abstract:

Research background: Financial literacy has been a topic of discussion in recent years. The concept of financial literacy can be understood as knowledge of financial concepts, but above all as the ability to be able to orientate in the financial market, the ability to manage funds or financially secure oneself and one's family. It is also the ability to properly distribute household expenses or secure income. In our case, we want to look at the level of financial literacy in connection with the shopping behaviour of the population. Originally, the survey focused on Slovakia and Poland, but since we did not manage to obtain a sufficient number of responses from the Polish side, we will focus primarily on the survey in Slovakia and only point out the results achieved in Poland. In addressing this issue, we relied on already existing global surveys, which point to a low level of financial literacy. One of the surveys involves the OECD, which tests pupils aged 15 in certain countries at regular intervals. The Household Finance and Consumption Survey targets people over the age of 18 and tests people in multiple countries. We also conducted surveys that would point out the purchasing behaviour of the population of Slovakia during the COVID-19 pandemic, one of which was carried out by the TASR agency.

Purpose of the article: The aim of the paper is to point out the current state of financial literacy of the population in Slovakia in relation to shopping behaviour and to outline recommendations for strengthening financial literacy.

Methods: Various methods are used in the paper. By analysing the existing surveys, we determined the assumptions of the survey. Subsequently, using a questionnaire survey, we determined the level of financial literacy. We also used mathematical and statistical methods in the evaluation. Subsequently, by synthesizing the acquired theoretical knowledge and survey results, we outlined possible measures to improve financial literacy in Slovakia.

Findings & Value added: The results of the survey can be used as a basis for work in the field of financial literacy and its constant increase.

Keywords: family budget, financial literacy, shopping behaviour.

JEL Classification: G53

1. Introduction

The term financial literacy offers a wide range of definitions that are very related. According to Garg et al. (2018), financial literacy can be seen as the ability of an individual to allocate his/her available funds independently, responsibly, and efficiently. It is as a property of using skills and knowledge for optimal management and distribution of one's own funds to financially secure oneself and family (Garg et al., 2018). Some authors the financial literacy as the ability to use an individual's knowledge, skills, and experience to make effective decisions about using and managing own finances to provide lifelong financial security for oneself and his/her families (Nemeth et al., 2022). It means the ability to understand the basic financial products that people encounter in their lives daily and significantly affect their economic situation and well-being. Financial literacy as a personal or family management includes three components, namely: money literacy, price literacy, and budget literacy (Fang et al., 2018).

Foreign authors look at the issue of financial literacy similarly to Slovak authors (Gerrans et al., 2013). Financial literacy as a combination of knowledge, skills, and behaviours that are necessary for correct financial decisions and for achieving the financial well-being of an individual (Hermansson et al., 2021). Some authors defines it as the ability to track cash resources and payment obligations, knowledge of opening savings accounts and loan applications, basic knowledge of health and life insurance, ability to compare competitive offers and plan future financial needs (Rudeloff et al., 2019).

A minor difference in the definition of financial literacy can be seen in Gerrans and Heaney, according to whom financial literacy is not an isolated category but a specialized part of economic literacy, i.e., the ability to secure an income, to move in the labour market, decide on one's own salaries and ability to be aware of the possible consequences of own decisions on current and future income (Hermansson et al., 2021). Another view is about who do not look at the concept of financial literacy from a different point of view, but, unlike the above authors, add to the importance of education, which is an essential part of financial literacy (Fish et al., 2021). According to another authors, the concept of financial literacy does not only mean the ability to manage available funds, but also the ability to create own budget, know how to properly assess the value of money or orient yourself in the market of financial products (Wilson et al., 2014). Scientists have confirmed the importance of knowledge by referring to how knowledge can improve a person's financial well-being (Lin et al, 2019).

According to Worthington Financial services markets require consumers to be more financially literate if they are to manage their finances effectively (Worthington, 2013). The consumers may be overexposed to financial risks. In this respect, increasing financial literacy levels of consumers has become essential, and assessing the financial literacy of the population is a key ingredient of any policy to do so (Karakurum-Ozdemir, 2019). Financial literacy includes skills, competences, and knowledge that are essential for the proper use of the products offered by the financial market (Zhu et al., 2021). These are well-known terms such as credit, interest rate, investment, savings, pension insurance, insurance, inflation, family budget, shopping behaviour etc., which are closely related to financial literacy (Ritsalu et al., 2016). However, the aim of this paper is not to point out the basic theoretical knowledge in the field of financial literacy, but to point out the results and findings from the survey.

2. Methodology

Currently, there are several surveys focused on financial literacy. When looking for statistics, we came across many surveys, only focused on a certain age group, but especially on primary

and secondary school students. One of the latest statistics on the financial literacy of children under 15 is OECD PISA, which conducted the last survey in 2018.

All the surveys focused on the level of financial literacy show a low level of financial literacy. This problem does not only concern people living in Slovakia, but it is also a global problem, which the OECD deals also with. According to the OECD PISA measurement (2018), the average level of performance of OECD countries was 505 points. Slovak students at the age of 15 achieved an average performance of 481 points. In the cycles of the PISA study, which included financial literacy, Slovakia ranked below the average level among OECD countries with its average score. Poland is in significantly higher positions in this evaluation.

The results of the survey point above all to the below-average performance of students in Slovakia in the field of financial literacy. As we wanted to focus primarily on the age group of 18+ (productive population), it was difficult to find research that would focus on the entire population and not just on students. Finally, we found a project called Household Finance and Consumption Survey (2019) (hereinafter referred to as HFCS), which deals with the financial literacy of Slovaks, all euro area countries and some countries outside the euro area, such as Poland, Hungary, Croatia, Romania, and Czechia. The surveys have been carried out since 2010. In Slovakia, the surveys took place in 2010, 2014 and 2017. We analysed the results from the third survey (2017) in more details and compared them with the previous findings (2014). The aim of the HFCS surveys was to find out the respondents' ability to understand the basic concepts in the field of finance. In 2014, in the second wave of testing, HFCS used five questions to find out how respondents in Slovakia understand the basic concepts in the field of credit, savings, and investment. In 2017, the range of questions was reduced to four (Sharkova et al., 2013).

Although the National Bank of Slovakia and the Ministry of Education, Science, Research and Sport of the Slovak Republic (MESRS SR) have an initiative to increase the financial literacy of Slovaks and try to support it, based on these surveys we can state that the level of financial literacy in Slovakia is nevertheless, relatively low, even lower than in 2014. While in the second HFCS survey 10.6% of respondents correctly answered all questions in the third survey, the number decreased to 9.6% of correct answers. On the contrary, the number of "I do not know" answers increased to 11.3% while in 2014 only 7.4% of respondents marked this possibility of answers. This survey also shows to a positive correlation between the achieved level of education and the number of correct answers. We also found that people who draw a home loan / mortgage are more financially literate. The above research shows that there is a constant problem with financial literacy in Slovakia, even though the MESRS SR still puts education in this area at the forefront (Mihalcova et al., 2014).

Subsequently, we focused on the COVID-19 pandemic, which affected every individual, both financially, personally, and emotionally. We also dare say that it has disrupted the shopping behaviour of many people. We will look at a survey that was conducted in November 2020 and June 2021 by TASR on a sample of more than 1,000 respondents. The survey shows that people bought less consumer products in hypermarkets, and the number dropped from 40% to 25% of customers. Respondents whose net monthly income is up to EUR 800 limited their consumption and bought less. In contrast, people with a net monthly income of EUR 1,800 and more changed their shopping behaviour by making one big purchase instead of several smaller ones. Subsequently, the survey shows that in June 2021, 36% of respondents bought for consumption, mainly women. 44% of respondents shopped more often online than before the pandemic. By contrast, only 8% of respondents said they had reduced the frequency of online shopping. 22% of respondents planned to make online purchases even after the end of the pandemic, these were respondents who were aged 18-44 and had a high school diploma and a

university degree. We can therefore say that the COVID-19 pandemic significantly affected the shopping behaviour of the Slovak population.

Based on the findings presented in surveys we have identified following statistical hypothesis:

H1: There is a relationship between education and financial literacy.

H2: There is a statistically significant relationship between the level of financial literacy and the drawdown of a mortgage.

H3: There is a statistically significant relationship between age and changes in purchasing behaviour due to the COVID-19 pandemic.

The questionnaire survey was conducted in an electronic form. This type of survey has its advantages such as time flexibility, no financial costs, addressing many respondents in a relatively short period of time, the ability to set respondents not to skip a question so that they do not send an incomplete questionnaire etc. Respondents also prefer to fill in the electronic questionnaire, as it ensures a higher degree of anonymity. Thanks to it, we can more easily evaluate the obtained data. On the other hand, the disadvantage is the low computer literacy of some potential respondents and the lack of feedback from respondents. We created the questionnaire on the website www.surveymonkey.com, which is used exclusively for questionnaire surveys. We distributed the questionnaire to respondents via social networks. The questionnaire was in circulation in the period from 01/02/2022 to 04/03/2022. Before completing the questionnaire, respondents could read the accompanying text, which contained a request for completion and a brief guide to how the questionnaire will be used. The questionnaire contained 25 questions. The first 5 questions were used to find out the profile of the respondent; the questions were directing at finding out the gender, age, region which the respondent came from, highest level of education, and monthly average income netto. Since we asked questions about financial literacy, but also about the shopping behaviour of respondents, the remaining questions were divided into two parts. Questions 6 to 16 were used to identify the knowledge in the field of financial literacy; question 17 was asked to find out how the COVID-19 pandemic affected the population in Slovakia; questions 18 to 24 were used to get information on shopping behaviour; question 25 identified the impact of the COVID-19 pandemic on shopping behaviour (Mihalčova et al., 2014).

The sample size was determined using the formula mentioned below, where the confidence level was set at 95% and the allowable margin of error at 5%.

