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OBSAH

IMPACT OF CORPORATE GOVERNANCE MECHANISMES ON FINANCIAL PERFORMANCE: EVIDENCE FROM MALAYSIAN BANKS

Djellali Yakouta , Bradji Sabah

Abstract: *Many studies have concluded that corporate governance has a significant impact on the financial performance of banks, and consequently on overall financial stability. This study investigates the influence of corporate governance mechanisms—specifically board size, board activity, board independence, CEO duality, board committees, and audit committee independence—on banks' financial performance. Financial performance is operationalized using key indicators such as return on equity (ROE), return on assets (ROA), and net interest margin (NIM). Data for the analysis were obtained from the annual reports of eight Malaysian banks, covering the period from 2006 to 2023.The study suggests that corporate governance mechanisms have a multifaceted impact on bank performance. The regression results indicate that board size, board activity, board committee sand audit committee independence influence ROE and NIM; whereas board independence and CEO duality do not consistently affect performance across the models. The study highlighting the need for a balanced governance approach to oversee risks while maintaining efficient operations. The findings offer important managerial implications by highlighting the specific corporate governance mechanisms that influence various dimensions of bank performance, and they contribute to the theoretical literature by elucidating the complex, multidimensional impacts of these mechanisms on profitability, operational efficiency, and interest income management.*

Keywords: *Corporate governance mechanisms, bank performance, board size, audit committee, Malaysia*

***JEL classifications**: G210 , G3 , G34*

1 INTRODUCTION

Corporate governance has emerged as a critical concept in both advanced and emerging economies over the past few decades due to its role in enhancing performance quality and excellence. Weak corporate governance practices, including the failure of boards of directors to prioritize stakeholder interests, have frequently been linked to the pooe performance of financial institutions. (Aebi, Sabato, & Schmid, 2012); (Beltratti & Stulz, 2012); (Erkens, Hung, & Matos, 2012). The 2008 global financial crisis, which led to the collapse of multiple banks, prompted international institutions such as the International Monetary Fund, the World Bank, the Organization for Economic Cooperation and Development, and the Basel Committee to emphasize the need for the banking sector to strengthen its internal governance frameworks. These financial crises have significantly influenced the development of legislation and regulatory frameworks governing banking operations, particularly in shaping corporate governance structures (Tourani – Red & Lngely, 2010). However, governance frameworks vary across countries due to differences in institutional, legal, and economic environments. Corporate governance is fundamentally concerned with the mechanisms by which firms are directed and controlled, often giving rise to agency problems that stem from the separation between ownership and management. According to (Muhammad, Hayat, Iqbal, & Khan, 2016)the board of directors serves as a crucial mechanism in corporate governance. Effective corporate governance mechanisms within financial institutions are expected to foster management structures capable of mitigating excessive risk-taking and responding to financial challenges, thereby contributing to overall financial stability (Karamanou & Vafeas, 2005). Moreover, corporate governance is regarded as an essential component of market discipline, driving increased demand for robust governance frameworks from investors and other financial market participants. Regulatory bodies have addressed these challenges by enacting corporate governance reforms across various jurisdictions. In the United States, for example, the Sarbanes-Oxley Act (2002) was implemented to strengthen corporate accountability, while in the United Kingdom, corporate governance codes such as the Combined Code of Corporate Governance (2003) serve as best practice guidelines, exerting indirect legal influence through stock exchange listing requirements. In the banking sector, the Basel II framework has been widely adopted by developing

and emerging economies as a means to enhance corporate governance standards.

This study seeks to contribute to the existing body of knowledge on corporate governance by examining the impact of various governance mechanisms on the financial performance of banks in Malaysia.Specifically, the research seeks to assess the ability of Malaysian banks to implement corporate governance practices to enhance efficiency. Furthermore, the study examines the role of the prevailing corporate governance regulatory framework in shaping the financial performance of Malaysian banking institutions. To achieve these objectives, a representative sample of eight commercial banks from 2006 to 2023 is analyzed. The study employs multiple measures of bank financial performance to ensure the robustness of the empirical findings. Four alternative proxies for bank performance—net interest margin, return on average equity, and return on average assets—are utilized to document and analyze the relationships derived from empirical applications within the dataset. Empirical results are generated using three widely recognized econometric techniques: pooled Ordinary Least Squares (OLS), Random Effects, and the Generalized Least Squares (GLS) method. This methodological approach facilitates comparative analysis, enables the validation of econometric techniques, and ensures the robustness of empirical findings. The results indicate that, for the Malaysian banking sector, the GLS methodology outperforms both pooled OLS and Random Effects models in addressing classical econometric challenges associated with dynamic panel data and socio-economic variables, such as endogeneity, simultaneity.

The paper is organized as follows. Section 1 reviews the relevant literature and articulates the empirical hypotheses regarding corporate governance mechanisms. Section 2 describes the sample, variables, and econometric models employed in the analysis. Section 3 presents and discusses the empirical findings, while the final section offers concluding remarks..

2 LITERATURE REVIEW

The Cadbury Committee (1992) is credited with establishing the most prevalent concept of corporate governance, defining it as the structure that governs and regulates organizations. Good governance, therefore, entails efficient organizational frameworks that minimize agency costs associated with

information asymmetry and managerial entrenchment. Shah and Butt (2009) found that board size is negatively correlated with equity costs, suggesting that effective corporate management can lower a company's equity expenses. Investors are more likely to trust companies that exhibit strong profitability profiles and robust asset bases. Nurfatanah Bt Abdullah (November 2021) further argues that corporate governance is essential due to the separation of management from ownership and its impact on financial performance. Despite extensive research into various aspects of corporate governance and their effects on financial performance, empirical findings have often been inconsistent. Given its long-standing history and broad scope—encompassing a wide range of economic and legal phenomena—the definition of corporate governance varies according to the specific focus of inquiry.

Empirical evidence indicates that the impact of corporate governance mechanisms on the financial performance of Malaysian banks is substantial. A number of studies have demonstrated that effective governance practices such as board diversity, strict regulatory compliance, and enhanced transparency ,contribute to improved profitability and more robust risk management in the banking sector.This relationship is particularly relevant in the context of banks in Malaysia, where specific governance characteristics _Key Governance Mechanisms_ can lead to improved financial outcomes , which the Board Composition: A diverse board, including female participation, positively influences bank performance, as shown in studies focusing on Malaysian banks (Farooq, M., Al-Jabri, Q. Mohd., Khan, M. T., Humayon, A. A., & Ullah, S., 2023)

Regulatory Compliance: Adherence to regulations is crucial for maintaining investor confidence and improving financial performance (TANAKA, H., Kumar, P., & Kagura, T., April 2024). Financial Reporting Transparency: Clear and transparent financial reporting is linked to better financial outcomes, as it fosters trust among stakeholders. in other side the Empirical Evidence agree by Research indicates that effective governance mechanisms significantly impact profitability and risk management in banks (TANAKA, H., Kumar, P., & Kagura, T., April 2024). A study analyzing 300 bank-year observations found that certain governance characteristics, such as board size and director remuneration, positively affect financial performance. (Farooq, M., Al-Jabri, Q. Mohd., Khan, M. T., Humayon, A. A., & Ullah, S., 2023)

While the evidence supports the positive impact of corporate governance on financial performance, it is essential to consider that not all governance practices yield the same results across different contexts. For instance, the effectiveness of governance mechanisms may vary between Islamic and conventional banks, suggesting a need for tailored approaches in governance strategies.

The significance of corporate governance appears to rise in importance within both academic circles and the agendas of policymakers, particularly in response to global events typically linked to crises. This trend can be observed following incidents like the Asian crisis of 1998, the collapses of Enron and WorldCom, the global financial crisis of 2007, and the subsequent credit crisis of 2008. Concerns have grown regarding the inadequacy and ineffectiveness of corporate governance mechanisms, which have led to insufficient board oversight and a decline in bank value. Consequently, recent attention has been directed toward the shortcomings present in the governance systems of banks. However, these crises are merely symptoms of deeper structural issues that underscore the increasing importance of corporate governance mechanisms for economic development and their status as a critical policy concern (Bobirca.A & Miclaus.P.G, 2007)

Typically, banks are known for a significant level of opaqueness regarding their transactions and operations. Consequently, the attributes and characteristics of corporate governance within the banking sector are distinct. This distinction arises from the particular traits of the banking system, which exacerbate issues related to governance and may diminish the efficacy of conventional governance frameworks, such as boards and audit committees (Laeven.L, 2013); (Alharbi.R, McLaren.J, & Elnahass.M, 2022), when compared to non-financial companies. The Basel Committee on Banking Supervision indicates that the banking sector has distinct regulations regarding corporate governance, which pertains to "the manner in which the business and affairs of banks are governed by their boards of directors and senior management" (Basel Committee on Banking Supervision, 2006)This suggests that because of the unique characteristics of banking institutions, governance mechanisms significantly influence how they operate and fulfill their responsibilities. (Haji & Ghazali, 2018)posit that a firm's performance is primarily driven by its resources, viewing the firm as a bundle of capabilities that are rare, valuable,

non-substitutable, and inimitable—qualities that underpin sustainable competitive advantage. In this context, positive hidden values, such as the intangible assets derived from board characteristics, can enhance performance, while negative hidden values, or intangible liabilities, may hinder it. Supporting this perspective (Hermawan, Hanif, Biduri, & Wijayanti, 2021), examined the influence of good corporate governance on the financial performance of Indonesian banks—using ROA as a proxy—and found that robust governance practices positively impact financial outcomes. However, contrasting evidence exists in the literature, as some studies have reported an insignificant relationship between corporate governance and firm performance (Hassan, Marimuthu, & Johl, 2015); (Singh & Davidson, 2003); (Prevost, Rao, & Hossain, 2002), suggesting that the effect of governance mechanisms may be contingent on contextual factors.

2.1 Board size

Within the theoretical framework for corporate governance, several theories posit a relationship between board size and financial performance. In particular, both agency theory and resource dependency theory contend that a larger board of directors can enhance firm performance by providing a broader range of expertise and resources for effective oversight (Kiel & Nicholson, 2003). Consequently, board size is widely regarded as a pivotal factor that impacts both the quality of corporate governance and the overall financial performance of a firm.

(Arora & Sharma, 2016) demonstrate that a larger board size enhances financial performance and decision-making, attributing this benefit to the greater intellectual capital available in larger boards. Similarly, (Al-Matari E. , 2020)examined the impact of board characteristics on corporate performance in the financial sector and found that an increase in board size significantly improves financial outcomes. (Poudel & Hovey, 2012)further support this view by showing that larger boards enhance the efficiency of commercial banks. However, contrasting perspectives exist in the literature. (Jensen M. , 2003)contends that oversized boards contribute to corporate failure, while (Fauzi & Locke, 2012)argue that smaller boards may better enhance overall performance. In line with the latter argument, (Morekwa Nyamongo & Temesgen, 2013)assert that banks with smaller boards tend to be more

efficient due to their ability to more closely monitor management. Additionally, (Lamichhane, 2018)further explains that excessively large boards may encounter coordination and control issues, leading to prolonged decision-making and declining performance. Given these conflicting findings, the literature provides evidence for both positive and negative relationships between board size and firm performance.

Consequently, the following hypothesis is proposed: H1. “The size of the board of directors impacts the financial performance of banks in Malaysia.”

2.2 Board activity

Board activity reflects the frequency of meetings held by an organization's board of directors, during which key strategic decisions and organizational policies are discussed. These meetings play a crucial role in shaping the organization’s direction and ensuring effective governance. Additionally, board meetings serve as an essential platform for directors to obtain relevant information, monitor the company’s progress, and fulfil their oversight responsibilities (Eluyela, et al., 2018).The board activity was reported to have a significant relationship with the firm’s financial performance. According to his study, a high frequency of meetings helps in the assessment/monitoring of business activities at the right time and timely solving of business matters. (Al-Matari E. , 2020)This result was consistent with the study of (Salim, Arjomandi, & Seufert, 2016)which established that a high frequency of meetings yields better performance. (Lee & Lok, 2020)study concluded that firms’ performance is negatively associated with busy boards. Also, firms with a busy board are experiencing higher operational risks, especially in the volatility of ROA, operating cash flows, and stock returns. (Aktan, Turen, Tvaronavičienė, Celik, & Alsadeh, 2018)According to the study findings indicate that the frequency (number) of meetings held by the board of directors exerts a significantly negative impact Board meetings, defined as the assemblies of an organization's board of directors to deliberate on strategic coverage and key decisions affecting its future, are critical for facilitating the flow of information and tracking company progress (Eluyela, et al., 2018). Some studies report that a higher frequency of board meetings is positively associated with improved financial performance, as regular meetings enable timely assessment, monitoring, and resolution of business matters (Al-Matari E. , 2020); (Salim,

Arjomandi, & Seufert, 2016). In contrast, other research suggests that an excessive frequency of meetings—indicative of a "busy board"—may be detrimental to firm performance. For instance, (Lee & Lok, 2020)find that busy boards are linked to lower performance and increased operational risks, such as greater volatility in ROA, operating cash flows, and stock returns. Supporting this negative view, (Aktan, Turen, Tvaronavičienė, Celik, & Alsadeh, 2018)demonstrate that a higher number of board meetings is significantly associated with a decline in financial performance, as measured by return on equity, implying that overly frequent meetings may have a destructive rather than constructive impact.

In light of these mixed findings, we propose the following hypothesis: H2. "The number of board meetings impacts the financial performance of banks in Malaysia."

2.3 Board committees

Committee structures enable boards to address key issues in greater depth than is typically feasible during full board meetings, allowing organizations to tailor their governance practices to specific business challenges and corporate cultures. The composition and number of board committees vary widely, with no universal standard regarding their type or number. (Hayes, Mehran, & Schaefer, 2004) documented significant variation in both the number and composition of committees across firms. Nevertheless, certain board committees—particularly the audit committee in financial institutions—are widely regarded as critical. (Hayes, Mehran, & Schaefer, 2004)further reported that the proportion of outside directors serving on committees does not significantly affect firm performance. Moreover, they observed that the number of committees is positively related to both the total number of directors and firm size In contrast, (Elamer & Benyazid, 2018)emphasize that specific characteristics of risk committees—such as their existence, independence, meeting frequency, and size—are negatively associated with firm performance. Based on this literature, we propose the following hypothesis:

H3. "Board committees impact the financial performance of banks in Malaysia."

2.4 Board independence

In response to the collapse of several large corporations, organizations have increasingly recognized the vital role of independent directors in strengthening governance. Independent directors contribute diverse perspectives and actively engage in board deliberations, serving as monitors of executive management and ensuring accountability. (Alves, 2014)demonstrated that board independence positively and significantly enhances profit quality by mitigating earnings management practices. Similarly, (Wu & Li, 2015)found that a higher proportion of independent directors is associated with improved financial performance, advocating for the appointment of additional independent directors to bolster business outcomes. Further supporting these findings, studies by (Park, Choi, & Yoo, 2007) and (Dahya, Dimitrov, & J. McConnell, 2008)indicate that the inclusion of independent or outside directors contributes to enhanced firm performance. Moreover, (Akeju & Babatunde, 2017) affirmed that board independence significantly improves the timeliness and quality of financial reporting. In light of this evidence, the following hypothesis is proposed:
H4. "The independence of the board of directors impacts the financial performance of banks in Malaysia."

2.5 Duality

CEO duality—where the same individual serves as both chief executive officer and board chairman—is a focal point of interest among shareholders and regulatory bodies. Proponents of separating these roles argue that such a structure upholds key principles of corporate governance by preventing the concentration of decision-making power and preserving board independence (Jensen M. C., 1993). From an agency theory perspective, CEO duality can compromise shareholder rights by reducing the board's capacity to challenge management decisions when conflicts of interest arise. Conversely, supporters contend that duality facilitates a more streamlined strategic focus and faster decision-making. Empirical findings on the impact of CEO duality are mixed. For instance, (Tian & Lau, 2001)and (Kiel & Nicholson, 2003)report a positive association between duality and firm performance. In contrast, studies by (Abdullah, 2004) and (Weir & Liang.T., 2000), find no significant performance differences between firms with dual and nondual leadership structures.

Further complicating the picture, research by (Dey, Engel, & Liu, 2011), (Grove, Patelli, & Xu, 2011), and (Dong, Girardone, & Kuo, 2017)indicates that CEO duality may detrimentally affect financial stability in financial institutions, although (Carty & Weiss, 2012)report no significant relationship. In light of this diverse evidence, we propose the following hypothesis: H5. "Chairman duality impacts the financial performance of banks in Malaysia."

2.6 Audit committee

The existence of an audit committee has been demonstrated to enhance governance, encourage conservative financial practices, and reduce the likelihood of opportunistic earnings management (Xie, Davidson, & DaDalt, 2003); (Bedard, Chtourou, & Courteau, 2004) and (Sharma & Kuang, 2014). The primary objective of the Board Audit Committee (BAC) is to provide independent oversight by reviewing the firm's financial condition, financial reporting processes, and internal control systems, thereby ensuring effective checks and balances and recommending remedial actions as necessary. Empirical evidence supports the role of audit committees in enhancing financial performance; for example, (Mohammad, Abdullatif, & Zakzouk, 2018)found a positive and significant relationship between the audit committee and both ROE and ROA in commercial banks in Jordan. Conversely, (Al-Ahdal, Alsamhi, Tabash, & Farhan, 2020) reported an insignificant impact of audit committees on performance in their analysis of corporate governance mechanisms. (Abbott, Parker, & Peters, 2004)argue that the independence of audit committee directors is critical for effective monitoring, as the lack of economic or psychological ties to management encourages unbiased oversight and is associated with a reduced likelihood of financial restatements. Furthermore, (Bédard & Gendron, 2010)note that the associations between audit committee characteristics—such as size, independence, competency, and meeting frequency—and the quality of financial reporting tend to be stronger in the United States than in other countries. (Beasley & Salterio, 2001)also suggest that firms with the incentive and capacity to enhance their audit committees often exceed the legislative minimum by including a higher number of outside directors. This is particularly relevant given that the Listing Requirements of Bursa Malaysia mandate that all listed companies maintain audit committees comprising at least three members, with a majority being independent. In light

of these findings, we propose the following hypothesis: H6. “Audit committee impact the financial performance of banks in Malaysia.”

3 RESEARCH METHODOLOGY

3.1 The method

To test the hypotheses, econometric models were employed to examine the impact of corporate governance mechanisms on bank financial performance. Panel data were collected to analyze the relationship between various corporate governance factors and financial outcomes in the banking sector. Consistent with prior literature, the analysis began with pooled OLS regression models, which provided a straightforward baseline due to their simple specification and ease of interpretation. However, while OLS is widely used for its simplicity, it does not account for individual heterogeneity, potentially leading to biased parameter estimates. To address these concerns, sensitivity analyses were conducted using both firm-fixed and random effects models. Moreover, diagnostic tests revealed that nearly all models exhibited heteroscedasticity and cross-sectional dependence, issues that necessitated the use of the Generalized Least Squares (GLS) estimation method—a technique specifically designed to provide more efficient and reliable parameter estimates in this case study .

3.2 Sampling and data collection

The sample comprises all commercial banks operating in Malaysia, with banks that did not publish the required financial information in their financial statements being excluded. Consequently, the final sample consists of 9 commercial banks observed over an 18-year period (2006–2023), resulting in a total of 144 observations. The selection was based on the availability of pertinent financial and non-financial data as reported in the banks’ annual and governance reports published on their respective websites.

3.3 Measurement of variables

For measuring bank financial performance, the study employs three dependent variables—return on equity (ROE), return on assets (ROA), and net interest margin (NIM)—as proxies for performance. The independent variables pertain

to corporate governance mechanisms and include board size, board activity, CEO duality, board independence, board committees, and the audit committee. The analysis primarily utilizes panel data regression techniques to investigate the relationships between these corporate governance attributes and the various dimensions of bank financial performance. Table (1) shows the definition and measurement of these variables.

Table No. (1): Units of Measurement for Study Variables

Variables	Definition	Measurement
Dependent Variables		
ROE	Return on equity:	Is the ratio of net income divided by shareholder's equity
ROA	Return on asset:	Is the ratio of net income divided by total assets.
NIM	Net interest margin	Is the difference between interest paid and interest received, adjusted for the total amount of interest-generating assets
Independent Variables		
B_SIZE	Board size	Total number of board members
B_INDEPEN	Board independence	The proportion of directors who are independent
B_ACTIVITY	Board activity	Number of board meetings held during each year
DUALITY	CEO DUALITY	If the CEO and Chairman are the same person = 0; otherwise = 1
B_COMMET	BOARD COMMITEES	MEASURED BY THE NUMBER OD BOARD COMMITTEE
AC_INDP	AUDIT COMMITEE	The proportion of members who are independent

Source: Prepared by the researchers

4 DATA ANALYSIS

4.1 Descriptive Analysis

Table 2 presents the descriptive findings, highlighting the central tendency and dispersion of the indicators.

Table No. (2): Descriptive Statistics

variables	Mean	Median	Max	Min	Standard deviation	Jaque-Bera
Bank financial performance ratios						
ROE	0.1250	0.1030	0.8710	0.0128	0.0941	8385.9268
ROA	0.0111	0.0110	0.0218	0.0005	0.0038	6.5865
NIM	0.0196	0.0196	0.0340	0.0063	0.0046	5.6308
Corporate governance mechanisms						
Board size	8.7152	9.0000	13.0000	4.0000	2.1763	3.5635
Board independence	0.5980	0.5700	5.0000	0.2000	0.3936	71195.526
Board activity	11.1527	10.0000	24.0000	5.0000	4.7102	10.3592
duality	0.8680	1.0000	1.0000	0.0000	0.3396	158.2911
Board committees	4.6111	5.0000	8.0000	3.0000	1.1037	3.5931
Audit committee independence	0.8875	1.0000	1.0000	0.0100	0.1786	130.2387

Source: Prepared by the researchers based on the outputs of E-views 12 software.

Table 1 presents the descriptive statistics for all variables included in the regression analysis. The mean return on equity (ROE) is approximately 12%, (Statista, 2024) while the mean return on assets (ROA) is 1.1%, figures that are largely consistent with Statista reports (Statista, 2024), which indicate that the Malaysian banking industry's ROE is around 12% and its ROA is approximately 1.3%. In contrast, the mean net interest margin (NIM) is 1.96%, which is slightly lower than the 2.02% reported by Bank Negara Malaysia (BNM, Financial Stability Review Second Half 2023, 2023).Despite this, the performance ratios in our sample tend to be higher than those observed in the EU and USA; for instance, ROE in these regions is reported to be 8.97% and 11.14%, respectively, while ROA is 1.3% in the USA (statistica, 2024) compared to 0.68% in the EU (Statista, 2024).

Furthermore, Table 1 indicates that the average board size is 8 members, with the range spanning from 4 to 13 members. This finding aligns with the recommendations of Bank Negara Malaysia's Corporate Governance Policy Document (BNM, 2024), which suggests that a board should be large enough to ensure a diversity of thought and expertise, yet small enough to facilitate

effective decision-making—typically between 7 and 11 members, depending on the institution's size and complexity. Additionally, the average proportion of independent directors on the board is approximately 60%, signifying a relatively high level of board independence in the Malaysian banking sector. This observation is in accordance with Bursa Malaysia Listing Requirements, which mandate that independent non-executive directors should constitute at least one-third of the board to ensure effective monitoring and the enhancement of firm value.

According to Bank Negara Malaysia's Corporate Governance Policy Document, boards should meet at least six times per year. As shown in Table 1, Malaysian banks hold an average of 11 board meetings annually, with the frequency ranging from 5 to 24 meetings. Additionally, Table 1 indicates that, on average, 86% of the banks separate the roles of CEO and board chairman, which is consistent with BNM's governance principles aimed at maintaining an appropriate balance of power. The data further reveal that the mean number of board committees is four, with a range of three to eight, aligning with BNM's standard that typically stipulates four to six committees depending on a bank's size, complexity, and regulatory requirements. In terms of audit committee independence, the results show that approximately 89% of the committee members are independent, suggesting that the majority of audit committees adhere to the high independence standards set by regulators. Moreover, the Pro. Jarque–Bera test confirms that the normality assumption is accepted at the 5% level for all variables, in order to address potential issues of unit heterogeneity and large variations in measurement scales, the natural logarithms of all continuous dependent and independent variables were computed prior to conducting the regression analysis. This transformation ensures unit homogeneity and enhances the accuracy of the econometric results.

4.2 Correlation matrix

Table No. (3): Pearson Correlation Coefficients Among Independent Variables

Correlation t-statistic probability	LnROE	LnROA	LnNIM	LnBsize	LnBindependt	LnBactivity	Duality	LnBcomet	LnAuditcomet
LnROE	1.000 ------ ------								
LnROA	0.199 2.426 0.016	1.000 ------ ------							
LnNIM	0.251 3.100 0.002	0.244 3.011 0.003	1.000 ------ ------						
LnBsize	0.190 2.317 0.021	0.085 1.025 0.306	0.168 2.033 0.043	1.000 ------ ------					
LnBindependt	0.055 0.665 0.507	0.009 0.109 0.912	0.110 1.323 0.187	- 0.202 - 2.465 0.014	1.000 ------ ------				
LnBactivity	0.446 5.943 0.000	0.118 1.418 0.158	0.224 2.749 0.006	0.455 6.104 0.000	0.144 1.740 0.083	1.000 ------ ------			
Duality	0.239 2.933 0.003	0.243 2.989 0.003	0.102 1.230 0.220	0.389 5.042 0.000	0.062 0.740 0.460	0.431 5.707 0.000	1.000 ------ ------		
LnBcomet	0.311 3.910 0.001	0.115 2 1.382 5 0.168 9	0.372 4.789 0.000	0.421 5.536 0.000	0.078 0.942 0.347	0.515 7.174 0.000	0.235 2.890 0.004	1.000 ------ ------	
LnAuditcomet	-0.118 -1.416 0.158	0.003 0.034 0.972	- 0.098 - 1.179 0.240	- 0.028 - 0.335 0.737	0.150 1.813 0.071	0.025 0.303 0.761	0.109 1.315 0.190	-0.076 -0.912 0.362	1.000 ------ ------

Source: Prepared by the researchers based on the outputs of E-views 12 software.