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{C^2} \quad (1)$$

where:

- n sample size,
- Z the value derived from the statistical tables, where for a 95% confidence level, the Z value is 1.96,
- p probability 0.5
- C allowable error range.

$$n = \frac{1.96^2 \cdot 0.5 \cdot (1 - 0.5)}{0.05^2} \cong 386 \text{ respondents} \quad (2)$$

As the questions in the survey were focused on the population of the age 18+, we had to correct the size of total population in Slovakia. According to the official statistics, as of

31/12/2020 the size of the population under 18 was 1,028,173 inhabitants, thereby we worked with the size of population of 4,431,608 inhabitants. Subsequently, we used a formula to calculate the correction for the sample size according to the following formula. According to the calculations, we need a sample of at least 385 respondents to complete the questionnaire survey according to the calculations (Szarkova et al., 2013).

$$n_{cor} = \frac{n}{\frac{1 + (n - 1)}{pop}} \quad (3)$$

where:

n sample size,

pop size of the population considering.

$$n_{cor} = \frac{386.16}{\frac{1 + (386.16 - 1)}{4,431,608}} = 385 \text{ respondents} \quad (4)$$

3. Results

281 respondents took part in the questionnaire survey, which is 73% of the required sample. Even given that we did not manage to complete the overall sample, it can be assumed that 73% of the questionnaire completion represents a sufficient level of notice. On the Polish side, the participating respondents represent only 48% of the sample size, precisely for this reason, as already mentioned, we will only analyse the survey in Slovakia.

129 respondents in the age category of 18-26 years participated in the questionnaire survey, which represents the highest number of respondents, followed by 81 respondents in the age group 27-42 participated and 56 respondents in the age group of 43-57 years. The fewest respondents took part in a questionnaire survey in the category of 58+, namely 15 respondents. More women than men took part in the survey; 61% compared to 39%. The inhabitants of the Žilina Region had the largest representation in the survey, followed by respondents from the Bratislava Region. The least answers were from the Prešov Region.

The most of respondents achieved a secondary education completed by a high school diploma. 67 respondents completed university education, which is 24% from all respondents. 25 respondents achieved only primary education. 42 respondents achieved secondary education (15%), and 19 respondents completed 2nd degree or higher university education (9%).

As for determining the amount of income, most respondents (34%) indicated a monthly income in the range of EUR 527 to EUR 726. On the other hand, less than EUR 526 earned 17% of respondents. In the case of this earning group, it is important to note that these respondents earn less than the official minimum wage in Slovakia (the amount of the minimum wage in Slovakia as of 01/01/2022 was EUR 525.65).

The general part of the questionnaire survey was followed by the questions from the area of financial literacy. The first question was whether the respondents are familiar with investing. Almost half of the respondents could not answer this question and therefore indicated the possibility "I do not know". 36% of respondents answered the question correctly, so the purchase of shares is riskier of these forms, and 17% of respondents answered incorrectly. Thus, the question shows that respondents do not know how to move in terms of investment.

Of the 281 respondents, 153 created a financial reserve, the rest of respondents did not. We linked this question to the gender of the respondents, and it turned out that women saved more than men. We assume that women saved more money on the financial reserve because they are more careful and can save more money than men, as in most cases a man is a breadwinner.

Other questions were focused on the area of pension provision in Slovakia. 64% of respondents answered correctly there are a 3-pillar system in Slovakia. As many as 25% of respondents marked "*I don't know*" as the answer.

Subsequently, we found out what experiences our respondents had with loans. Only 46% of them had experience with a mortgage loan. As many as 140 respondents did not use consumer credit at all. However, 93 respondents borrowed money to buy a car, 35 respondents for electronics, and 13 for vacation. Respondents did not use consumer credit at all for Christmas presents or other goods.

The concept of interest is closely related to mortgage and consumer credit. We wondered if the respondents knew what this term meant. 112 respondents correctly answered the question, i.e., 40%. More than half of the respondents answered incorrectly, i.e., that "*the interest is a fee that is paid when borrowing a loan*". 72 respondents answered, "*I do not know*", 15 respondents thought that interest was a monetary reward for credit.

Inflation has been a frequently mentioned term in recent times. According to the survey, only 12% of respondents understand this term. Half of the respondents marked the answer "*I do not know*" and we assume that the respondents ignored this question or were afraid to click another answer. Today, we consider it important to understand this concept. We were surprised that even respondents with a university degree could not answer this question. The correct answer was marked only by 19 respondents with a university education of the 2nd degree and with higher and only 15 respondents with a university education of the 1st degree.

The COVID-19 pandemic affected many people, whether health, psychologically or financially, so we found out how and whether the pandemic affected respondents at all. 40% of them began to monitor their spending more during the pandemic, i. j. 40% (113), 35% (99) of respondents managed to save money for savings, 25% (69) were not affected by COVID-19 pandemic. One option was to answer that in case of a pandemic people did not have money, so they had to take a loan, but zero respondents chose this question.

In questions focused on **a shopping behaviour** of the population and their expenditures, we found out whether the respondents monitor their expenditures monthly, i.e., whether they had under control the finances they spend on expenditures. According to the result, 159 respondents monitored their spending, representing 159.

Subsequently, based on the findings, we can divide expenses of the respondents into 12 basic groups. 14% of expenses were used to buy food and soft drinks, 12% were spent on housing, water, electricity, gas, and other fuels, 12% on clothing and footwear, 11% on transport. Other categories of expenditures were placed below 10%.

Most respondents spent 50% to 60% of their income on necessary expenses per month. 72 respondents spent up to 70% and more of income on necessary expenses. 55 respondents spent 10% to 20% of income on necessary expenses, 38 respondents spent 30% to 40% of their income, and 31 respondents did not yet have any necessary expenses. We consider the necessary expenses, those expenses that are paid at regular basis, such as rents, energy, instalments etc.

Nowadays, people are increasingly influenced by various factors or people when shopping. According to this fact, we wanted to know what people used to make decisions about buying goods and services. Our survey was completed by more young people than older ones, because the result show that the respondents most indicated that they follow influencers when shopping, who promote products on social networks. The second most used influencer are discounts,

which are displayed on TV or on the Internet; this answer was marked by 110 respondents. There were also people who still followed the leaflets, namely 32 respondents, and 10 respondents marked the answer "other" but did not indicate what other method they use.

Regarding shopping, most respondents (214) answered that they shopped spontaneously. More than 20% of respondents make a list and only 1% of respondents stated that they shopped at the instigation of advertising or otherwise. Nowadays, many people buy spontaneously, which is not right, because they buy things they do not even need, but they buy them, for example when they see they are in action or campaign.

When shopping, the price is most influenced by Slovaks – according to our results, up to 133 respondents. The answer of these respondents corresponded to the amount of income at the level of the minimum wage. People who had an income between EUR 727 to EUR 926 were already dealing with prices for products less, 8 respondents answered. They are more interested in the brand or in the quality of products and services.

As with financial literacy and shopping behaviour, we wondered if there had been any change in connection with the pandemic. More than half of the respondents started shopping online. 29% of respondents did larger household supplies and only 15% of respondents did not change shopping behaviour due to the pandemic. Thus, we can say that COVID-19 changed shopping behaviours in case of 85% of respondents.

4. Discussion

In this chapter, we will verify the hypotheses using the IBM SPSS Statistic program and summarize the results of the survey.

Verification of the hypothesis No. 1: There is a relationship between education and financial literacy.

Since we have two qualitative variables, we will use Chi-square test of the independence of two categorical variables. To verify independence, it is necessary to establish a null (H0) and alternative hypothesis (H1).

H0: There is no dependence between the educational attainment and the level of financial literacy.

H1: There is a dependence between the educational attainment and the level of financial literacy.

Subsequently, using the SPSS program, we created a contingency table of actual numbers, where we put the ratio of education and financially literate and illiterate respondents, respectively. We used this data from a questionnaire survey. We can consider as financially literate respondents those of the seven questions intended for financial literacy in the questionnaire survey correctly answered at least 5 questions. We consider financially illiterate those who answered less than 5 questions correctly.

Table 1: Contingency table of actual numbers

Education	Financially literate individuals	Financially illiterate individuals	Total
1 st level of university degree	51	16	67
2 nd level of university degree and higher	18	1	19
secondary education without diploma	3	39	42
secondary education with diploma	61	67	128
primary education	2	23	25
Total	135	146	281

Source: own elaboration

We can use the Chi-square test only if two conditions for a contingency table of the type $r \times s$ are met:

1. at least 80% of the theoretical numbers are ≥ 5
2. each theoretical frequency is at least 1.

In our case, both conditions are met, and Chi-square test can be used to identify dependence or independence between the observed variables.

Table 2: Chi-square test

Value of Chi-square	Total number	P-value (Sig.)
81.968	281	0.000

Source: own collaboration

In the following table we will look at the p-value of the test (Sig.) using which we will find out whether the contingency coefficient is statistically significant or insignificant using the alpha value of 0.05. If the p-value of the test is <0.05 , then we accept hypothesis H1, if the p-value of the test is > 0.05 , then we accept hypothesis H0.

We found that the p-value of the test (Sig.) is <0.05 , so we reject the null hypothesis and accept the alternative one that means that there is an existence of a statistically significant relationship between the achieved education of the respondents and the level of their financial literacy.

Table 3: Calculation of Phi

	Value	P-value
Coef. Phi	0.540	0.000
Cramer's V	0.540	0.000
Total number	281	

Source: own collaboration

Since we have found that there is a relationship between education and financial literacy, we can further determine the strength of the relationship between these two variables using the value of the Cramer's V. As is stated in the Figure 3, the Cramer's V is 0.540, which means a medium dependence of between education and financial literacy. In addition, the p-value of this contingency coefficient is also equal to 0.000, and we can therefore say that there is a moderately statistically significant dependence between the observed variables.

Verification of the hypothesis No. 2: There is a statistically significant relationship between the level of financial literacy and the drawdown of a mortgage.

We have applied the same methodology as in the case of the hypothesis No. 1. and worked with following null and alternative hypothesis.

H0: There is no statistically significant dependence between the level of financial literacy and using a mortgage loan.

H1: There is statistically significant dependence between the level of financial literacy and using a mortgage loan.

Table 4: Contingency table of actual numbers

	Financially literate	Financially illiterate	Total
Mortgage	individuals	individuals	
yes	60	68	128
no	76	77	153
totally	136	145	281

Source: own collaboration

We can use the Chi-square test only if two conditions for a contingency table of the type 2x2 are met:

1. sample size is greater than 20
2. all theoretical numbers are ≥ 5 .