In reference to the Pearson correlation matrix presented in Table 2, the dependent variable, LnROE (representing banks' financial performance), is moderately correlated with board activity and board committee variables, with correlation coefficients of 44% and 31%, respectively, while its correlations with the remaining variables are weak. Similarly, the net interest margin (NIM) exhibits a weak correlation of 37% with the board committee variable. Furthermore, audit committee independence is negatively correlated with

both ROE and NIM, with coefficients of 1% and 0.9%, respectively. The variable ROA displays very weak correlations with all other variables. Additionally, Table 2 indicates that among the independent variables, there exists a weak, negative correlation between audit committee independence, ROE, and NIM. The remaining correlations are either below 51.1% or statistically insignificant. Based on these findings, there appears to be no multicollinearity issue among the independent variables, as all correlation coefficients are below the 80% threshold recommended by (Field, 2005).

4.3 Empirical regression models on performance

To investigate the effect of corporate governance mechanisms on bank financial performance, we estimate a series of basic panel data models using the pooled OLS estimator. In these models, the dependent variables are represented by bank performance measures, including return on equity (BROEi,t), return on assets (BROAi,t), and net interest margin (BNIMi,t). The independent variables comprise key corporate governance attributes: board size (B_SIZEi,t), board independence (B_INDEPENi,t), board activity (B_ACTIVITYi,t), CEO duality (DUALITYi,t), board committees (B_COMMETi,t), and audit committee independence (AC_INDPi,t). Specifically, the models are specified as follows:

Model 1:

$$BROEi,t = \beta_0 + \beta_1 B\_SIZEi,t + \beta_2 B\_INDEPENi,t + \beta_3 B\_ACTIVITYi,t + \beta_4 DUALITYi,t + \beta_5 B\_COMMETi,t + \beta_6 AC\_INDPi,t + \varepsilon i,t \quad (1)$$

Model 2:

$$BROAi,t = \beta_0 + \beta_1 B\_SIZEi,t + \beta_2 B\_INDEPENi,t + \beta_3 B\_ACTIVITYi,t + \beta_4 DUALITYi,t + \beta_5 B\_COMMETi,t + \beta_6 AC\_INDPi,t + \varepsilon i,t \quad (2)$$

Model 3:

$$BNIMi,t = \beta_0 + \beta_1 B\_SIZEi,t + \beta_2 B\_INDEPENi,t + \beta_3 B\_ACTIVITYi,t + \beta_4 DUALITYi,t + \beta_5 B\_COMMETi,t + \beta_6 AC\_INDPi,t + \varepsilon i,t \quad (3)$$

These models facilitate a comprehensive examination of how various dimensions of corporate governance influence different aspects of bank financial performance, thereby providing a robust empirical foundation for the subsequent analysis.

Where:
B_SIZE = Board size
B_INDEPEN = Board independence
B_ACTIVITY = Board activity
DUALITY = CEO duality
B_COMMET = Board committees
AC_INDP = Audit committee independence
ROE = Return on equity
ROA = Return on assets
NIM = Net interest margin
β = Coefficient parameters
ε = Residual error

4.4 Regression results

Three distinct tests were conducted to assess the impact of corporate governance mechanisms on bank financial performance, employing three basic static panel data models. The estimation results are summarized in the table below, which presents the findings in a concise and accurate manner. This approach allowed the researchers to comprehensively address all aspects of the research question within the study's limitations.

Table No. (4): Results for POLS, Fixed effects and random effects model

	Tests	**p-*value***	***Accept/reject***	***interpretation***
Model 1 ROE	Breusch-Pagan	0.0273	*H0: reject*	*Polsis rejected*
	Hausman test	0.3885	H0: accept	Random effect is applied for estimation
Model 2 ROA	Breusch-Pagan	0.0001	H0 reject	*Polsis rejected*
	Hausman test	0.8932	H0 accept	Random effect is applied for estimation
Model 3 NIM	Breusch-Pagan	0.0000	H0: reject	*Polsis rejected*
	Hausman test	0.7449	H0: accept	Random effect is applied for estimation

Source: Prepared by the researchers based on the outputs of E-views 12 software.

The findings indicate that for models (1), (2), and (3), the null hypothesis of the Hausman test is accepted, thereby supporting the use of the random effects model. Additionally, the p-value of the Restricted Fisher Test is statistically

significant at the 5% level, reinforcing the appropriateness of the chosen specification.

Table No. (05): Estimation of Study Models with panel least squares model

Variables		ROE	ROA	NIM
LnBsize	Prob	0.3131	0.65948	0.37923
	Coef	-0.38692	0.11251	0.08684
LnBindepen	Prob	0.8619	0.9029	0.73549
	Coef	0.00000	0.01943	0.02066
LnBactivity	Prob	0.01523	0.20630	0.18626
	Coef	0.07897	-0.3246	-0.1335
Duality	Prob	0.33117	0.66701	0.5485
	Coef	0.2073	0.16905	0.09389
LnBcommitee	Prob	0.56265	0.42508	0.02373
	Coef	-0.03431	0.2177	0.23965
Ln AuditComtindepen	Prob	0.07218	0.59385	0.05152
	Coef	-0.1433	-0.0559	-0.0788
R-squared		0.09621	0.0225	0.45628
Adjusted R-squared		0.05663	-0.0202	0.4019
Durbin-Watson stat		1.448433	1.9628	0.7458

Source: Prepared by the researchers based on the outputs of e-views12 software

Before interpreting the economic implications of our study's results, it is imperative to first verify the statistical efficiency of the selected models. This verification involves testing for cross-sectional independence and heteroscedasticity in the residuals, as the presence of these issues can compromise the efficiency and accuracy of econometric estimates, thereby undermining their reliability in economic analysis. Depending on whether these measurement issues are detected—and on the specific nature of any such

issues—the estimation method will be adjusted accordingly to correct for these problems, particularly given that the panel's time dimension exceeds the number of cross-sectional units.

Table No. (06): Serial Correlation and Heteroscedasticity tests

	Tests	**p-*value***	***Accept/reject***	***interpretation***
Serial Correlation				
Model 1 ROE	Breusch-Pagan LM	0,00001	*H0: reject*	*No cross-section dependence in this model*
	Pesaran scaled LM	0,00000	H0: reject	
Model 2 ROA	Breusch-Pagan LM	0.08010	H0: accept	*No cross-section dependence in this model*
	Pesaran scaled LM	0.1397	H0: accept	
Model 3 NIM	Breusch-Pagan LM	0,0000	H0: reject	*The presence of an auto correlation in this model*
	Pesaran scaled LM	0,0000	H0: reject	
Heteroscedasticity				
Model 1 ROE	Likelihood ratio	0,0000	H0: reject	The presence of Heteroscedasticity in this model
Model 2 ROA	Likelihood ratio	0,0000	H0: reject	The presence of Heteroscedasticity in this model
Model 3 NIM	Likelihood ratio	0,0000	H0: reject	The presence of Heteroscedasticity in this model

Source: Prepared by the researchers based on the outputs of e-views12 software

For models (1) and (3), the Breusch-Pagan LM and Pesaran scaled LM tests yield p-values of 0.000 at the 1% significance level, leading to the rejection of the null hypothesis of cross-sectional independence and indicating that these models exhibit cross-sectional dependence among their errors. In contrast, model (2) produces a p-value significantly greater than 0.05, resulting in the

acceptance of the null hypothesis and suggesting that its residuals are cross-sectionally independent. Furthermore, the likelihood ratio test returns p-values of 0.0000 across all models, confirming the presence of heteroscedasticity at the 1% significance level in each case.

5 RESULTS AND DISCUSSION

Based on the measurement issues tests, which indicated that almost all models suffer from heteroscedasticity and cross-sectional dependence, the Generalized Least Squares (GLS) estimation method is identified as the most appropriate for all three models. GLS effectively accounts for both heteroscedasticity and non-independence across cross-sections, thereby providing more reliable estimates. The results of the GLS estimation are presented in the table below.

Table No. (07): Estimation of Study Models with generalized least squares model.

Variables		ROE	ROA	NIM
LnBsize	Prob	0.00000	0.00108	0.0122
	Coef	0.5565	-0.294138	0.0916
LnBindepen	Prob	0.01226	0.1963	0.4199
	Coef	-0.16507	0.043813	0.02221
LnBactivity	Prob	0.0236	0.00000	0.02298
	Coef	0.346820	-0.52866	-0.06386
Duality	Prob	0.73831	0.5741	0.13494
	Coef	0.05738	-0.1854	0.08791
LnBcommitee	Prob	0.00014	0.79065	0.00001
	Coef	0.676054	-0.02097	0.18850
Ln AuditComtindepen	Prob	0.00328	0.59647	0.00139
	Coef	-0.22611	-0.041610	0.15853

R-squared	0.78683	0.8163	0.8984
Adjusted R-squared	0.76552	0.7980	0.8883
Durbin-Watson stat	1.9433	1.89190	1.941253

Source: Prepared by the researchers based on the outputs of e-views12 software.

Regarding the partial significance of the parameters across the four models of bank financial performance, the results indicate that not all parameters are statistically significant. Specifically, the variable lnBsize is significant in all four models, whereas lnBactivity, lnBindependance, lnBcommitees, and lnAuditcometindependence are significant in only some models. Notably, the CEO Duality variable is consistently insignificant across all models, as its p-values for the student's t-statistic exceed the 0.05 threshold.

Furthermore, the R-squared and Adjusted R-squared statistics for the four models range between 76% and 89%, suggesting that the models explain a substantial proportion of the variation in the dependent variables. The Durbin–Watson statistic, consistently close to 2, implies that the assumption of independent errors is largely satisfied (Field, 2005).

Overall, the four models estimated using the Generalized Least Squares (GLS) method are statistically robust, exhibiting both partial and overall significance, as well as an absence of measurement issues. Consequently, the results obtained can be considered reliable for further economic analysis.

5.1 Economic Interpretation of the Results

The findings from Model (1) indicate that board size has a positive and statistically significant impact on ROE, suggesting that larger boards are associated with higher profitability. This result supports the notion that effective governance benefits from a more diverse board composition, as a greater number of directors can offer a wider range of skills, experiences, and perspectives. Such diversity enhances the board's ability to monitor management and make informed strategic decisions, ultimately contributing to improved bank performance. In contrast, the board independence variable exhibits a negative and significant relationship with ROE, implying that a higher proportion of independent directors is linked to lower profitability. This finding suggests that although board independence is generally valued for reducing

agency problems, an excessively independent board may lack critical industry-specific expertise or adopt overly conservative approaches, which could impede dynamic decision-making (Bhagat & Black, 2002).Additionally, board activity is found to have a positive and significant relationship with ROE, indicating that more frequent board meetings and active engagement in oversight functions facilitate timely strategic decisions and more effective monitoring, thereby boosting bank performance. Furthermore, the strong positive and statistically significant effect of board committees on ROE indicates that the presence and effectiveness of specialized committees—such as nomination and remuneration committees—enhance board oversight. (Carter, Simkins, & Simpson, 2003)These committees concentrate on key governance areas, which can lead to more informed decision-making and, ultimately, improved bank performance. Conversely, the negative and significant coefficient for audit committee independence suggests that a higher degree of independence within the audit committee is associated with lower ROE. This finding implies that while independence is essential for rigorous financial oversight, it may also result in more conservative strategies that restrict risk-taking and innovation, thereby potentially dampening performance in a competitive banking sector. Alternatively, it may reflect that banks with poorer performance adopt more robust audit functions as a corrective measure. (DeZoort, Hermanson, Archambeault, & Reed, 2002). Contrary, CEO duality exhibits a statistically insignificant relationship with ROE, indicating that within this sample, duality does not reliably impact performance. The role of duality remains controversial in the literature, with some studies suggesting benefits from unified leadership and others advocating for a separation of roles to enhance oversight.