As is obvious, both conditions were met, and the results of the Chi-square test are stated in the Figure 5. Based on them, we have found out that there is no statistical dependence between financial literacy of the respondents and using a mortgage loan, i.e., the H0 was confirmed in this case.

Table 5: P-value calculation

Chi-square value	Total number	P-value (Sig.)
0.219	281	0.719

Source: own collaboration

Verification of the hypothesis No. 3 There is a statistically significant relationship between the age and changes in purchasing behaviours due to the COVID-19 pandemic.

We worked with the following null and alternative hypothesis and used the same methodology as in the case of the hypothesis No. 1 and No. 2.

H0: There is no statistically significant dependence between the age and changes in purchasing behaviours due to the COVID-19 pandemic.

H1: There is statistically significant dependence between the age and changes in purchasing behaviours due to the COVID-19 pandemic.

We have applied the same process of verification as in the case of the hypothesis No. 1 and since all the conditions for using the Chi-square test were met and the p-value is less than $\alpha = 0.05$, we can state, that there is a statistical dependence between the age and changes in purchasing behaviours due to the COVID-19 pandemic.

Table 6: P-value calculation

Chi-square value	Total number	P-value (Sig.)
88.221	281	0.000

Source: own collaboration

According to the value of the Cramer's V, see the Figure 8, we can state that there is moderate statistical dependence between the observed variables that is statistically significant.

Table 7: Phi coef. calculation

	Value	P-value (Sig.)
Phi coef.	0.560	0.000
Cramer's V	0.396	0.000
Total number	281	

Source: own collaboration

The findings of the hypothesis can be summarized as:

1. There is a positive link between education and financial literacy. Out of 281 respondents, we consider 135 to be financially literate, i.e., 48% of all participators in the questionnaire survey. The most correct answers were given by respondents with a university degree of the 1st and 2nd degree (25% together) and 22 respondents with a high school diploma were able to answer correctly 5 and more answers.
2. The relationship between financial literacy of the population and using a mortgage loan was not confirmed in case of Slovakia, while the survey conducted by HFCS indicated a positive relationship between financial literacy and using of a mortgage loan. According to our survey, 21% of all respondents who used a mortgage loan answered 5 or more questions correctly, while more that 27% of respondents who did not use it.
3. Interdependence was confirmed between the age of respondents and changes in online shopping during the COVID-19 pandemic. Of the respondents in the age category of 18-26 years, 26% started shopping online, 13% made larger household stocks and only 7% of respondents did not change their shopping behaviour during the COVID-19 pandemic.

Based on the results of our survey, we recommend to strength education of pupils of primary and students of secondary schools in the area of financial literacy.

Based on the low level of financial literacy of primary and secondary school students, the National Standard for Financial Literacy (NSFL) prepared the standard, the version 1.0, that

was approved by the Government of the Slovak Republic in 2008. The newest standard, version .2 has been in force since 2017 and focuses on topics such as financial responsibility, securing money, savings and investing, etc. This standard was to be incorporated into primary and secondary school curricula but was not mandatory. The State School Inspectorate (2015) examined in the school year 2014/2015 how many primary and secondary schools incorporated the standard into the school educational programs. The inspection was performed at 165 primary schools and 29 grammar schools in Slovakia. The results indicate that 33 primary school did not work with the NSFL at all, 65 school incorporated the standard partially, and 67 school incorporated comprehensively.

We also want to point out the need to optimize household spending. This measure follows from both the questionnaire survey and the ever-increasing inflation. It is astonishing that the inhabitants of Slovakia do not understand the concept of inflation and it follows that we cannot even adequately prepare for it. According to the questionnaire survey, food expenditure is also the largest household expenditure. It is these expenses that are necessary, but on the other hand, as follows from shopping behaviour, even the most “spontaneous” purchases. We therefore recommend monitoring expenses and optimizing them.

Expenditures on housing, water, electricity, gas, and other fuels belong to the second group of the most frequently consumed expenditures. Gas prices also increased by 19.6% and electricity by 11.7% compared to the previous year. We recommend people to save electricity. In many households, e.g., there are also several TVs, PCs, or various other appliances and members of families should think about their use and try to limit their consumption.

Expenditures on clothing and footwear are consumed expenditures on which respondents spend their finances. As many as 12% of respondents chose this group of expenditures on which they spend the most income. We assume that these are young people who do not yet have their own families or housing. It is good to think whether people will buy like this even if the prices of all consumer spending continue to rise, which will certainly rise. We suggest that when shopping for clothes, people should reach for discounted pieces or shop in second-hand shops (chisels). Alternatively, to reach for quality pieces that will last them longer, this is what the consumer’s financial literacy says.

Each of us must have felt the higher transport costs. It is important to note that the car transport is used daily and is a certain human standard. Many households use cars every day for short and long distances. Fuel prices increased by 22% year-on-year, as did service fees, and car parts. Due to the reduction of transport costs, we recommend using cars only when necessary or over long distances or using public transport instead of cars or if it is possible to use a bicycle. Given the current situation in the coming period, we expect stagnation in wages. Therefore, we recommend people to generate passive income. These revenues can be obtained e.g., through investment.

As the result of the financial crisis, we suggest to Slovaks to really monitor their expenses monthly, and we bring several types of expenses that people should focus on. We recommend dividing household expenses as follows:

- 10% for the financial reserve,
- 20% life insurance and pension insurance,
- 30% mortgage loans,
- 40% of consumption expenditure.

Each Slovak should create a financial reserve. It is not just a matter of creating, but also of maintaining and not interfering in these finances. However, financial experts recommend that each household set aside at least 10% of its monthly income for a financial reserve. It is advisable to postpone part of the income to the financial reserve as soon as the payment comes

to the consumer. At the beginning of the savings, it is good to set a certain amount and save it every month. The most favourable reserve should be about 6 times the average household income.

In the event of unforeseen situations, such as loss of income due to illness or incapacity for work, it is necessary to protect income with appropriate life insurance. Life insurance settings protect the individual as well as his/her family from the negative effects caused by a loss of income. For this category of financial products, you should spend 20% of your monthly income. We can also include creating your retirement savings here. As many young people do not yet think of retirement and do not realize that the sooner, they start saving, the better they will be in old age.

Today, many households are in debt. Our questionnaire survey shows that 46% of respondents said they had a mortgage. Our sample consisted of more young people studying than those who work, we can say that if more working people took part in the survey, the percentage would be higher. For loans, it is important to know that the RPMN tells us how much the loan will cost us, this is one of the most important parameters to look at when processing a loan. The amount of loan repayments should not exceed 30% of total income. However, we are only talking about mortgage loans, as far as consumer credit is concerned, we should avoid this or get rid of it as soon as possible. As we have already mentioned, the amount of repayments should not exceed more than 30% of spending, but as a result of inflation, interest rates are rising, it is quite possible that spending on household loans will increase too. In this case, it is necessary to pay attention to the time of loan fixation.

The last item that each Slovak should focus on is monitoring not only the necessary household expenses, but also the consumer spending. As consumption expenditure accounts for a large part of expenditure, it is necessary to monitor it regularly. When buying a given item, it is good to think about whether it is necessary to buy it. Even so, one becomes financially literate. The household should set aside 40% of the total income for necessary and consumption expenses. To keep this amount, it is appropriate to set a family budget, for which you, for example you can download the app to your mobile phone to keep your expenses under control.

We focused on these four indicators intentionally, because they relate to the shopping behaviour of the population in Slovakia and point to financial products, thanks to which one does not get into unfavourable situations associated with financial problems. Of course, it is not enough just to use these four rules: 10% to put on the financial reserve, 20% to put on life insurance and pension, max. 30% for mortgages, and 40% of income for household consumption, but education in the field of financial literacy is also very important. Therefore, to improve the level of financial literacy of adults, we propose that compulsory education in this area be created in the workplace. Employers could agree to work with financial intermediaries or other professionals, who would educate them at least once a month, or they could discuss finances, or focus on specific life cases, because many people do not know what to do in critical situations, and there is no one to talk to about such things.

Our questionnaire survey also shows that 103 respondents have a financial intermediary. Of these people, we consider 91 respondents to be financially literate, which means that the financial intermediary also influences the financial literacy of the population in Slovakia. Therefore, we recommend considering using the services of a financial intermediary.

5. Conclusion

The paper analyses the results of the financial literacy surveys conducted by the OECD PISA and HFCS. We were particularly interested in a survey conducted by the HFCS project, which

found that respondents had low financial literacy. Based on these results, we compiled 2 hypotheses, which we verified in our questionnaire survey. We also focused on surveys in the field of shopping behaviour during the COVID-19 pandemic. TASR conducted a survey to address this issue. We also used the results to establish one of the hypotheses. Subsequently, we compiled and conducted a questionnaire survey, which shows that 48% of respondents were financially literate. We found out that more women than men put themselves in the financial reserve in Slovakia, and next that low-income respondents looked at only one factor, which was price, when shopping. The validity of all 3 hypotheses was verified, and important recommendations in this area were pointed out. Financial literacy is an area that is currently being addressed. It is important for every individual in everyday life. Today's world offers us many opportunities as we can learn for free, so we only need to use this opportunity.

Author contributions: All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

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EFFICIENT MANAGEMENT OF TRANSPORT COMPANY COSTS IN THE POST COVID PERIOD USING MANAGEMENT ACCOUNTING TOOLS

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Cite as: Ponisciakova, O. (2022). *Efficient management of transport company costs in the post covid period using management accounting tools*, *Ekonomicko-manazerske spektrum*, 16(1), 104-113.

Available at: [dx.doi.org/10.26552/ems.2022.1.104-113](https://doi.org/10.26552/ems.2022.1.104-113)

Received: 8 March 2022; Received in revised form: 29 May 2022; Accepted: 9 June 2022; Available online: 30 June 2022

Abstract:

Research background: Business management is currently facing a number of problems that arise in a very turbulent business environment, regardless of the subject of the business. The situation is also characteristic of transport companies, which are not only in need but also interested in various tools to support the management process. As part of value creation management, cost calculation is one such tool. It is the oldest and, at the same time, the most used. It is constantly evolving in an effort to reflect on the current conditions forming in the business environment.

Purpose of the article: to focus on one of the ways to streamline cost management. It is an application of managerial accounting tools that enriches traditional calculation procedures with new progressive forms. A specific measure in this context is the use of the ABC calculation and, in particular, the advantage it provides to support management compared to the traditional calculation.

Methods: To evaluate the calculation methods in question, it was necessary to proceed from the analysis of the acquired knowledge concerning the development, origin, and basic characteristics of both calculation methods, and then the method of comparison was used in the final comparison and definition of advantages or disadvantages.

Findings & Value-added: The required output can be realized based on the application of methods of analysis, synthesis, and abstraction using a logical-deductive approach together with the application of specific mathematical procedures. The findings and benefit of the comparison lie in the higher efficiency and accuracy of the calculation procedure used by managerial accounting. At the same time, this fact contributes to a more efficient management of value-creating quantities.

Keywords: management; managerial accounting; ABC calculation; traditional calculation; comparison.

JEL Classification: M41

1. Introduction

At present, it is very difficult for company managers to ensure the long-term growth of the company or, more generally, the very existence of the company in the market. For this reason, they strive to improve management and refine their economic information system. This consists of various purpose elements, which, depending on their focus and content, support the performance of management so that the set goals are met at different time horizons. Significant elements include the cost subsystem, accounting information subsystem, calculation subsystem, controlling, etc. All components of the economic system are interconnected and cooperate. As Sukhina et al. (2022) point out, that enterprise cost management is a component of the enterprise management system as a whole. Transport activity has significant implications for the other sectors' activities, including agriculture and agribusiness. Transportation costs represent a significant determinant of total operating costs, and therefore the selling price, which affects the competitiveness of products and the achieved business results. (Savic et al., 2020) Constrained by low profit margins and having to be active in a highly competitive market, companies active in this sector seek multi-dimensional innovative solutions that lower their operational costs. (Carlan et al., 2019)

In this context, management accounting fulfils an important mission and complements existing financial accounting with important information to support decision-making within the accounting information subsystem. Bulog et al. (2019) also add to this assertion, stating that Managers need relevant information to lean on in order to achieve success and growth of the company. Accounting information should form an important share in managerial decision making even in micro companies where managers have different educational backgrounds. Marius et al. (2012), state that we consider managerial accounting to be an essential source of information for business management. Mihăilă (2014), who adds that managerial accounting, is an area of accounting that supports corporate governance in planning, decision-making, control, and analysis, extends the definition. Effective use of managerial accounting by operational management ensures profitable growth of the company, including freight.

Financial accounting provides the management of a transport organization with comprehensive information about its activities. This information is indeed quite detailed, but not sufficient. Therefore, the term managerial accounting has evolved in organizations as a term for comprehensive information needed for successful managerial work. Managerial accounting is one of the modern management tools of an organization, as its content is in principle not subject to remote control. Not only the department in which it operates but also by the management, tools and methods used to determine the success of an organization determines the success of an organization. Managerial accounting belongs to the modern tools of organization management since its content is, in principle, not subject to off-site control. Kontsevoy et al. (2020) also agree with this view, arguing that the management accounting information system should be oriented towards solving complex issues and making managerial decisions quickly. Marenych et al. (2021) add that management accounting is based on generally accepted principles of accounting, (financial) accounting and specific principles of managerial accounting; principles of accounting (financial) accounting, general and specific principles of managerial accounting; only on general (or own) principles.

2. Literature review

The success of the organization is not decided only by the department in which they operate but also by the use of managerial tools and methods. (Jacková, 2016). Generally, in the literature, it is also referred to as an independent form of business accounting, which provides

information support to the management system of the business entity. Management accounting is an integrated system of collecting, processing, and informing internal users about the company's income and expenses in order to ensure effective cost management and obtain a positive financial result (Zadoroznuy, 2020). In French literature and in French-speaking countries, managerial accounting is referred to as cost management accounting—Comptabilite - Comptabilite de Gestion, and in German literature we encounter the concept of decision-making cost and revenue accounting - Entscheidungsorientierte Kosten und Leistungrechnung. In English literature we encounter a term similar to management - managerial accounting (Král, 2001). In the conditions of the Slovak Republic, managerial accounting reached a boom before the Second World War. Its subsequent development in our conditions stagnated due to the introduction of a centrally planned economy after the Second World War. The boom in managerial accounting occurred in our conditions only after the "gentle revolution" in 1989 (Král et al., 2010). An important aspect of managerial accounting is the fact that it can be considered as a system that displays information about business activities within a company. Its task is to find, record, and analyse information about business activities through reports, statements, and reports for executives to support their decision-making and management. They are then able, based on management accounting information, to draw up proposals, recommendations, and measures, which will lead to an improvement in the overall performance of the undertaking. An important role in this context is played by the fact that increase profitability require information on the real level of costs, rationality of use various resources (Bozgulova et al., 2019). In their view, they agree with Sternad (2020), who states that Cost management is important for every transport company. Increasing competition in road freight transport forces companies to cost-effectiveness, so they need to know their costs of carrying out the transport service. Nowak et al. (2020), that costs represent an important economic category that is closely related to the price, can state it. Each company must perfectly manage costing, especially absorption costing, which consists of budgeting overhead costs on the production (performance, products and services). In addition to traditional calculations, one of the important tools of managerial accounting is activity-based calculation (ABC method). As Stopka et al. (2021) claims, ABC is an efficient technique for enhancing the quality of provided services and process complexity of certain railway companies, executing its activities at a regional or international scale. It is one of the new costing approaches that eliminate the inaccuracies and deficiencies of the traditional costing system. Compared to other costing techniques, considerable change lies especially in the way of assigning indirect cost units to activities based on actual causations, and subsequently, assigning activities to the very cost items by the intensity of their consumption. Furthermore, this approach allows decision-makers to identify specific cost item in terms of determining ways of how they can be managed. Activity-based Costing (ABC) is an advanced method of calculation and management. It can provide managers with relevant and accurate cost information so they can make the right production decisions and optimize resource allocation. The article presents the theory and steps of ABC calculation, analyses the unfavourable factors of ABC applied to a Chinese manufacturing company, and presents some measures to improve the application of the method. (Zhao et al., 2016) This method has emerged from the shortcomings of traditional calculation methods, which became more visible during the eighties of the 20th century. To this day, many authors, who have different views on the essence, address the issue of ABC calculation. Lepadata (2007), who points out, also confirms that management is an activity based on activity-based division, as defined by the ABC method. For some authors, activity management is considered the development and refinement of the ABC method. For others, ABC is a business management subproduct. The third category of authors, who consider ABC as a

costing tool and the ABM method as a performance management psychology, has a different concept.

The ABC method can be considered one of the most modern methods of cost calculation. It is the result of research carried out by top American economists in the 1980s. The need for a new approach to cost identification is linked to the development of automation, the expansion of the product range, and the related increase in the share of indirect costs. The traditional way of allocating costs proved to be insufficient and often led to incorrect conclusions and decisions. Later, this method was introduced into the practice of the world's most successful companies (e.g., Chrysler, AMD, ABB, Boeing, Hilton Hotel Network, etc.), as well as smaller, dynamically developing companies. In Slovakia, the introduction of the method, e.g., at a telecommunications operator, in banking and food (e.g., Heineken). The main idea of the ABC method is that it considers activities, not individual performances, to be the cause of costs. The solution of the problem of calculations by the ABC method therefore requires knowledge and understanding of the factual course of specific activities, procedures, and processes within the company. (Šukalová et al., 2013) Emerging globalization has led to the formation of intense global competition. Therefore, active participants in the global market had to start thinking about creating more accurate, and especially more objective, calculation procedures and updating performance standards and competitive strategies. Globalization has brought many changes in terms of production conditions and corporate governance itself. The most important determinants of these changes include:

- increasing globalization and increasing competitive pressure,
- substitution of work by automation of production and activities,
- constant innovation of performance and technology,
- great attention paid to the quality and individuality of services, shortening the life cycle of services,
- increasing the share of service activities,
- change in cost structure - increase in indirect costs,
- customer orientation preference.

Cooper and R. Kaplan (from Harvard Business School) became pioneers in the field of calculation according to activities. They developed and published a new way of calculating costs in 1988. Its benefit is the ability to eliminate, and in many cases, eliminate the shortcomings of the calculation procedures used so far. They called the method Activity Based Costing (ABC). It deals mainly with the assignment of overhead costs to performance and cost calculations. Its basic principle consists of assigning the consumed resources to activities, grouping activities into activities, and then assigning activities to cost objects. The interplay of the facts has given rise to changes in the method of calculation, which has resulted in the need to look for links between the incurrence of costs and the existence of the business. The closest link is to performance, the implementation of which causes certain activities and, at the same time, costs. This relationship is ultimately the main idea of ABC. The cause of costs is activities, not individual performances. The practical use of the ABC method therefore requires a detailed knowledge of the facts and course of specific activities, procedures, and processes within the company.

3. Methodology

In order to evaluate the calculation methods in question, it was necessary to rely on information from the relevant literature and other available sources. The acquired knowledge

concerning the development, formation, and basic characteristics of both calculation methods was then used in the final comparison, defining the benefits or shortcomings that resulted from it. The required output could be realized based on the application of methods of analysis, synthesis, and abstraction using a logical-deductive approach together with the application of specific mathematical procedures.

4. Results

When considering the implementation of activity-based calculation, the company's management often faces a major decision. The introduction of a progressive method of calculation, together with the positives, is associated with various negatives, which can often discourage managers from practical use. A comparison of traditional business calculations with the ABC method can provide arguments that will guarantee the usefulness of ABC.