Model (2) yields a mixed picture of the relationship between corporate governance mechanisms and bank performance as measured by ROA. In this model, only board size and board activity exhibit statistically significant relationships with ROA, and both associations are negative. Specifically, the results indicate that as the board becomes larger, ROA tends to decrease, suggesting that larger boards may suffer from coordination difficulties and diluted responsibilities. These inefficiencies could lead to slower decision-making and less effective oversight of daily operations, thereby reducing a bank's operating performance (Cheng, 2008). Similarly, the highly significant negative effect of board activity on ROA implies that increased board activity is

associated with lower operating performance. One interpretation is that overly active boards may engage in micromanagement or excessive intervention in managerial decisions, which can disrupt managerial autonomy and operational efficiency, resulting in poorer asset utilization. Alternatively, it may be that lower-performing banks prompt more frequent board meetings as a corrective measure, leading to the observed negative association (Kamarudin, Mohamad Ariff, Azmi, & Mohd Suffian, 2024).Alternatively, it may be that lower-performing banks prompt more frequent board meetings as a corrective measure, leading to the observed negative association. In contrast, the coefficient for board independence is positive—suggesting that a higher proportion of independent directors might improve ROA—but this relationship is not statistically significant ($p > 0.05$), indicating that the evidence is not robust enough to draw firm conclusions in this sample. CEO duality exhibits a negative coefficient that is not statistically significant, suggesting that the concentration of leadership roles does not have a discernible impact on ROA. This finding implies that any potential benefits or drawbacks associated with duality, as debated in the corporate governance literature, may be neutralized in terms of operating performance. Similarly, the relationship between board committees and ROA is negative but statistically insignificant, indicating that the mere presence or structure of specialized board committees does not significantly influence operational performance in this study. This lack of significance may imply that the effect of board committees is either inherently weak or mediated by other unobserved factors.

Likewise, audit committee independence also shows a negative yet non-significant relationship with ROA. Although the negative direction suggests that a higher degree of audit committee independence might lead to more conservative decision-making—potentially reducing operating performance—the absence of statistical significance means that this relationship cannot be reliably confirmed within the sample. Model (3) investigates the relationship between various corporate governance mechanisms and bank performance, as measured by the net interest margin (NIM). Consistent with the findings of Model (1), both board size and the presence of board committees exhibit statistically significant positive associations with NIM. This result indicates that a larger, well-organized board complemented by effective specialized committees is linked to improved net interest margins. Moreover, audit committee independence shows a positive and statistically significant effect,

suggesting that banks with a higher proportion of independent members on their audit committees tend to achieve better management of interest margins—potentially through enhanced financial oversight and more robust risk management practices. In contrast, while the variables board independence, board activity, and duality display positive or negative signs, their lack of statistical significance implies that these factors do not exert a decisive direct impact on NIM. Their effects may be more nuanced or may interact with other aspects of bank operations and governance.

6 CONCLUSIONS

The aim of this study was to investigate the impact of corporate governance mechanisms on the financial performance of Malaysian banks over the period 2006–2023, employing panel data techniques with observations from eight banks. The results across the three models reveal that significant determinants of bank performance include board size, board activity, board committees, and audit committee independence, whereas board independence and CEO duality do not exhibit a robust impact.

Specifically, board size influences all dimensions of bank performance, with its effect varying by performance measure: larger boards are associated with higher overall profitability (ROE) and improved interest margins (NIM), yet they may negatively affect operational efficiency (ROA). Board activity displays a dual effect; while increased board engagement significantly enhances profitability, it simultaneously detracts from operational efficiency and net interest margins when excessive, suggesting that an overly active board may introduce coordination challenges that impair day-to-day operations.

Moreover, board committees emerge as key drivers of profitability and interest performance, strongly improving both ROE and NIM, although their impact on ROA is not significant. Audit committee independence has a differential effect: it appears to reduce overall profitability while enhancing interest income performance, with no significant influence on operational efficiency. These differential effects underscore the trade-offs inherent in rigorous financial oversight, where enhancements in risk management may come at the expense of short-term profitability. Board independence exhibits a negative impact on ROE, its effects on ROA and NIM are not statistically significant, suggesting a context-dependent role in shaping bank performance. Similarly, CEO duality

does not emerge as a significant determinant across the models, indicating that the concentration of leadership roles has no discernible impact on bank performance in this sample.

This study suggests that corporate governance mechanisms have a multifaceted impact on bank performance. The key findings indicate that board size significantly influences performance across multiple dimensions: larger boards are associated with higher overall profitability (ROE) and improved interest margins (NIM), yet they may negatively affect operational efficiency (ROA). Board activity exhibits a dual effect; while increased engagement significantly enhances profitability, excessive activity detracts from both operational efficiency and net interest margins, likely due to coordination challenges in day-to-day operations. Furthermore, board committees emerge as critical drivers, strongly improving both ROE and NIM, although their influence on ROA is not significant. Audit committee independence shows a differential impact—it appears to reduce overall profitability while enhancing interest income performance, underscoring the trade-offs inherent in stringent financial oversight. In contrast, board independence and CEO duality do not consistently affect performance, suggesting that their roles may be context-dependent. Overall, the results underscore the importance of a balanced governance framework that leverages the benefits of specialized oversight while mitigating potential drawbacks such as over-involvement or inefficiencies. These nuanced insights are invaluable for academics and practitioners aiming to optimize corporate governance structures within the banking sector.

The study, however, is subject to certain limitations that future research should address. First, this study employs ordinary least squares (OLS) and generalized least squares (GLS) regressions to examine the effects of corporate governance mechanisms on financial performance. Future studies could benefit from employing simultaneous equation frameworks, as demonstrated by Carter et al. (2003) and Campbell and Minguez-Vera (2008), or by utilizing instrumental variable (IV) approaches and dynamic panel data methods (e.g., system GMM) to better control for reverse causality and omitted variable bias. Second, the study covers a relatively small sample size and a short time period. Future research should consider using longitudinal data from larger and more diverse

samples to provide more robust insights into the relationship between corporate governance mechanisms and financial performance.

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AUTHORS

Ph.D student Djellali yakouta , Entrepreneurship and Organization Management Laboratory, Echahid Cheikh Larbi Tebessi university, Algeria, Email: yakouta.djellali@univ-tebessa.dz

Ph.D Bradji sabah, Economic diversifications to achieve food and health security, Laboratory, Echahid Cheikh Larbi Tebessi university, Algeria, Email: sabah.bradji@univ-tebessa.dz

STRESORY GENERACE "Z" V PRACOVNÍM PROSTŘEDÍ

GENERATION "Z" STRESSORS IN THE WORK ENVIRONMENT

Lucie Mrklasová, Barbora Pánková

Abstrakt: Studie prezentuje výsledky kvalitativního výzkumu zaměřeného na pracovní stresory u příslušníků generace Z. Výzkumný vzorek tvořilo osm respondentů ve věku 19–25 let, zastupujících různé úrovně vzdělání a profesní zaměření. Data byla získána prostřednictvím polostrukturovaných hloubkových rozhovorů a následně analyzována metodou otevřeného kódování.

Výsledky ukazují, že za klíčové stresory generace Z lze považovat nedostatečnou komunikaci s nadřízenými, nízkou mzdu a absenci slovního ocenění. Tyto faktory mají přímý vliv na pracovní motivaci a subjektivně vnímaný well-being respondentů. Identifikované stresory se částečně překrývají s těmi, které popisuje odborná literatura, avšak vztahy s nadřízenými se v tomto výzkumu ukazují jako významnější determinant stresu, než je v předchozích studiích uváděno.

Přínosem studie je vytvoření stresového profilu generace Z, který reflektuje specifické projevy a zdroje stresu této věkové skupiny. Získané poznatky mohou být využity zaměstnavateli při optimalizaci pracovních podmínek, nastavení komunikačních procesů a při tvorbě strategií pro zvýšení spokojenosti a retence mladých zaměstnanců.

Klíčová slova: pracovní zátěž, well-being, Gen Z, stresory

JEL klasifikace: J24, J28, M12, M54

Abstract: The study presents the results of a qualitative research focused on work-related stressors among members of Generation Z. The research sample consisted of eight respondents aged 19–25, representing different levels of education and professional backgrounds. Data were collected through semi-structured in-depth interviews and subsequently analyzed using open coding.

The findings indicate that the key stressors for Generation Z include insufficient communication with supervisors, low salary, and lack of verbal recognition. These factors directly influence work motivation and the perceived well-being of respondents. While the identified stressors partly overlap with those reported in the literature, relationships with supervisors appear to be a significantly stronger determinant of stress in this study than previously described.
The main contribution of this article is the development of a stress profile of Generation Z, reflecting the specific sources and manifestations of stress within this age group. The insights may serve employers in optimizing working conditions, improving communication processes, and designing strategies aimed at enhancing job satisfaction and retention of young employees.

Keywords: workload, well-being, Gen Z, stressors

JEL classification: J24, J28, M12, M54

1 ÚVOD

Stres představuje v současné společnosti běžně diskutované téma a patří mezi nejčastěji zkoumané oblasti v psychologii. Americká psychologická asociace jej dlouhodobě uvádí jako jeden z klíčových fenoménů současného života. V posledních letech je přitom stále častěji zmiňována souvislost stresu s nejmladší generací vstupující na pracovní trh – generací Z. Podle průzkumu společnosti Deloitte (2023) se 32 % zástupců této generace cítí dlouhodobě pod stresem a vykazuje příznaky úzkosti. Téměř třetina respondentů (29 %) navíc uvádí projevy vyhoření způsobené intenzitou a náročností pracovních podmínek.

Závažná zjištění přináší i zpráva Americké psychologické asociace (2023), podle níž jedinci ve věku 18–34 let vykazují vyšší míru stresu než starší generace. Tento trend je navíc meziročně rostoucí. Typickými důsledky jsou zejména obtíže se soustředěním, které mohou přímo ovlivňovat pracovní výkonnost mladých zaměstnanců. Je tedy zřejmé, že pracovní stres má negativní dopady nejen na samotné jednotlivce, ale také na organizace, v nichž působí.

Významným zdrojem psychické zátěže u mladších ročníků jsou i faktory spojené s digitálními technologiemi a sociálními sítěmi. Studie Mulder et al. (2024) prokázala, že nadměrné užívání sociálních médií během pandemie COVID-19 významně přispělo k nárůstu symptomů úzkosti a stresu u adolescentů a

mladých dospělých. Tyto poznatky naznačují, že příslušníci generace Z vstupují na trh práce s již zvýšenou predispozicí k psychické zátěži, což zvyšuje jejich zranitelnost vůči pracovním stresorům.

Cílem této studie je proto analyzovat, jaké pracovní stresory generace Z vnímá, zda se shodují s těmi, které uvádí odborná literatura, a v jaké míře se od nich odlišují. Studie se rovněž snaží objasnit, nakolik se generace Z v prožívání a zvládání pracovního stresu liší od starších kohort a jaké implikace tyto rozdíly přinášejí pro zaměstnavatele i další výzkum v této oblasti.

2 GENERACE

Akademická literatura se neshoduje na jednotném vymezení generací ani na jejich charakteristikách či přesném časovém určení. Přesto je zřejmé, že rozlišení jednotlivých generací má význam, neboť umožňuje lépe porozumět rozdílům v hodnotách, postojích a chování, které se promítají i do pracovního prostředí.

Podle Koulopoulose a Keldsena (2016) představují generace samostatné sociální skupiny se sdíleným souborem hodnot, zkušeností a přesvědčení, které formují jejich pohled na svět. Tyto charakteristiky přetrvávají po celý život, což může usnadňovat stabilitu, ale zároveň komplikovat otevřenost změnám a inovacím.

McCrindle (2010) zdůrazňuje, že zkoumání generací má význam nejen v oblasti spotřebního chování, ale i ve vztahu k pracovnímu prostředí. Porozumění generačním rozdílům totiž usnadňuje komunikaci mezi zaměstnavateli a zaměstnanci a umožňuje efektivnější nastavení pracovních podmínek a organizačních procesů.

Souvislost mezi generacemi a stresem popisují Zemke a kol. (2013). Podle autorů může generační různorodost přinášet kreativní potenciál a inovace, ale současně představuje i zdroj napětí a konfliktů. Klíčové je proto využít tyto rozdíly pozitivním způsobem a zabránit tomu, aby se staly překážkou fungování organizace.

Pokud jde o konkrétní vymezení, Berg (2020) uvádí následující generace: válečná generace (1925–1942), poválečná generace (1943–1960), generace X (1965–1980), generace Y (1981–1999) a generace Z (2000–2013). Zemke a kol.

(2013) rozlišují čtyři generace: tradicionalisté (narození před rokem 1943), Baby Boomers (1943–1960), generace X (1960–1980) a mileniálové (1980–2000).

McCrindle (2010) pak pracuje s rozdělením na sedm generací: Federation generace (narození před rokem 1924), Builders (1925–1945), Baby Boomers (1946–1964), generace X (1965–1979), generace Y (1980–1994), generace Z (1995–2009) a generace Alpha (2010–2024).

V této studii je použito vymezení McCrindleho (2010), který generaci Z definuje obdobím let 1995 až 2009. Studie se dále zaměřuje především na generace, které jsou v současnosti zastoupeny na pracovním trhu, počínaje Baby Boomers.

Generace Baby Boomers je podle Zemkeho a kol. (2013) charakterizována aktivním a energickým přístupem k práci a důrazem na lidskost. Její příslušníci usilují o vytváření spravedlivého pracovního prostředí s rovnými příležitostmi a jsou spojováni s obdobím občanských práv a posilování rozmanitosti.

Generace X je podle Klímové (2022) typická pragmatismem, důrazem na jistoty a loajalitou vůči zaměstnavatelům. Zástupci této generace bývají vnímáni jako individualističtí, stabilní a s nízkou mírou fluktuace. Jsou spojováni s vysokou pracovní morálkou, respektem k tradičním hodnotám a důrazem na finanční stabilitu.

Generace Y se odlišuje globalizovaným charakterem. Podle Berg (2020) jde o první generaci vyrůstající ve světě, kde kulturní vlivy přesahují geografické hranice. Formujícími událostmi byly pád železné opony, třetí průmyslová revoluce a rozvoj internetu. Generace Y je proto flexibilní, adaptabilní a otevřená změnám. Specifická výchova, která často zdůrazňovala individualitu a výjimečnost, však mohla přispět k vyššímu sebevědomí, ale i k větší citlivosti vůči kritice.

Na tuto charakteristiku navazuje generace Z, která aktuálně vstupuje na pracovní trh a na niž se tato studie soustředí.

Tabulka 1: Vymezení generací dle McCrindleho

Generace	Časové vymezení
Baby Boomers	1956-1964
Generace X	1965-1979
Generace Y	1980-1994
Generace Z	**1995-2009**

Zdroj: vlastní zpracování

2.1 Generace Z

Generace Z je podle McCrindleho (2010) nejvíce materiálně zabezpečenou, technologicky adaptovanou, globálně propojenou a formálně vzdělanou generací v dosavadní historii. Závodná (2023) zdůrazňuje, že její příslušníci jsou citliví, podporují rozmanitost a díky globalizovanému charakteru sdílejí podobné hodnoty a postoje napříč různými zeměmi.

Formování generace Z probíhalo v období ekonomických krizí a geopolitických nejistot. Na rozdíl od předchozích kohort byli její příslušníci od útlého věku intenzivně vystaveni mezinárodnímu prostředí prostřednictvím globálních značek a digitálních technologií. Klíčovým faktorem utvářejícím hodnoty a postoje generace Z jsou sociální sítě. Jayatissa (2023) uvádí, že generace Z je charakterizována nejen digitálním nativismem, ale také pragmatismem, preferencí rovnováhy mezi pracovním a osobním životem a důrazem na otevřenost a diverzitu. Tyto hodnoty odlišují generaci Z od předchozích generací a významně ovlivňují její očekávání od pracovního prostředí.

Význam rovnováhy mezi pracovním a soukromým životem potvrzují i studie z oblasti řízení lidských zdrojů, podle nichž právě příslušníci generace Z kladou na work-life balance větší důraz než starší generace (Sánchez-Hernández et al., 2019). Nedostatek rovnováhy pak může působit jako významný stresor, který se promítá do jejich profesní spokojenosti i celkového well-beingu.

Podle Bera (2020) tráví generace Z většinu volného času online. Internet a sociální sítě se pro ni staly hlavním zdrojem zábavy, informací i sociálních interakcí. Mezi autority této generace patří influenceři a tvůrci obsahu na platformách jako YouTube, Instagram, Snapchat, TikTok či Twitter, jejichž

názory mají významný dopad na formování hodnot a životních postojů. Současně se generace Z vyznačuje větší otevřeností v projevech názorů, což souvisí s anonymitou digitálního prostředí.

Generace Z rovněž vykazuje silnou touhu po profesním úspěchu a nezávislosti. Mnozí její příslušníci preferují flexibilní formy práce nebo podnikání před tradičním zaměstnaneckým poměrem. U části z nich se objevuje podnikatelský duch, díky němuž mohou dosáhnout společenského i ekonomického uznání již v mladém věku.

Z těchto charakteristik vyplývá, že generace Z přináší na pracovní trh jedinečnou kombinaci digitální kompetence, vysokých očekávání a citlivosti na pracovní podmínky. Tyto faktory mohou být zdrojem jejího profesního rozvoje, ale také významnými stresory, pokud nejsou organizačně reflektovány.

3 PRACOVNÍ STRES, EFEKTIVITA PRÁCE A WELL-BEING

Pracovní stres je v odborné literatuře obvykle definován jako nesoulad mezi nároky, které jsou na zaměstnance kladeny, a zdroji, které má k dispozici. Podle Světové zdravotnické organizace (WHO, 2020) představuje pracovní stres odpověď organismu na požadavky a tlaky, jež neodpovídají schopnostem a znalostem jedince. Objevuje se v různých pracovních situacích, přičemž jeho intenzita narůstá zejména tehdy, pokud zaměstnanec postrádá podporu nebo kontrolu nad pracovními procesy.

Rozsah pracovního stresu je v současnosti značný. Podle údajů Evropské agentury pro bezpečnost a ochranu zdraví při práci (EU-OSHA) trpí přibližně polovina zaměstnanců v Evropě různými formami pracovního stresu. Podobná situace se potvrzuje i v českém prostředí – průzkum Univerzity Karlovy a Všeobecné fakultní nemocnice v Praze ukázal, že pro 39 % Čechů představuje zaměstnání významný zdroj stresu (Jouza, 2020). Tyto skutečnosti dokládají, že pracovní stres není okrajovým jevem, ale fenoménem s dopady na zdraví i ekonomickou výkonnost.

Význam studia pracovního stresu spočívá především v jeho dopadu na efektivitu a well-being zaměstnanců. Urban (2019) zdůrazňuje, že časté projevy stresu vedou k únavě, zvýšené chybovosti a k narušování týmové spolupráce. Podobně Timotius a Octavius (2022) uvádějí, že stres snižuje produktivitu dvojím způsobem: přímo prostřednictvím fyziologické a psychické zátěže

(aktivací hormonální odpovědi), a nepřímo prostřednictvím zhoršení mezilidských vztahů na pracovišti.

Současně literatura upozorňuje na souvislost mezi stresem a subjektivním well-beingem zaměstnanců. Koncept well-beingu vychází z pozitivní psychologie a zahrnuje snahu zaměřit se na pozitivní aspekty lidského prožívání, jako je naplnění potenciálu, udržování zdraví a rovnováha mezi pracovními a osobními rolemi (Seligman, 2000). Sonnentag (2015) rozlišuje dvě složky well-beingu: hédonickou, spojenou s pocity pohody, a eudaimonickou, která vyjadřuje naplnění a smysluplnost života.

Nadměrný pracovní stres má však dopady i na fyzické zdraví. WHO (2020) uvádí, že přetrvávající tlak v zaměstnání může vést nejen ke snížení výkonnosti organizací, ale také k somatickým onemocněním zaměstnanců.

V odborné literatuře se přesto objevují i nuance: některé studie zdůrazňují, že pracovní stres nemusí být vždy jednoznačně destruktivní. Timotius a Octavius (2022) hovoří o jeho potenciálním dopadu, nikoliv o automatické kauzalitě. Hirschle a Gondim (2020) upozorňují, že i když je negativní vztah mezi stresem a well-beingem převládající, existují kontexty, v nichž tato souvislost není jednoznačná. Tyto poznatky ukazují, že pracovní stres nelze vnímat pouze jako univerzální determinant zhoršení zdraví a výkonnosti.

Z tohoto důvodu je nezbytné zkoumat konkrétní stresory a jejich individuální dopad na zaměstnance. Cílem této studie je proto identifikovat specifické stresory u generace Z a posoudit jejich význam vzhledem k celkovému prožívání stresu a jeho důsledkům.

4 METODOLOGIE

Cílem studie bylo identifikovat pracovní stresory, s nimiž se setkávají příslušníci generace Z, a porovnat je s obecně popisovanými stresory uváděnými v odborné literatuře. Na základě tohoto srovnání byl vytvořen stresový profil specifický pro tuto věkovou skupinu, jenž může být využit zaměstnavateli při nastavování strategií ke zmírnění či eliminaci pracovního stresu.

Studie byla koncipována tak, aby odpověděla na dvě hlavní výzkumné otázky:

Výzkumná otázka 1: Jaké pracovní stresory generace Z vnímá a do jaké míry se shodují s obecně popisovanými stresory?

a) Jaké konkrétní stresory se v pracovním prostředí u generace Z objevují?
b) Které z obecných stresorů jsou pro generaci Z relevantní a které naopak nejsou respondenty zmiňovány?

Výzkumná otázka 2: Jak mohou zaměstnavatelé reagovat na pracovní stresory u této generace?

K zodpovězení první otázky byly provedeny polostrukturované hloubkové rozhovory, jejichž prostřednictvím byly identifikovány a následně kategorizovány stresory uváděné respondenty. Tyto údaje byly porovnány s pěti kategoriemi obecných stresorů, vymezených na základě literární rešerše. Závažnost jednotlivých stresorů byla hodnocena respondenty pomocí pětibodové Likertovy škály (1 = minimální stres, 5 = extrémní stres).

K druhé výzkumné otázce poskytla data opět polostrukturovaná interview, během nichž respondenti reflektovali své strategie zvládání stresu a hodnotili opatření, která jejich zaměstnavatelé podnikají nebo by potenciálně mohli podniknout.

Výzkumný vzorek tvořilo osm respondentů ve věku 19–25 let, kteří splňovali následující kritéria:

- genderová vyváženost – zahrnutí respondentů obou pohlaví,
- různorodé vzdělání – zastoupení středního i vysokoškolského vzdělání,
- pracovní zkušenost v oboru – všichni respondenti byli zaměstnáni v oblasti, v níž se chtějí profesně rozvíjet, aby byla zajištěna relevance jejich zkušeností.

Sběr dat probíhal formou polostrukturovaných rozhovorů podle předem připravených tematických okruhů. Tento postup umožnil získat hlubší vhled do prožívání respondentů při zachování možnosti jejich volného vyjádření. Vzhledem k citlivému charakteru dat byla všechna interview anonymizována.

Analýza dat probíhala v několika krocích. Nejprve byly rozhovory přepsány pomocí softwaru Transkriptor, následně importovány do programu MAXQDA Analytics Pro (24.2.0) a analyzovány metodou otevřeného kódování.

Identifikované kódy byly seskupovány do širších kategorií, k nimž byla přiřazena i hodnocení závažnosti podle respondentů. Výsledkem bylo vytvoření stresového profilu generace Z, který kromě samotných stresorů obsahuje i jejich projevy, způsoby zvládání a doporučení adresovaná zaměstnavatelům.

5 VÝSLEDKY

V kapitole shrnujeme hlavní oblasti, co kterých nejvýznamnější stresory generace Z na pracovním trhu spadají.

5.1 Komunikace

Komunikace se ukázala jako jeden z nejvýznamnějších stresorů. Sedm z osmi respondentů uvedlo, že jim interakce s nadřízenými působí stres. Pět z nich přitom připisovalo problémy především samotným vedoucím pracovníkům.

Respondenti uváděli zejména nedostatečnou četnost komunikace a absenci aktuálních informací. Jak uvedl jeden z účastníků (25 let, HR specialista): *„Komunikace mezi jednotlivými stupni vedení občas vázne. Člověk nemá vždy aktuální informace o dění ve firmě a musí si je dohledávat. Je stresující, když informace nezískávám přímo od nadřízeného, který by je měl předávat.“* Podobně jiný respondent (19 let, truhlář) konstatoval: *„Od vedoucích očekávám větší informovanost. Často musím aktivně vyhledávat informace sám, což je zatěžující.“*

Kromě nedostatečné četnosti komunikace byla zmiňována i neschopnost vedoucích naslouchat potřebám zaměstnanců a nedostatek upřímnosti. Tyto poznatky potvrzují také Moon a Lee (2024), kteří zjistili, že mladí pracovníci často obtížně zvládají hierarchické prostředí a nedostatek horizontální komunikace, což vede k pocitům nejistoty. Podobně Flynn et al. (2025) prokázali, že absence podpory a zpětné vazby u studentů ošetřovatelství generace Z zvyšuje úzkost a stres.

5.2 Finance

Finanční otázky patřily k nejčastěji zmiňovaným stresorům, přestože zkušenosti respondentů se lišily podle formy úvazku a životní situace.