With the traditional method of calculation, the company ensures the implementation of its services in internally differentiated organizational units. They can be supply, sales, and production, auxiliary, and other economic centers. It is necessary to transform the company's costs from the corporate level, i.e., from financial accounting, through in-house organizational units, i.e., calculation units. In internal accounting and calculations, a breakdown of direct and indirect costs is used. The problem is a clear assignment of costs to individual outputs. To overcome this problem, overheads include, in addition to all indirect costs, a part of the direct costs. In addition to the acceptance of generic costs, it is necessary to distinguish between:

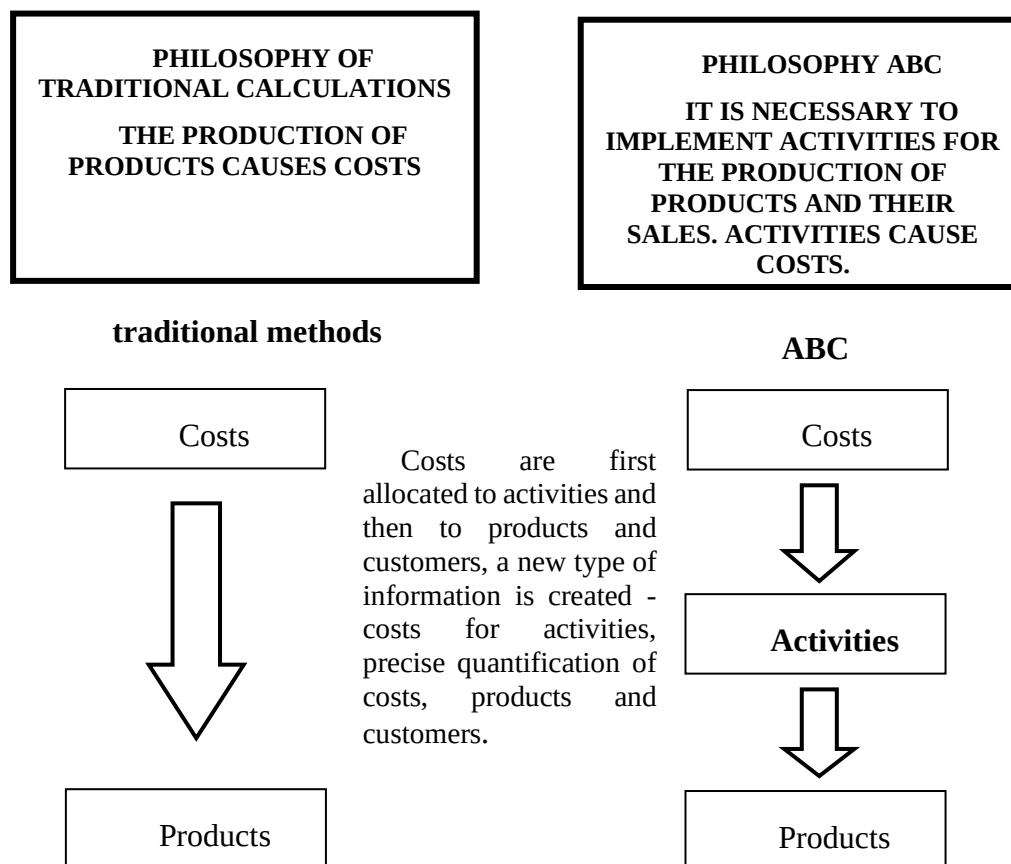
- overheads arising from the actual,
- when considering the implementation of activity-based calculation, the company's management often faces a major decision. The introduction of a progressive method of calculation, together with the positives, is associated with various negatives, which can often discourage managers from practical use. A comparison of traditional business calculations with the ABC method can provide arguments that will guarantee the usefulness of ABC. 1 volume and structure of the services (overheads), which depend not only on capacity and technical characteristics but also on the performance and discipline of the center's staff,
- insurance, depreciation, rent, and so on), which are determined by the task of a specific center and cannot be influenced by the staff of that center.

TCA assigns costs to individual products as separate units. Costs that we can demonstrably assign to a given product or service are also allocated, and costs that cannot be allocated equally are calculated for all calculation units. A typical example is the number of hours a machine produces one product, or the number of working days. The advantage of TCA in the first place is:

- simplicity,
- cheaper acquisition of the necessary data and information,
- lower set-up costs.

On the other hand, this method also has its disadvantages, which include the fact that it does not take into account the activities of the company. The accuracy of cost calculations is limited.

Figure 1: Figure description



Source: own processing

5. Discussion

The management method, based on the analysis of the relationship between costs and activities and the ABC calculation derived from it, provides interesting stimuli, which in some cases extend its application to tactical and strategic considerations and decisions. The method brings new information in particular:

- for the management of activities, activities and processes,
- for performance line management,
- for departmental management.

The long-term, traditionally focused orientation of managers to management along the line of performance and along the line of responsibility was reflected in the lower attention paid to the management of auxiliary and service activities (repairs, delivered services, supply activities, etc.). Internal departments at various levels of the corporate hierarchy provide these activities, which are frequently uncoordinated and, to some extent, duplicated. A new, informative view of the costs of individual activities implemented through individual orders and departments allows us to reveal not only the above-mentioned disharmonies and duplications. It gives the opportunity to assess the cost-effectiveness of these activities and compare them with their benefits. It thus creates a natural pressure to eliminate activities that do not have an effect (storage of materials, semi-finished products, and products) or even if their added value is

negative (handling complaints about received materials or own products). In the long run, the method allows:

- then, to assess the cost-effectiveness and benefits of the more broadly understood activities formed by the systematic combination of sub-activities,
- we will analyse the course of these activities in terms of their coordination.

Its aim is to provide the basis for the restructuring of the necessary activities in the whole understanding of the business process so that it runs as efficiently as possible.

In contrast to the traditional way of assigning indirect costs to final services (based on the assumption that the larger the volume of services performed, the greater the overhead costs), the ABC calculation draws attention to the cost intensity of non-standard, small-volume services and their cost intensity. This information is useful for specific price negotiations and can focus the attention of managers in the long run on the elimination of non-standard performances and activities. The ABC method thus indirectly affects the efficiency of design and technological work, the management of the supply, production, and sales processes, and the coordination of ancillary and service activities. Another significant advantage is the method of separate management of fixed and variable costs, which is based on a critical examination of the conclusions that come primarily for short- and medium-term management. It emphasizes that market share and business effects can be increased mainly by maximizing capacity utilization, which can also be achieved by reducing the sales price of the additional volume and assortment to the level of variable product costs. The alternative view of product costs offered by the ABC method emphasizes the cost intensity of the additionally produced assortment. This is because the pursuit of maximum capacity utilization leads to a higher share of non-standard activities in the final phase when classifying products with a smaller volume. Together with the reduction in the prices of these products, this can result in a reduction in profit and return on capital. Knowledge of the sub-activities that give rise to costs is of considerable importance in improving the budgets of those overhead costs that are not related to changes in the volume of services performed. It makes it possible to process variant budgets for a different range of performed sub-activities, to measure the performance of the departments that provide the activities, and to influence the economy by spending these costs in the departments that are responsible for their amount.

A new look at the causes of these costs has led to the development of two methods of budgeting them, known as "Activity Based Budgeting" and "Zero Based Budgeting." It is paradoxical that the source of difficulties in its practical application is also a wide range of diverse support and service activities, as well as services provided to a wide range of customers as prerequisites for the effective use of the method. These are activities as well as, e.g., providing information on how many units of sub-activity relate to a certain part of the realized range of final outputs. In the case of using the method as a basis for decision-making, e.g. on changes in the volume and structure of realized outputs, it is required to distinguish processes caused by the number of outputs from processes whose volume is not affected by the number of outputs. The effectiveness of the use of this data is significantly affected by how accurately it is possible to quantify the proportion of costs dependent and independent of the volume of the evaluated activity. In a more detailed analysis of sub-activities, there are some difficulties in allocating costs related to several joint activities. The conceptual approach of the method not only broadens the traditional view of business processes but also orients them in the current direction in terms of their current characteristics. Difficulties in implementing the method are rather related to the practical problems of quantifying the information needed. In connection with the development of automation of information systems and their integration with automated control of technological processes, the severity of these problems is decreasing, and

on the contrary, the number of large companies that are gradually applying the method is growing.

Use of the ABC method in relation to partial activities in practice

These advantages of the method have the greatest effect in industries like these, which are characterized by a wide range of services, the implementation of which requires a number of costly support and provisioning activities. The greatest experience with its application is in the manufacturing industry, with heterogeneous production and assembly technology. However, the method is also applied in non-manufacturing industries, e.g. in commercial companies, banking, insurance, and transport. It brings fundamental differences compared to other methods in activities in which the development of activities causes costs to arise in indirect relation to the volume of final services. This relationship between costs, activity, and volume of final outputs is typical, especially for the following types of activities:

- logistics operations ensure mainly the supply and sales phase of reproduction (material orders, entry control, transfers to production, in-plant transport, packaging, shipping, transport to customers, including information support for these activities),
- operations ensure the balance between resources and their use (operational planning and dispatch management of supply, production, and sales),
- operations, ensuring the implementation of changes (machine set-up, design, and technological preparation),
- operations ensuring quality control of performed services (quality control, handling of complaints at the entrance and exit, expenses for repairs of failures).

In terms of the decision-making tasks for which the ABC method provides information, it is generally accepted that in the calculation area it provides an improved basis for solving tasks related to the design and defense of prices and for tasks based on the knowledge of full product costs. This is dominated by long-term tasks on capacity and how to fulfil it ("produce or buy" tasks). Systematic monitoring of the cost intensity of individual activities and aggregate activities, especially if it is possible to separate the costs affected by the volume of activity (activities) from the costs that cannot be influenced by volume, can also be used in analyses of so-called value creation (Value Chain Analysis, Value Based Management).

6. Conclusions

The calculation, based on the allocation of costs to sub-activities, provides some new information, especially for the management of activities, activities and processes, but also for traditional areas of management along the lines of services and departments. The new information view on the costs of activities allows you to assess their cost intensity and compare it with their benefits. It thus creates a natural pressure to eliminate activities that either do not have the desired effect or whose added value is negative. From a top point of view, the method allows you to assess:

- cost-effectiveness and benefits of more broadly understood activities, formed by a systemic combination of partial activities,
- analysing the course of these activities, especially in terms of coordination.

As an information base, the calculation processed by the ABC method draws attention to the cost intensity of non-standard, low-volume services and the reasons for their cost intensity. This information can direct managers' attention in the long term to the elimination of non-standard performances. However, it is necessary to highlight managers' relatively conservative approach

to changes in regular values. Certain limits are represented by low awareness of new management options and a reluctance to innovate within established methods and tools.