Například respondentka (25 let, účetní) uvedla, že nízké finanční ohodnocení ji vedlo k setrvání na zkráceném úvazku: *„Mzda neodpovídá obdobným pozicím,*

ale práci nevykonávám jen kvůli financím, také kvůli kolegům. Přesto musím zvažovat změnu zaměstnání.“ Jiný respondent (25 let, HR specialista) konstatoval: *„Plat pokrývá pouze základní náklady, na dovolenou musím spořit dlouhodobě.“*

Specifickým příkladem byla zkušenost respondenta – OSVČ (23 let, pojišťovací zprostředkovatel), který uvedl: *„Můj příjem je značně kolísavý. V obdobích, kdy se nedaří uzavírat obchody, pociťuji silnou nejistotu a obavy z minimálního výdělku. To má negativní vliv na mou náladu i kvalitu spánku.“*

Tyto výpovědi ukazují, že finanční situace může být pro generaci Z významným zdrojem nejistoty, a to jak u zaměstnanců v tradičních pracovních poměrech, tak u osob samostatně výdělečně činných.

5.3 Nedostatečné ocenění

Nedostatek slovního ocenění byl dalším silně akcentovaným stresorem. Čtyři respondenti výslovně uvedli, že absence pochvaly či poděkování významně snižuje jejich pracovní motivaci.

Respondentka (25 let, účetní) poznamenala: *„Slovní ocenění je spíše výjimečné, pochvala se objevuje jen zřídka.“* Další účastnice (23 let, referentka ve státní správě) doplnila: *„Za více než dva roky v práci jsem nedostala žádné pozitivní hodnocení ani poděkování.“*

Tyto zkušenosti potvrzují význam uznání a zpětné vazby, které mohou působit jako významný motivační faktor. Absence ocenění navíc úzce souvisí s předchozími kategoriemi stresorů, zejména s komunikací a finančním ohodnocením.

5.4 Projevy stresu

Respondenti popisovali široké spektrum fyzických a psychických projevů stresu. Nejčastěji uváděli nervozitu, strach, gastrointestinální obtíže, koktání, zvýšenou chybovost, zrudnutí a tendenci k uzavírání se.

Například respondent (25 let, sportovní analytik) uvedl: *„Stres se u mě proměňuje v nervozitu, která zásadně snižuje mou pracovní výkonnost.“* Respondentka (21 let, asistentka pedagoga) popsala: *„Pod vlivem stresu začínám dělat chyby, které bych jinak neudělala, a jednám zmatečně.“*

Další respondent (25 let, HR specialista) doplnil: *„Stres negativně ovlivňuje mou soustředěnost i rozhodování. Někdy se zakoktám nebo reaguji nevhodně.“* Podobně jiná respondentka (25 let, účetní) popsala: *„Při stresu jsem zpomalená, nervózní a méně výkonná. Chybovost se zvyšuje i při rutinních úkolech.“*

U některých respondentů se stres promítal i do negativního vztahu k práci samotné, jak uvedl například účastník (19 let, truhlář): *„Stres mě demotivuje natolik, že se mi nechce chodit do práce a dělám chyby i v běžných úkolech.“*

Tyto projevy dokládají, že pracovní stres u generace Z může mít přímý vliv na individuální výkonnost i na celkovou pracovní spokojenost.

6 DISKUSE A ZÁVĚRY

Výsledky výzkumu ukázaly, že nejvýznamnějšími pracovními stresory generace Z jsou nízká mzda, problémy v komunikaci s nadřízenými a nedostatečné ocenění – ať již ve formě finanční, či verbální. Tyto závěry jsou v souladu s publikovanými studiemi věnujícími se pracovnímu stresu u mladších generací. Zároveň se ukázalo, že generace Z klade na vztahy s nadřízenými a na okamžitou zpětnou vazbu výrazně větší důraz než starší generace, což potvrzují i studie Moon a Lee (2024) nebo Flynn et al. (2025).

Vedle těchto faktorů respondenti často zmiňovali také nejistotu zaměstnání a časté organizační změny, které rovněž zvyšují stresovou zátěž. Lze tedy konstatovat, že většina identifikovaných stresorů odpovídá těm, které uvádí odborná literatura, avšak u generace Z nabývají některé z nich výraznější intenzity – zejména vztahy s nadřízenými a potřeba kontinuální zpětné vazby.

Významnou roli hrají také ekonomické aspekty. Respondenti často zdůrazňovali, že jejich mzda neodpovídá dosaženému vzdělání ani očekáváním. To může souviset s jejich novým postavením na trhu práce a s nedostatkem praktických zkušeností, jak uvádí PROSOVÁ (2023). V důsledku toho se objevují pocity nespokojenosti a frustrace, které se mohou transformovat do nižší pracovní motivace.

Důležitým zjištěním je, že identifikované stresory často vyvolávají u příslušníků generace Z pocity méněcennosti a nedostatečného uznání. Problémy v komunikaci (zejména nedostatek informací a absence naslouchání), nízké či

nejasně komunikované platové podmínky a nedostatek ocenění vytvářejí prostředí, které může u mladých zaměstnanců oslabovat pocit vlastní hodnoty.

Výzkum rovněž potvrdil souvislost mezi stresem a pracovními výsledky. Respondenti uváděli, že stres snižuje jejich efektivitu prostřednictvím nervozity, ztráty koncentrace a chybovosti. Někteří popsali i psychosomatické projevy, jako jsou gastrointestinální obtíže nebo poruchy řeči. Tyto symptomy dokládají přímý vliv stresu na výkon a celkový pracovní well-being, což odpovídá závěrům předchozích studií (Urban, 2019; Timotius a Octavius, 2022).

Identifikace specifických stresorů generace Z má pro zaměstnavatele praktický přínos. Výsledky ukazují, že optimalizace komunikačních procesů, nastavení transparentního systému odměňování a pravidelná zpětná vazba mohou významně přispět ke zvýšení spokojenosti i retence mladých zaměstnanců. Vhodným opatřením se jeví zejména zavedení pravidelných individuálních setkání („one-to-one“), jejichž prostřednictvím mohou nadřízení reagovat na potřeby zaměstnanců, poskytovat podporu a sdílet informace o aktuálním dění v organizaci.

Dále je vhodné uvažovat o zavedení jasných metrik hodnocení výkonu (KPI), které umožní objektivně hodnotit práci zaměstnanců a posílit jejich motivaci. Transparentní komunikace o mzdové struktuře a možnostech profesního růstu může zmírnit nejistotu a posílit důvěru zaměstnanců v organizaci. Pokud není možné okamžité zvýšení mezd, lze využít alternativní formy benefitů, například příspěvky na pojištění či podporu vzdělávání.

Výsledky této studie podtrhují potřebu, aby zaměstnavatelé věnovali zvýšenou pozornost specifickým požadavkům generace Z. Zohlednění těchto faktorů může přispět nejen k vyšší spokojenosti zaměstnanců, ale také ke zlepšení celkové pracovní atmosféry a efektivity organizace.

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AUTOŘI

Ing. Lucie Mrklasová, e-mail: lucie.mrklasova@mail.newton.cz

PhDr. et Mgr. Barbora Pánková, Ph.D., MBA, Centrum humanitních věd, Vysoká škola NEWTON; Pedagogická fakulta, Univerzita Karlova, email: barbora.pankova@newton.univesity , barbora.pankova@pedf.cuni.cz

AUTHORS

Ing. Lucie Mrklasová, e-mail: lucie.mrklasova@mail.newton.cz

PhDr. et Mgr. Barbora Pánková, Ph.D., MBA, Centre of Humanities, NEWTON University; Faculty of Education, Charles University, email: barbora.pankova@newton.university, barbora.pankova@pedf.cuni.cz

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MARKET STRUCTURE ANALYSIS OF THE CZECH MACHINERY MANUFACTURING INDUSTRY

Nikola Sobotková, Vojtěch Bartoš

Abstract: This research examines the market structure of the Czech engineering industry using the Herfindahl-Hirschman Index and other microeconomic indicators to identify the degree of competition and market concentration in the sector. The analysis covers 1,876 active engineering companies in the Czech Republic from 2014 to 2023. The HHI values found indicate very low market concentration. Combined with estimates of price elasticity of demand, the price parity model, and the return on investment indicator, the results suggest that the sector exhibits characteristics of a highly competitive and fragmented market. In such a highly competitive environment, technological innovation by individual companies appears to be a key determinant of their long-term competitiveness.

Keywords: CZ-NACE 28, market structure, market concentration, competitiveness

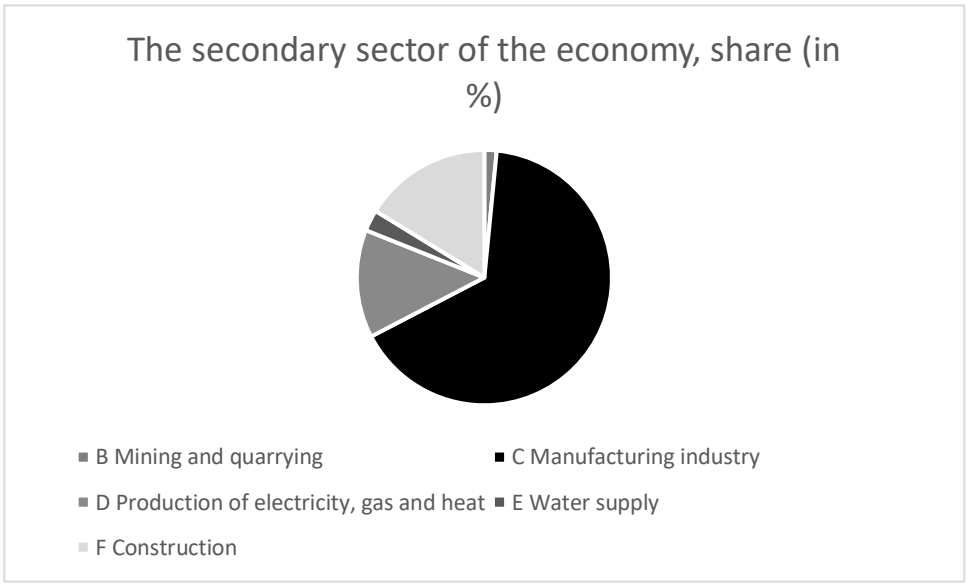
JEL klasifikace: D41, L11, L60

1 INTRODUCTION

This research focuses on identifying the market structure of the Czech engineering industry and determining the degree of competition in this sector. The structure of a specific industry market can be identified using selected models, which can be used to determine the market's concentration, the number of companies operating in the industry, their market shares, the barriers to entry into the industry, and the behaviour of companies. Following on from this statement, the research question is as follows: "What is the degree of competition and market concentration in the engineering industry in the Czech Republic?"

From the perspective of the Czech economy, this research focuses on the secondary sector, within which the manufacturing industry represents the largest share of production, as, according to available data, it accounts for 65% of production within the secondary sector of the economy (Czech Statistical Office [CSO], 2024). This share is illustrated in the chart below.

Figure 1: Composition of the secondary sector of the Czech economy



Source: Own processing

The manufacturing industry (CZ-NACE C) encompasses a broad spectrum of activities categorized into groups CZ-NACE 10 to 33. Within these groups, the largest share is held by the engineering sector, which mainly comprises groups CZ-NACE 25 to 33. The specific sector CZ-NACE 28, which is the subject of this research, represents the third largest group within this focus. The largest representative is CZ-NACE 28, followed by CZ-NACE 25. This group, therefore, represents one of the key pillars of industrial production in the Czech Republic, and its performance has a direct and significant impact not only on the stability of the domestic economy but also on the country's export performance and competitiveness in international markets. This sector accounts for a significant part of the gross value added of the Czech industry. In the face of increasing global pressures, technological change, and the challenges associated with sustainable development, it is now more important than ever to understand its

internal economic structure and the competitive relationships that prevail within it. (CSO, 2024)

Although the performance of individual companies in a given industry is often analyzed by many authors in the literature, for example (Chaithanapat et al., 2022), (Ozmutlu & Can, 2022), (Çelik & Uzunçarşılı, 2023), and (Baby et al., 2024), and many others, less attention is paid to the structural characteristics of the market. Foreign and domestic literature mostly focuses on modelling market structures primarily in connection with regulatory interventions, which has already been addressed by (Joskow & Rose, 1989). However, the literature searched on this topic lacks publications that deal with the use of microeconomic analyses to determine market structure, specifically in the engineering sector. However, knowledge of market structure is an important aspect of understanding how the industry operates. Market structure fundamentally influences the behaviour of firms, their investment strategy, and has a significant impact on the long-term efficiency and innovativeness of the sector.

The purpose of this research is to explore the market structure of the engineering sector in the Czech Republic by employing selected microeconomic models. The research also seeks to identify the factors that most influence the maintenance of competitiveness in Czech engineering, based on previous findings about market structure. The study thus contributes to a deeper understanding of the economic nature of the Czech engineering industry.

The introduction to the article represents the issue in question. This chapter will be followed by a literature review, which provides the theoretical basis for the issue. The following chapter describes the data, the process of obtaining it, and the methods used to identify and verify the characteristics of the market structure of the sector. The next chapter will present the results, and the article will end with a conclusion.

2 LITERATURE REVIEW

Understanding the market structure is fundamental to sector-level economic analysis. It shapes firm behaviour, pricing strategies, innovation incentives, and the efficiency of resource allocation. The structure of a market provides a

conceptual framework for analyzing the nature of competition, the distribution of market power, and overall sector performance. The traditional distinction lies between models of perfect and imperfect competition, although real-world markets typically fall somewhere along this continuum. Identifying the prevailing market structure in a given industry and its defining features is thus essential for assessing competitive dynamics and policy implications. Economic literature offers a range of theoretical models.

Perfect competition, as rigorously defined by Robinson (1934), is a market structure in which the demand for an individual seller's output is perfectly elastic. This aligns with (Chamberlin, 1933) notion of pure competition, which is narrower than broader interpretations that propose multiple market conditions. Contemporary economic theory tends to adopt these broader interpretations, such as Chamberlin's conditions of perfect competition, which consist of four core assumptions: (1) numerous buyers and sellers participate in the market; (2) firms offer homogeneous products; (3) there are no market barriers to entry or exit; (4) all participants have perfect information. While this theoretical framework provides essential insights into market efficiency and behaviour, Robinson acknowledged that perfect competition is impossible in practice, making it a limiting case for analytical purposes, such as ours. (Mankiw, 2023) The model of perfect competition is therefore only a theoretical concept with very strict assumptions that are practically impossible to fulfil in a real economic environment.

At the other end of the spectrum are market structures that deviate from the assumptions of perfect competition. Monopolistic competition, as formalized by Chamberlin (1933), preserves the condition of many sellers but introduces product differentiation, allowing firms to exercise some degree of market power. Oligopoly is characterized by a small number of dominant firms whose decisions are interdependent, often analyzed through game theory. Monopoly represents the extreme case, where a single firm supplies the entire market, typically protected by legal protection or high entry costs. Table 1 summarizes the degree to which each structure aligns with assumptions of perfect competition.

Table 1: Market structures and their compliance with perfect ompetition assumptions

Market Structure	Many Buyers and Sellers	Identical Products	Perfect Information	No Entry/Exit Barriers
Perfect competition	✓	✓	✓	✓
Monopolistic competition	✓	differentiated	some asymmetry	✓
Oligopoly	few sellers	can be identical	strategic uncertainty	high barriers
Monopoly	one seller	unique product	likely asymmetric	blocked entry

Source: Own processing

Regardless of whether the models are perfect or imperfect competition, the determination of market structure is based on a set of general assumptions, as is evident from the table above. The present research, therefore, focuses on a detailed analysis of these structural characteristics of the selected industry to identify and interpret conclusions specific to the industry under study.

The first characteristic is the assumption of *numerous buyers and sellers.* This implies that no individual actor can influence market prices. This is usually operationalized through concentration indices. The most commonly used quantitative indicator of market concentration is the Herfindahl–Hirschman Index (HHI). A low HHI and a large number of firms are indicative of competitive environments, as evidenced by empirical work linking structure to pricing power (Bresnahan, 1989; De Loecker & Warzynski, 2012).

The Herfindahl-Hirschman Index (HHI) is the most used tool to consider the concentration of a particular market and allows for an analysis of the distribution of market power between industry players (Kvalseth, 2021). This index measures the degree of market concentration and is often used to classify a market according to the degree of competition. The values of the Herfindahl-Hirschman index allow an empirical determination of whether an industry is close to the competitive model or low concentration, or whether it shows signs of dominance by a few large players, indicating high concentration. In the context of this study, the Herfindahl-Hirschman index will be used as an analytical tool for identifying the first key characteristic determining the

resulting market structure of the engineering sector in the Czech Republic. (Carlton & Perloff, 2015)

The Herfindahl-Hirschman index, based on (Hirschman, 1945) and (Herfindahl, 1950), is seen as a tool for estimating the potential of market power, according to (Kanagala et al.,2004). It is considered a suitable tool for assessing market concentration. A paper dealing with the construction sector also analysed market concentration using the HHI. Other authors, for example (Peleckis, 2022), perceive HHI as a practical tool for strategic decision-making by companies. The relationship between market structure, using HHI to identify market concentration. and the performance of construction firms has also been investigated by (Kim & Reinschmidt,2012). The Herfindahl-Hirschman index has been seen as a methodological basis in assessing competitive market structure, according to (Rhoades, 1993). The only research dealing with the intensity of competition in the engineering industry from an international market perspective was developed according to (Zhao et al.,2019).

The second characteristic is *product homogeneity, which* can be assessed by examining the price elasticity of demand. In competitive markets, identical goods exhibit high substitutability and minimal price variation (Chamberlin, 1933; Stigler, 1961). A high price elasticity of demand suggests that consumers readily switch to alternatives in response to price changes, indicating product homogeneity and market competition. In a perfectly competitive market, elasticity should be very high, ideally approaching infinity. In monopolistically competitive markets, demand remains elastic due to the presence of close substitutes, but not perfectly so, reflecting some degree of product differentiation. The price elasticity of demand in an oligopolistic market can vary significantly due to the complex interplay of competition. In a monopoly market, there is no close substitute, and demand tends to be more inelastic compared to other market structures (Frank & Bernanke, 2004).

The third characteristic, *free entry and exit,* can be tested using dynamics in profitability, firm turnover rates, or evaluating capital requirements as structural entry barriers, which measure capital costs or sunk costs. Empirical approaches also include analysis of return on investment (ROI) and persistent profitability trends to assess entry restrictions (Blažková & Hálová, 2022). This research will assess barriers to entry and exit in the industry using capital

intensity for entry into the industry and subsequent analysis of the return on these initial investments.

The final characteristic is *perfect information,* which implies that market participants possess full knowledge of prices and product quality. As direct measurement is difficult, researchers often use proxies including observed price transparency, consumer search cost indicators, and mechanisms of price discovery – building on foundational insights on information asymmetries (Akerlof, 1970; Stigler, 1961).

Given the importance of the engineering sector for the Czech economy and its traditionally strong export orientation, the study of its market structure and competitive dynamics is relevant from both academic and practical perspectives. The aim of the research is therefore to empirically identify the level of competition and the degree of market concentration in the engineering industry in the Czech Republic through the application of quantitative indicators that define the characteristics of its market structure.

3 METHODS AND DATA

3.1 Research database

Data for the machinery and equipment manufacturing firms were sourced from the ORBIS database. The data were selected from the database based on selected criteria[1]. The necessary accounting data was obtained for the last 10 years, for the period 2014–2023. This selection has provided a detailed database of the necessary data for a robust analysis. The research through this selection process obtained data on a total of 15,728 engineering enterprises. However, these enterprises have the status of active or not terminated, but records established around 1990 and are no longer operating or established in 2024, hence not yet active in 2023. These are new enterprises that do not yet report accounting data and are not relevant for the calculation. After the reduction of these incorrect data, the total number of relevant enterprises

[1] The engineering sector in the Czech Republic is very large, therefore, the research focused on a specific group of the sector, namely active enterprises in the Czech Republic falling under the category CZ-NACE 28, manufacture of machinery and equipment, including micro-enterprises. For market concentration, it is necessary to consider all enterprises in the calculation.

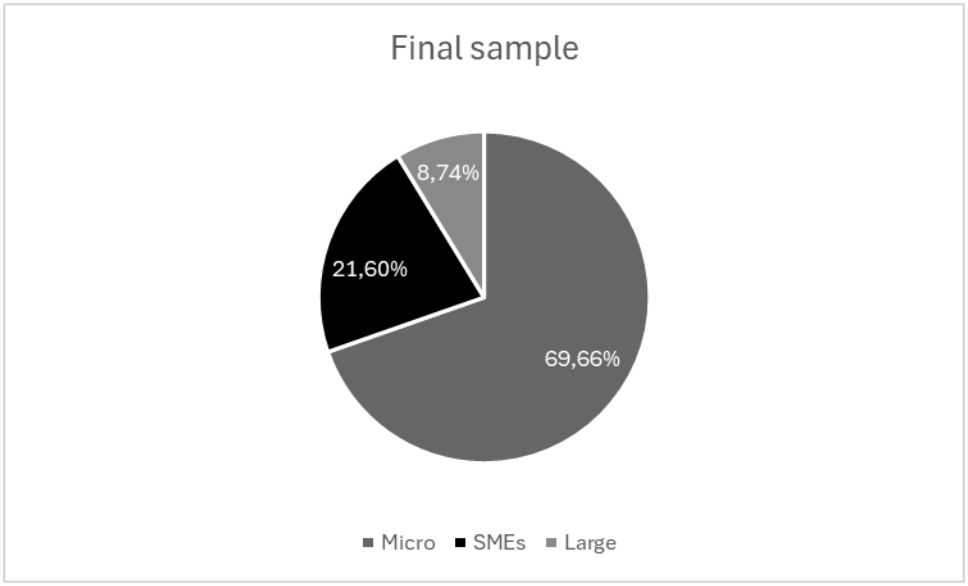
remains 1876 enterprises with relevant data. It should be noted that 70% of these are micro-enterprises. This is compounded by the fact that micro-enterprises are not obliged under Czech accounting to report data to the same extent as other categories of enterprises. The data show a lot of fluctuations or N/A values; for this reason, it is necessary to eliminate these extremes in the calculations for the integrity of the data. This can be achieved by using a Winsorised mean with a 40 % trimming, which means a 20 % trimming of outliers from each side. This will make the data more transparent.

Table 2: Sample selection process

Step	Description	Number of companies
1	Initial dataset	15,728
2	Inactive firms	9,498
3	Newly established	4,354
4	Final sample	1,876

Source: Own processing

Figure 2: Percentage composition of the final sample of companies



Source: Own processing

3.2 Theoretical and methodological foundations

In our choice of methods, we follow conventions where applicable and select alternatives in cases where data is insufficient. To test the first characteristic,

which ultimately determines the structure of the market, i.e., the existence of a large *number of sellers and buyers*, we use a modification of the Herfindahl-Hirschman Index in our research. From the calculation procedure, it can be indirectly deduced whether a few or many companies are operating in the market. This data is obtained using the Orbis database, as presented above. Based on this step, the result of the first characteristic of the selected industry can be identified. The number of entities operating in the market is also linked to their market shares. This represents market concentration. Market concentration is another key feature of the market structure of the industry, and also the degree of competition in the industry. Using the full application of HHI, the level of market concentration can be estimated. HHI is calculated as the sum of the squared market shares of all firms operating within a given market:

$$\text{HHI} = {}^{n}_{i}\sum(s_i{}^2) \tag{1}$$

where si is the market share of firm i, i is a number from 1 to n, and n is the number of firms in the market[2]. The interpretation of HHI values follows the conventional thresholds formalized by the U.S. Department of Justice and Federal Trade Commission (2010) and described in Table 2.

Table 3: Interpretation of the Herfindahl-Hirschman Index (HHI)

HHI Range	Concentration	Description
HHI < 1,500	Low	Many firms with similar market shares
1,500 ≤ HHI ≤ 2,500	Moderate	Several firms hold significant market shares
HHI > 2,500	High	A few dominant firms with large market shares

Source: Own processing

The Herfindahl-Hirschman Index (HHI) measures the degree of concentration, i.e., the distribution of market shares among companies. The result, therefore, serves as an indicator of potential competition or dominance in the market. For a more comprehensive determination of the market structure of a given

[2] The market share is calculated as a ratio of average sales to the total turnover of the industry; percentages are used as whole numbers, as in 25 instead of 0.25, to follow the conventions.

industry, it is therefore necessary to supplement the results with other indicators, such as price elasticity of demand and return on investment, which can better capture the competitive behaviour of companies.

We test *product homogeneity* by measuring the price elasticity of demand. Due to a lack of firm-level price and quantity data, we use the sales-to-relative-price relationship as a proxy. First, we estimate the quantity sold annually by dividing total industry sales by the average producer price indices for the manufacturing/engineering industry from the Czech Statistical Office. Then, we calculate the natural log of both the relative price and the estimated quantity:

$$\ln Q = \alpha + ß * \ln P + e; \quad (2)$$

We plot a time-series graph of log(quantity) against log(price) and fit a trend line; y = ax+b, where a represents the estimated price elasticity of demand. If a > 1, demand is elastic and consistent with strong competition and product homogeneity. In the other case, it is indicative of some degree of market power or product differentiation.