Author contributions: The author listed has made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: No new data were created or analysed in this study. Data sharing is not applicable to this article.

Acknowledgments: This publication was created thanks to support under the Operational Program Integrated Infrastructure for the project: Identification and possibilities of implementation of new technological measures in transport to achieve safe mobility during a pandemic caused by COVID-19 (ITMS code: 313011AUX5), co-financed by the European Regional Development Fund.

Conflicts of Interest: The authors declare no conflict of interest.

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OPERATING LEASE AS A MEANS AND MOTIVATION FOR CIRCULAR ECONOMY

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Cite as: Horak, J., Katz, K. (2022). *Operating lease as a means and motivation for circular economy*, *Ekonomicko-manazerske spektrum*, 16(1), 114-124.

Available at: dx.doi.org/10.26552/ems.2022.1.114-124

Received: 17 April 2022; Received in revised form: 3 June 2022; Accepted: 16 June 2022; Available online: 30 June 2022

Abstract:

Research background: The issue of circular economy is currently a very topical and discussed issue, which people are becoming increasingly aware of. There is no doubt that this growing trend attract the attention of the whole world, including policy-makers, industrial administrators, ecologists, or academics. Circular economy is a concept that is an integral part of sustainable development. It focuses on the ways how to improve the quality of human life and environment by means of increasing the productivity efficiency. Moreover, circular economy is considered essential in terms of protecting natural resources and environment. A means of sustainable development and product recirculation are leasing transactions.

Purpose of the article: The paper deals with the identification of positives and negatives of operating lease and determine whether it is a suitable tool to apply the principles of circular economy in the Czech economy. For this purpose, two research questions are formulated.

Methods: To answer the questions, statistical data of the Česká leasingová a finanční asociace (Czech Leasing and Financial Association) on the development of non-bank financing of business entities and consumers in the years 2017-2021 and phenomenological analysis of semi-structured interviews with respondents.

Findings & Value added: The results of the research show that operating lease is the most commonly used form of financing investment in tangible assets, despite the declining trend that could be caused by the COVID-19 pandemic. An interesting finding is that the respondents addressed perceive positives and negatives in completely opposite ways. The main contribution of the paper is that it opens up a new topic of financing and achieving the principles of circular economy. Although this study works with a smaller sample of data, further research from the perspective of manufacturers and lease products providers.

Keywords: Product recirculation, leasing, company, consumer, preference

JEL Classification: D22, G11, Q56

1. Introduction

The term circular economy (CE) first emerged in the 1970s, when people started to perceive fear of climatic changes that could lead to growing costs of natural resources (Garcia et al.,

2021). Currently, circular economy is becoming an increasingly discussed topic (Chamberlin and Boks, 2018). Liakos (2019) state that protection of the environment and natural resources, which are not infinite, is becoming a priority. According to Bastein (2013), CE is an industrial and economic system based on reusing raw materials and end-of-life products with a tendency to use natural resources. Adopting philosophy, principles and rules of circular economy and its approaches brings a suitable environmental solution (Farrelly and Green, 2020).

The Czech Republic is one of the member countries of the European Union (EU) with an average growth rate of their resources productivity, probably due to inefficient processes and policies (Robaina et al., 2020). Prague has already developed a strategic plan for the transition to circular economy approved by Prague City Council in January 2022 and supported by the EU and the United Nations (Vilamova, et al., 2019). The content of the plan includes also strategic goals for waste reduction in construction (where there is the largest volume of it), agriculture, and other sectors, which leads to the reduction of generated CO₂ greenhouse gases (Rybova and Slavik, 2017). With this plan, Prague aims to motivate the state and private sectors and the public. One of the means to protect natural resources and ensure sustainable development are leasing transactions, which represent a business model and a means that enables product recirculation (Ionascu and Ionascu, 2018). The introduction of circular models requires certain capital to finance the development, establishment of new technologies, infrastructure, and implementation of new or alternative renewable resources (Sariatli, 2017). This approach to investments is, however, restricted by the goal of all companies, which is the generation of profit (Schlosser et al., 2021). These financial barriers need to be addressed so that the capital investment in circular economy is more available (De Angelis et al., 2018). One of the options for financing capital is operating lease (Dias et al., 2020). Despite its difficulties, it has a positive impact on young growing companies, especially companies engaged in research and development (Cook et al., 2021).

The objective of the paper is to identify the pros and cons of operating lease and determine whether it is a suitable tool for applying the principles of circular economy in Czech economy. In order to achieve the set objective of the paper, the following research questions were formulated:

- 1) Can operating lease motivate the transition from linear to circular economy?
- 2) Will operating lease help achieve lower waste production and reduce greenhouse gas emissions?

2. Literature research

The transition to circular economy is a process that combines managerial practices and production (Vochozka and Rowland, 2015). Henrysson and Nuur (2021) focus mainly on available literature on the topic of circular economy (CE) and encourage innovative methods, emphasizing the necessity to replace established practices, the importance of instilling principles of circular economy using bottom-up approach in cities as well as at the regional level. In their analysis of regulations and initiatives supporting the disclosure of detailed data on public payments and sanctions, Nowaczek et al. (2021) point to the positive effect of transparency of corporate financial flows to public coffers and then to regions. Taxes thus become a financial tool in the form of penalties but also promoting positive perception of CE by individuals. The largest burden of CE is the production of waste in manufacturing. Rocha et al. (2021) brainstormed a series of important fundamental questions concerning the development of new design of small products combining CE for the development of sustainable industry and closing the principle of circularity between production, recycling and reuse. By

theoretical selection, Werning and Spinler (2020) present a list of 29 potential barriers to introducing changes prepared on the basis of case study evaluated by data triangulation. Seven of them are related to business and financial management models concerning performance-based selling, the willingness to adopt a long-term new strategy.

According to Horák et al. (2021), management decisions definitely include investment management and decisions on the form of financing. The implications of management decisions on investment financing through operating lease were examined by Eaton et al. (2021), who conducted extensive survey of 12,204 companies between 2001 and 2016 and by illustrating the changes in investments in rented assets, they identified the future upward trend of sales but downward trend of profits for the period of 3 years. Nechaev (2021) conducted a comparative analysis of the methods for calculating lease payments and proposed a method enabling a complex calculation of lease amounts, considering initiated payments, financial and property risks using the methods of reduced balance and acceleration coefficient.

In 2019, International Financial Reporting Standard for lease accounting (IFRS 16) was established by the EU. According to this standard, companies are obliged to report liabilities and assets related to leasing in their balance sheet (Wakil and Petruska, 2022). This standard unifies the preparation of annual accounts, thus facilitating the investment process (Gorowski et al., 2022). Pardo and Giner (2018) performed multidimensional analysis of the impacts of changes in accounting rules for operating lease. Based on a simulation study, they concluded that liabilities will increase by 4.81 % in balance sheets. IFRS 16 requires companies to report operating lease liabilities in the balance sheets. This change has significantly contributed to decisions on providing operating leases to financial analysts and bankers (van Kints and Spoor, 2019). Lima et al. (2020), however, based on a content analysis of financial statements and final accounts from the year 2018 and the expected financial statements after the introduction of IFRS 16, expect increasing financial costs and depreciation costs as well as lower financial independence and solvency of companies. Interestingly, Tumpach et al. (2021) analysed final accounts of 155 Slovak companies after the introduction of IFRS 16 and confirmed the findings by Pardo and Giner (2018), van Kints and Spoor (2019) on positive contributions of changes for investors, shareholders, creditors and companies. Gruber and Hartmann-Wendels (2021) also confirmed potential negative change in behaviour after the introduction of IFRS 16 in a very small percentage of companies. Rodrigues et al. (2021) conducted quantitative and descriptive research of leasing companies by comparing final accounts before and after the introduction of IFRS 16. The Wilcoxon test showed that there are no statistically significant differences between the compared final accounts. Endrizálová et al. (2018) examined the portfolio of airlines and found that these companies use operating lease to finance newer and greener fleets with lower environmental impact, and there are even companies that finance means of transport only through operating lease.

3. Methodology

The objective of the paper is to identify pros and cons of operating lease and to determine whether it may help adopt the principles of CE. As this is primarily qualitative research conducted to determine the behaviour of users of operating lease, the data from the Annual reports of Česká leasingová a finanční asociace (Czech Leasing and Financial Association - ČLFA) and data from semi-structured interviews will be used.

ČLFA is a member of the European Federation of Leasing Company Associations, bringing together about 39 companies which execute more than 80 % of all domestic leasing transactions and provides support to its members and those interested in concluding specific leasing

products. Information on non-bank financing of business entities will be removed from the annual reports entitled “Zpráva o stavu a vývoji nebankovního leasingového, úvěrového a faktoringového trhu v ČR” (Report on the Status and Development of the Non-Bank Leasing Credit and Factoring Market in the Czech Republic). The monitored period will include the years 2017, 2018, 2019, 2020 and 2021. For the purpose of the paper, only movable investment data will be used. They will be processed by the number of new and existing loan agreements, financial lease, operating lease, and full-service leasing. Credits and lease contracts will be evaluated according to the type of commodity in percentage. Moreover, there will also be used the share of operating lease in the total number of concluded lease contracts of movable investments in percentage, as well as the year-on-year increase or decrease.

The same data, except the division by commodities, are used for processing the results for consumers.

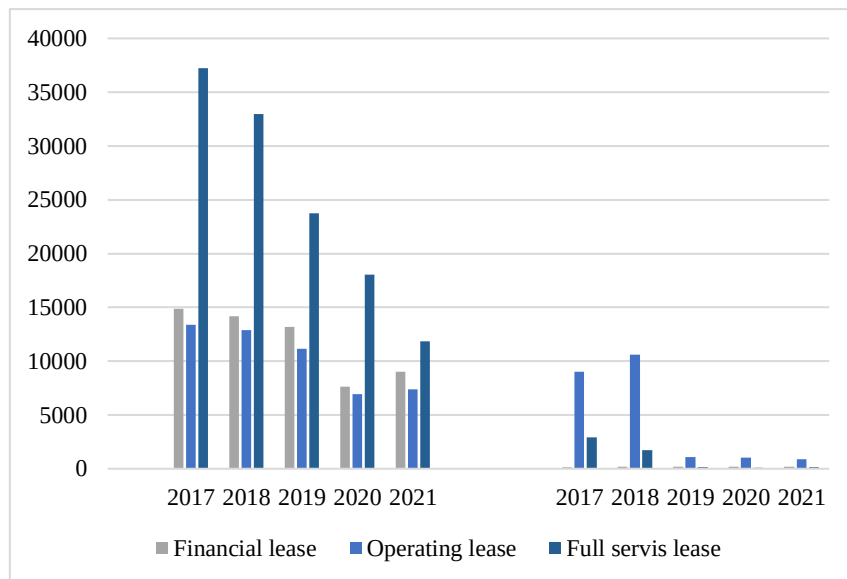
The data will be processed in Excel and evaluated using graphical representation in order to understand better the consumer behaviour when using non-bank financial products.

The research will also include word-of-mouth data for phenomenological analysis. The participant will be selected based on their differences and diversity so that the insight into the issue was gained from several perspectives. The addressed business entities are Axon Lab s.r.o. and Dopravní podnik hl. m. Prahy, which represent two opposite poles of wide business spectrum. A semi-structured interview will be conducted with the representatives of trading companies in their work environment. The interviews will be conducted in person, where notes will be made. The interviews will include thirteen questions, out of which some will be open, with the aim to determine the future development and trend of decisions on investment financing. If necessary, the personal interviews will be complemented to a smaller extent via communication in electronic form. After obtaining complete information, the interviews will be evaluated separately and then mutually compared.

4. Results

Graph 1 compares the number of new contracts in the years 2017, 2018, 2019, 2020 and 2021 negotiated by entrepreneurs and consumers for financial leasing, operating lease and full-service leasing. The number of existing contracts is compared by the same criteria in Graph 2. The graph representing new contracts shows a downward trend, which is also seen in the graph representing the existing contracts.

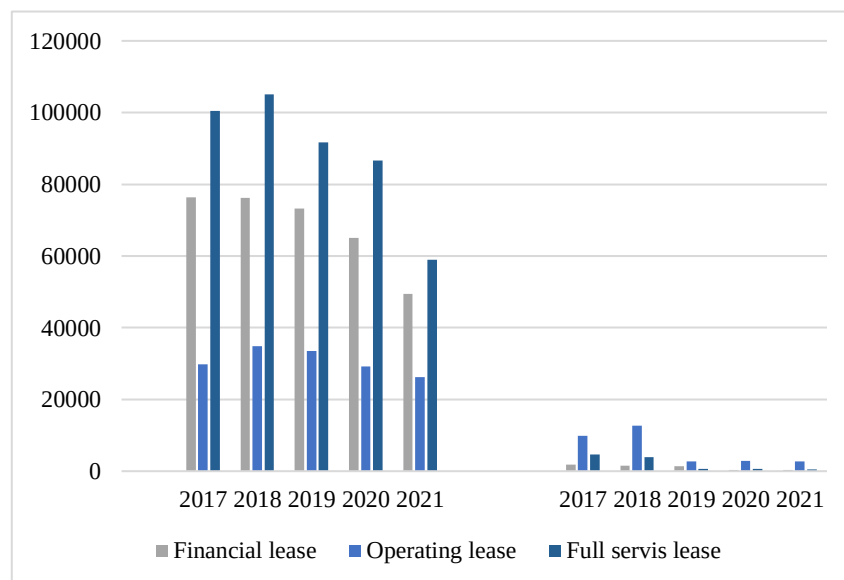
Graph 1: New contracts negotiated by entrepreneurs and consumers for financial, operating and full-service lease



Source: Authors.

It can be seen from the graph that new contracts for full-service leasing dominate at the beginning of the monitored period. At the end of the period, the number of contracts is about 10,000 for all categories. In the case of consumers, operating lease showed extreme values in the years 2017 and 2018 compared to other years.

Graph 2: Existing contracts negotiated by entrepreneurs and consumers for financial, operating and full-service lease

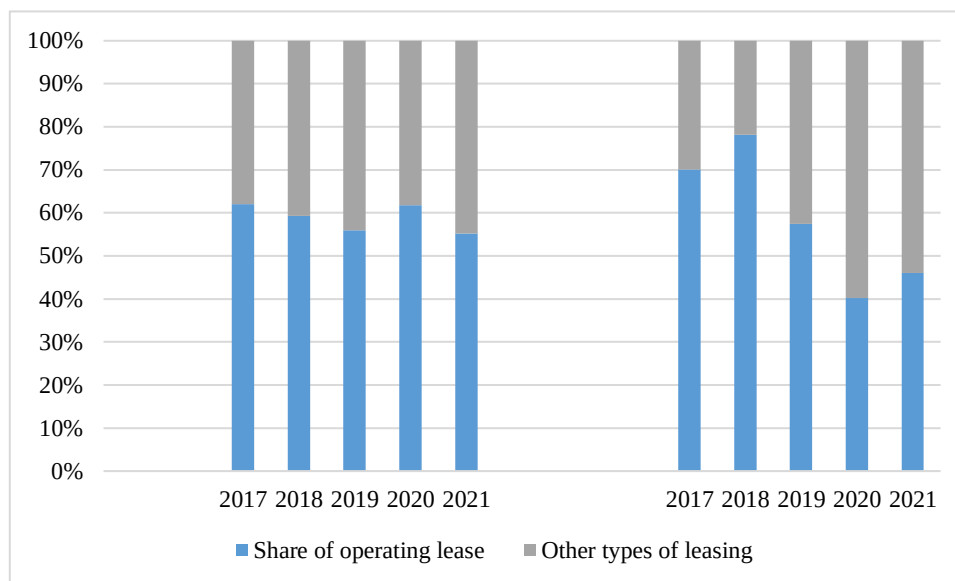


Source: Authors.

From the graph of the existing contracts both in the case of consumers and entrepreneurs, it can be seen that their number was highest in the year 2018. In general, the number of contracts decreases.

A more detailed analysis and share of operating lease can be seen in Graph 3. Its year-on-year development, increase or decrease in the number of contracts can be seen in Graph 4.

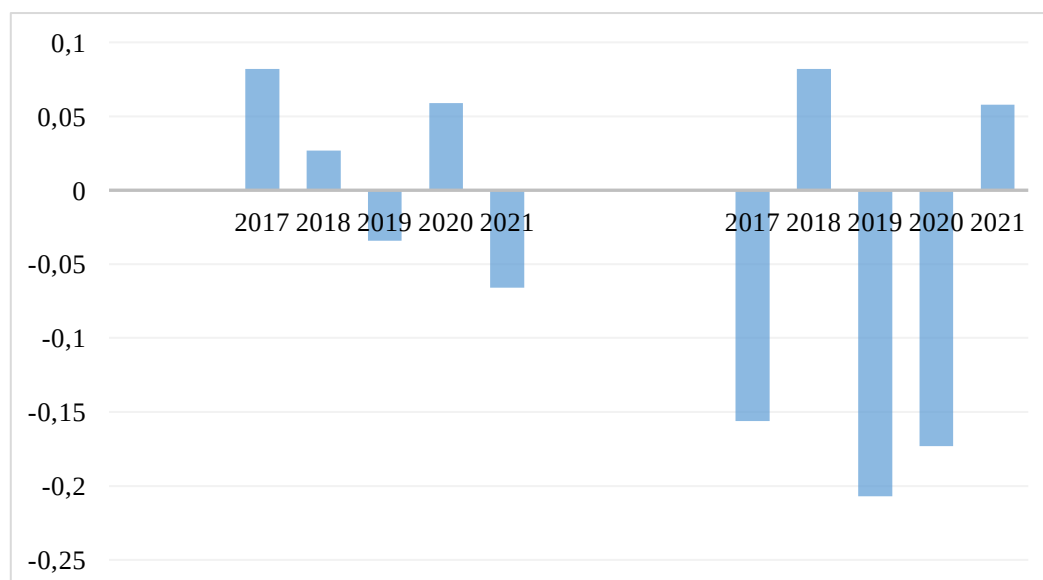
Graph 3: Share of operating lease in total leasing of movable investments of entrepreneurs and consumers



Source: Authors.

Graph 3 shows the financial share of operating lease in % in the total leasing. For consumers, the share is between 55 and 65 %; in the case of consumers, the share is not that stable. In the year 2020, the share was about 40 %, which is a 50% share compared to 2018.

Graph 4: Year-on-year increase in the number of operating lease contracts in % negotiated by entrepreneurs and consumers

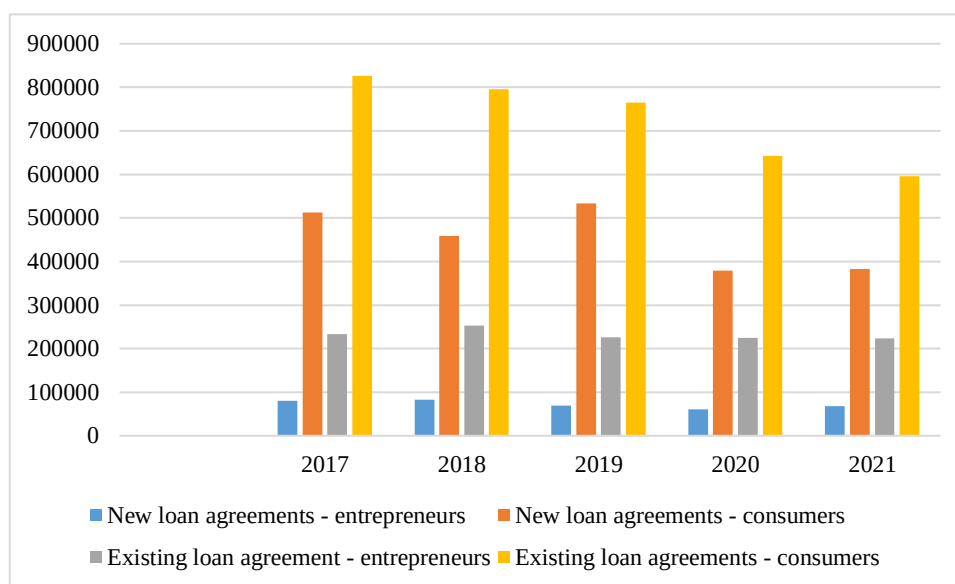


Source: Authors.