The presence of *entry and exit barriers* can be evaluated by analyzing the capital requirements for a new venture. Entry into the engineering sector requires significant capital investment, which we can see using the ORBIS database for individual companies. The creation of a new enterprise entails costs associated with the purchase of production facilities and warehouses, the acquisition of machinery and equipment, software, investment in automated production lines or robotic systems, and other technologies, or the costs associated with obtaining the necessary licenses. Other costs are undoubtedly personnel costs or operating costs in the form of materials, energy, etc. However, within the barriers to entry into the sector, the most important are capital investments, which are undoubtedly high. However, they can be supported by various subsidy programmes. Despite these relatively high capital requirements, there are no significant barriers to entry, such as legal or government regulatory barriers. This fact also encourages the continuous emergence of new engineering micro-enterprises, as can be seen from the database obtained, where micro-enterprises account for 70 % of these enterprises, and 4 % of them have recorded their emergence in 2023. A possible explanation may be the high returns that these investments bring, which may attract new enterprises to enter the market. This statement can be verified by the return

on investment (ROI) indicator. If the indicator comes out above the recommended normal value, it means a high return and market attractiveness for the entry of new businesses. If the indicator comes out low, it will mean that these investments in new business are not worthwhile and not profitable. The research will use a modified calculation. The research considered the return on investment as a ratio of profit in the form of EBIT and the most capital-intensive investments that are required to be made when entering the market, and may hinder entry into the industry, in the form of fixed assets (such as machinery, buildings, equipment or technology) (Kumar & Li, 2016).

Another aspect is the *level of market awareness*. To determine whether the market is perfectly informed, the price parity model can be used. In other words, compare the average price within individual firms with the average price of the industry. If the resulting deviations are small (close to the market average), it can be concluded that the market exhibits price parity. There is no data on the quantity sold in the database, so an alternative calculation must be used. Divide the sales of each firm by the average price of the product in the sector to obtain the estimated quantity. The research proceeded by estimating this average price through the usual prices of the most common representative in terms of production. For this article, the average price in the industry was set at 1 million crowns. Using the ratio of the sales of each enterprise to the average industry price, the quantity sold by each enterprise was estimated. Using the cost of goods sold, which must be deducted from the sales of the enterprise, and then dividing the difference by sales, the research obtained an indication of the gross margin percentage of the enterprise. The research calculated the average price of the product given enterprise as the cost of sales per unit, considering the gross margin calculated above. The research determined the percentage deviation from the industry average price. If these deviations are not too large and prices are around the industry price, the market shows price parity and is highly informed. Otherwise, the level of market information is low (Montag & Winter, 2020).

4 RESULTS AND DISCUSSION

4.1 Herfindahl-Hirschman index

In the first step, data on the number of companies operating in the sector were obtained. There are currently 1,876 companies operating in the engineering sector in the Czech Republic, which indicates a high number of sellers within the first characteristic. Subsequently, the concentration of companies in the sector was examined using HHI. This is because market concentration data is a key quantitative characteristic of the market structure of a sector and is also linked to the degree of competition in that sector.

The complete calculation is very extensive; only the resulting index for the entire industry will be interpreted within the scope of this paper. The calculation procedure has been commented on above. Due to the large amount of data, it is not possible to transfer the entire calculation to the article.

HHI 2014-2023 = 95,35

The resulting index for the period is very low. At the same time, the determination of the individual market shares of firms in the total turnover of the sector shows that there are many firms with very similar market shares cooperating in the sector, with no firm showing a leading position with a significant market share. To check whether the index is indeed this low, the Herfindahl-Hirschman index was also calculated separately for 2023.

HHI 2023 = 113,63

A very low Herfindahl-Hirschman Index indicates that the Czech engineering sector is highly fragmented, with many small enterprises holding minimal market shares. This reflects a high level of competition and very low market concentration.

The Czech engineering industry, focused on CZ-NACE 28, therefore, represents a market with many small companies with very small market shares. The large proportion of microenterprises in the sector also underpins this fact.

No firm is strong enough to influence the price, and the market share of each firm is only minimal. The degree of market concentration in the engineering sector in the Czech Republic, therefore, indicates the existence of high competitive pressure and market fragmentation. There were almost two

thousand firms in the comparison, so it is not possible to present relevant results within the scope of the paper. For if only a selection of firms were presented, it would not be relevant. The largest share was held by the engineering firm with a share of 0.042; the subsequent firms have a very similar decreasing share.

4.2 The price elasticity of demand

Elasticity was estimated based on the relationship between the producer price index and sales volume derived from revenues. It should be noted that the approximation used does not reflect actual consumer responses, but serves as an indicative measure of market sensitivity to price changes. The complete calculation procedure is described above. By substituting the data on total industry sales, the observed price indices, and the estimated quantity into the resulting log-linear equation, the resulting equations were then graphically represented by graphs. For illustrative purposes, the graph for the year 2023 has been selected.

Figure 3: The price elasticity in 2023

Source: Own processing

The resulting elasticities for each year are shown in the table below.

Table 4: Price elasticity over the years

year	price elasticity
2014	19,586
2015	19,656
2016	19,721
2017	19,729
2018	19,747
2019	19,764
2020	19,732
2021	19,709
2022	19,517
2023	19,811

Source: Own processing

It is important to note that, although the individual products in the engineering sector appear to show considerable differences, their basic functions and uses are the factors that confirm product homogeneity. An example is a machine tool, the main purpose of which will always be the same. Price elasticity of demand is one of the key indicators of competition between companies, as it reflects how sensitive customers are to price changes. The more elastic the demand is, the stronger the competitive pressure between companies. The estimated results of price elasticity indicate a highly competitive environment in the sector, with significant market sensitivity to price changes. The results can be interpreted as confirmation of strong competition between companies.

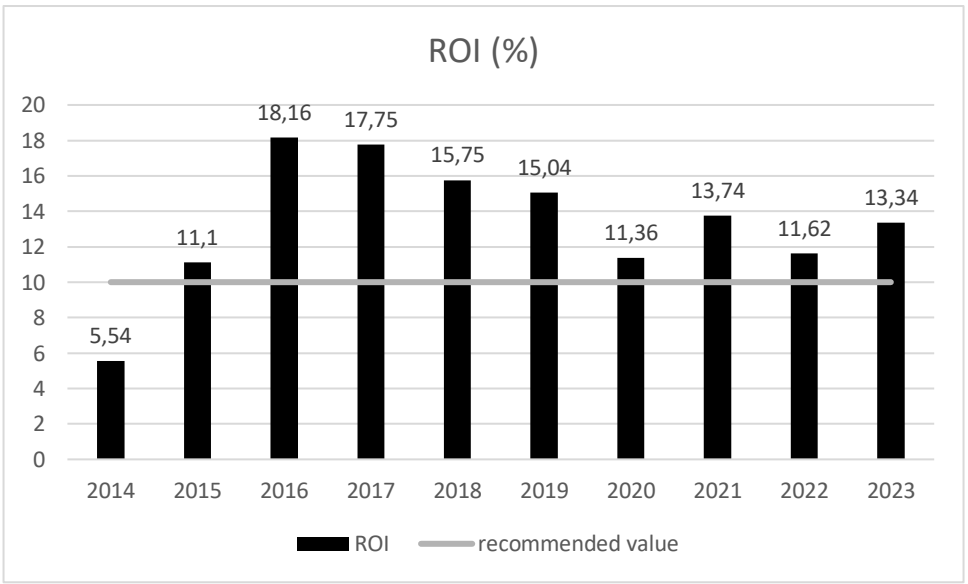
4.3 Return on investment

To verify the absence of barriers to entry into the sector, for example, an analysis of capital requirements can be provided. Capital investment at the start of a business is certainly challenging in terms of entering the engineering market, as a new business has to make large investments in terms of acquiring buildings, warehouses, machinery, equipment, technology, etc. Thus, entry into the industry is financially challenging. However, the number of new engineering enterprises shows that the market is still attractive for new enterprises. This attractiveness may stem from the high return on these initial investments, where the business will eventually be very profitable. To test market attractiveness, a modified ROI calculation for the industry was used, where a high value will imply a high return on investment, which implies a

significant attractiveness of new business entry. And a low value will represent an unprofitable investment and low attractiveness of entering this market in terms of high investment. Thus, if the value is low, the profitability of the investment would be low, and entry would not be worthwhile. The calculation procedure is again set out above. Below is a graph with the ROI calculations for the whole period under review and their comparison with the recommended value.

The ROI indicator serves here as a supporting tool for assessing the economic attractiveness of the sector and the possible existence of entry barriers. A higher average ROI suggests that investments in this sector are relatively profitable, which may attract new businesses and thus strengthen competitive dynamics.

Figure 4: Return on investment



Source: Own processing

The chart above shows the ROI results for the years under review. According to the financial analysis of the corporate sector, the general value of return on investment should be around 10 %. Values above 15 % are then considered very attractive. From the above, since 2015, there has been considerable market attractiveness and stimulates the entry of new entities into the market, thereby increasing the competitive dynamics of the sector. This again supports

the claim that the engineering sector in the Czech Republic is a highly competitive environment. This is also confirmed by the constant entry of new micro-enterprises into the market.

4.4 The price parity model

The final aspect involved in defining market structure is market information, which is measured in this study using a price parity model. By the above calculation, the average price of the industry was compared with the average prices of individual firms, and then the percentage deviations of individual firms from the industry were determined. These deviations were given to all firms in the industry. For clarity and interpretation, it was chosen to interpret the average deviation across the industry. The average deviation for the whole industry is found to be −11,4 %. However, it should be noted that the data analysed is very large and inconsistent, with outliers.

The general deviations to confirm perfect information should be around 2–3 %, but here the interpretation needs to be approached with great care. Across the industry, we are comparing companies of different sizes and structures. For these reasons, this calculation is an estimate. Due to the absence of direct quantity data, the research employed an indirect method to approximate price parity across firms, using estimated unit prices derived from gross margins and a representative industry price benchmark. While this approach allows for a rough indication of market awareness, its validity is limited due to the product heterogeneity, estimation assumptions, and the use of a single average industry price.

Another argument indicates that the price in the sector is determined by the market is the already mentioned strong competition from many firms. Thus, if a company were to try to set its price independently of the market, it would risk losing customers, since the B2B sector has strong bargaining power and usually requires a bid from several suppliers in each area. Assuming price differentiation, the customer would choose the firm with the lowest price, whereas in the case of price similarity, the customer decides based on the quality or technological progress and innovation of the firm. In engineering, then, it is essential to compete precisely through continuous innovation and technological progress to maintain a competitive advantage. Here, the research comes up against another argument, namely the importance of

technological progress in the sector. Rapid technological progress and innovation can reduce barriers to entry into the sector, as new technologies can be more accessible to small enterprises, allowing more enterprises to enter the market. In a highly competitive environment with many companies, firms generally have very little opportunity to differentiate themselves from competitors based on price or quality, innovation and technological progress; therefore become a key factor in gaining competitive advantage (Schumpeter,1942). This fact can also be called Schumpeterian competition. Schumpeter placed great emphasis on the role of innovation as a driver of economic growth.

5 CONCLUSION

Based on the applied models and empirical evidence, the machinery and equipment manufacturing industry in the Czech Republic is characterized by very low market concentration and a high degree of competition. The market is dominated by numerous small firms with similar shares, leaving no single firm in a dominant position. The attractiveness of the industry lies in its competitive environment, where technological progress and innovation are essential for sustaining firm-level performance. The results of the research, therefore, suggest that Czech engineering represents a highly competitive, fragmented market with a significant role for technological innovation.

Based on the analysis, it can be concluded that the engineering sector in the Czech Republic is characterized by low market concentration, a high number of active companies, and a high degree of competition. The Herfindahl-Hirschman Index confirmed strong market fragmentation, price elasticity indicates high market sensitivity to price changes, and return on investment indicates attractiveness for new entrants. These factors indicate a highly competitive environment with limited market power for individual companies. This study provides a new perspective on the dynamics of the industry and highlights the strategic role of innovation in a fragmented market. The conclusions of this study thus provide an empirical basis for understanding the competitive dynamics of the Czech engineering industry.

However, given the inconsistencies in available data and the limited transparency of microenterprises' accounting, the conclusions should be viewed as a theoretical framework. Further research is needed to refine and

deepen our understanding of Czech engineering, ideally integrating company- and sector-level analyses with qualitative evidence. The conclusions of this study are further limited by data availability and the simplification of the models used. The HHI index, price elasticity, and ROI provide only a partial view of market dynamics and do not include aspects that should be considered in future research.

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Author

Ing. Nikola Sobotková (corresponding author, email: nikola.sobotkova@vutbr.cz), Faculty of Business and Management, Brno University of Technology, Czech Republic

doc. Ing. Vojtěch Bartoš, Ph.D. (bartos@vutbr.cz), Faculty of Business and Management, Brno University of Technology, Czech Republic

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