Graph 4 provides further information and specifies the trends in Graph 1 and Graph 2. Again, the year 2017 shows higher values in the case of entrepreneurs, the year 2018 shows higher values for consumers.

Additional information on the number of granted leasing contracts concerning the number of granted loan agreements can be seen in Graph 5.

Graph 5: Number of loan agreements negotiated

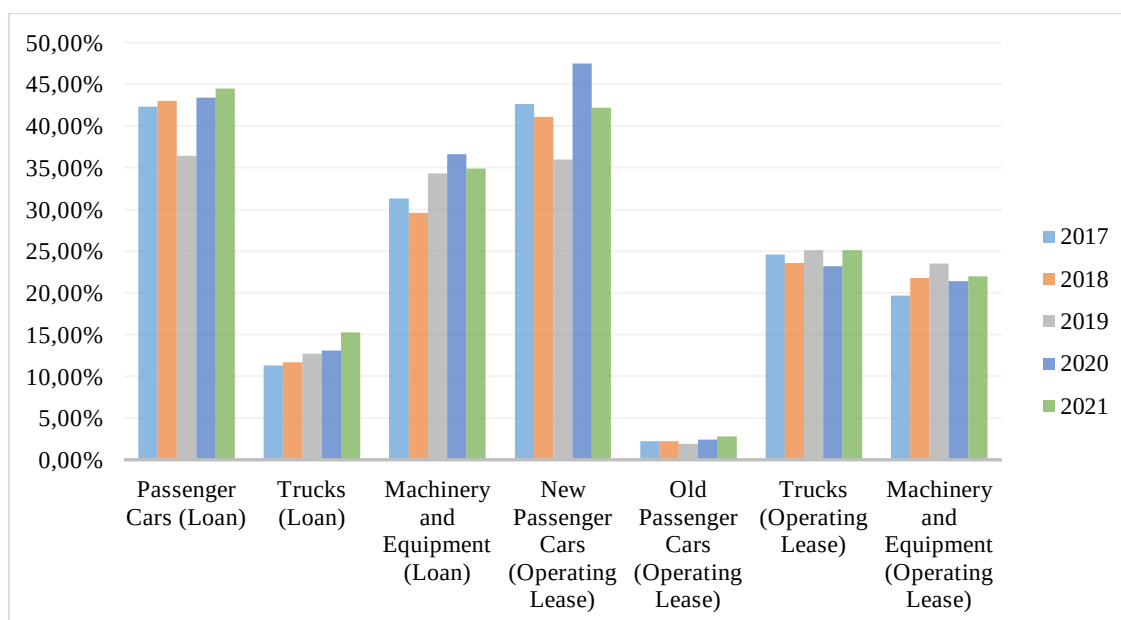


Source: Authors.

The number of new loan agreements is about 50,000 for consumers. However, it shows that compared to Graph 1 and Graph 2, loan is not a preferred financing option for entrepreneurs.

Graph 6 shows the use of funds in percentage obtained in the form of a loan or operating lease by commodities. The data are available for business entities only.

Graph 6: Loan and leasing contracts concluded by entrepreneurs by commodities



Source: Authors.

Graph 6 shows commodities funded by means of loans or operating lease. Most often, these were passenger cars; in the case of operating lease, they were divided into new and used cars. The second most common commodity are machinery and equipment financed by loan and trucks financed by operating lease. The proportional distribution between commodities does not change over the years.

Semi-structured interviews were conducted with two business entities. One of them is Axon Lab, spol. s r.o., whose line of business is the production and sale of laboratory equipment. Axon Lab, spol. s r.o. is a part of holding with headquarters in Switzerland. The interview conducted with the representative of the company can be divided into several parts. The first part concerned the information about the company, its culture, and use of operating lease. The company uses operating lease for its fleet of 10 passenger cars. It negotiates leasing contracts with the company LeasePlan Česká republika, s.r.o. for a period of 3 years. These contracts include amendments on mileage and the conditions of returning the used car. In the second part of the interview, the interviewee was asked whether the company plans to continue in operating lease. Due to financial advantages, no service-related requirements, and minimal assets, the company will continue to use this type of financing to fleet financing. After answering the closed questions concerning the current situation, the interview is focused on motivation and potential changes enhancing the idea of CE. Axon Lab spol. s r.o. prefers new cars. In terms of tax benefits, subsidies, ecology, and economics, the company prioritizes the interests of its sales representatives. It is particularly interested in their road safety and comfort. "The priority is to keep sales representatives safe on long journeys." A possible change can be using cars with alternative fuels.

Dopravní podnik hl. m. Prahy, a.s. (DP) is a company operating in Prague. Its line of business is primarily public transport. Information on operating lease was provided by the head of the department for passenger cars and vans ensuring in-house transport. The company has experience with operating lease, full-service lease, short-term and long-term rental of passenger cars and vans. The first operating lease negotiated with the company Sixt Leasing Franchisee; Speed lease a.s., included about 160 vehicles. After the expiration of the operating lease agreed with the provider in the year 2014, the agreement was not prolonged due to unfavourable conditions. Specifically, the payment for Škoda Fabia 1,2 was double excess. The second operating lease was negotiated for 32 passenger cars and 13 vans. Following previous experience, this change applied only to emergency vehicles, with the agreed mileage is observed. After the expiration of the contract, the company completely abandoned the idea of operating lease. "We are a large company; departments are changing and have great dynamics of needs to which operating lease is not able to respond." DP always used financing through operating lease and always preferred new vehicles. In terms of ecology, the company is pro-environmental. It owns 10 electric cars for which it got purchase subsidy and the company would welcome further benefits. The use of alternatively powered vehicles revealed new obstacles in the form of charging stations that needed to be built. However, it turned out that there are very few strategic places for charging, as specific conditions need to be met, such as conditions related to construction, it must not disrupt the smooth working regime, and need to be situated in places where electric cars are used.

5. Discussion

From the data obtained from ČLFA examined by means of graphs, it follows that loan and operating lease are widely used for financing. The number of contracts concluded by entrepreneurs concerning operating and full-service lease is significantly higher, as seen from Graph 1 and Graph 2. Moreover, there is a clear declining trend of covering costs by leasing. This can be seen in Graphs 3 and 4, which are focused on one product only, specifically operating lease. Although the business entities almost steadily achieve around 60 % of the total financing of movable investments without major fluctuations, consumers show certain decline, which is very pronounced in the year 2020. In spite of this, more than 40 % of consumers decide

to use operating lease in the year when the Czech Republic experienced the first two waves of COVID-19 pandemic. When comparing Graphs 1 and 2 with Graph 5 showing the number of loan agreements, it can be seen that the number of loan agreements is up to ten times higher and even higher in the case of consumers than the number of leasing contracts. However, the statistics did not specify the commodities. The last graph (Graph 6), which was used to simulate the overview of commodities, shows that there is a highest number of passenger cars and machinery and equipment.

A part of the research is information and data obtained from semi-structured interviews with two business entities. Both were asked the same questions. The interview consisted of factual and theoretical part. Both companies have experience with operating lease. The research has shown that the smaller company financed mainly from equity does not need to find new solutions that would combine ecology and economics. These barriers were formulated by Werning and Spinler (2020). In contrast, the large company, with regard to all the difficulties encountered, has completely abandoned from operating lease and is currently not considering this topic. The idea of ecology is supported by purchasing new vehicles; the economic aspect is considered by the fact that vehicles are owned, they are depreciated and finally sold off by means of FPSBA method. The pros and cons of operating lease are identical for both companies but on the opposite poles. The smaller company sees provision of service agreed in the operating lease agreement as positive. On the other hand, the large company, which has its own workshops, large number of employees of all manual professions, does not see service provided outside its premises as benefit. Neither of the companies perceives the use of leasing or management of movable asset negatively from the accounting perspective.

As for the research question concerning the motivation to the transition from linear economy to circular using operating lease, it shall be stated that the research sample is small and the results cannot be generalized. From the results obtained from ČLFA, it can be stated that a part of the second research question can be answered positively. Operating lease can help reduce the generation of greenhouse gases and emissions. In principle, the finding is in line with the conclusions by Endrizálová et al. (2018), according to which operating lease as a means of financing the purchase of new and innovative means of transport has a lower impact on the environment. ČLFA statistics indicate that a small share of operating leases is used also for purchasing used cars; we thus know the answer to the second part of the second research question of whether operating lease may help reduce waste production.

6. Conclusion

The objective of the paper was to identify pros and cons of operating lease and determine whether it is a suitable tool to apply the principles of circular economy in Czech economy.

The objective was achieved. In the chapter “Results”, two ČLFA statistics were processed for this purpose. Using a phenomenological analysis, information about two companies concerning the use of operating lease were obtained. In the chapter “Discussion of Results”, the use of operating lease was evaluated and compared with other products intended to finance investments, both from the perspective of entrepreneurs and consumers. The business entities addressed provided an insight into the practical experience with operating lease. Their responses obtained from theoretical questions provided information about their motivation for circular economy and described pros and cons of using operating lease. Neither of the entities uses operating lease to satisfy societal demand for ecology and sees any economic advantages of using it. An interesting finding is that the entities did not agree in terms of positives and negatives of operating lease. This means that each company needs different contractual

conditions adjusted individually to the companies, which are not offered by any of leasing companies.

The research questions and the answers obtained are only partial. The contribution of the paper is that it reveals unexplored possibilities of how to further support CE. Why are new vehicles manufactured but used vehicles financed by means of operating lease are not remanufactured by replacing engines? Why is not waste and scrap eliminated this way? Why there is a lack of cooperation of manufacturers, leasing companies, and end consumers or state? To answer these questions, it is necessary to conduct further research that would extend the obtained data from the perspective of end consumers, companies, and manufacturers, as well as from the perspective of financial institutions that provide operating lease to find out whether they are willing to adjust or change their product in order to support CE.

Author contributions: All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Funding: This research received no external funding.

Data Availability Statement: Publicly available datasets were analyzed in this study. This data can be found here: <https://www.clfa.cz/o-nas/vyrocní-zpravy>

Conflicts of Interest: The authors declare no conflict of interest.

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