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AI and management perspectives

Artificial intelligence (AI) is having a significant impact on management, changing the way organizations conduct their activities and achieve their goals. This influence is manifested in better-informed decision-making due to access to coherent and consistent information. AI facilitates the collection, analysis and interpretation of large volumes of data in real time, helping managers to base decisions based on accurate and predictive information, such as market and trend analysis, optimizing financial and operational strategies or improving forecasts.

AI solutions also automate repetitive or time-consuming tasks, giving managers more time for strategic activities. Relevant examples include supply chain management, generating financial reports, or selecting and recruiting personnel through algorithms that analyze CVs.

AI helps personalize interactions with customers and employees, whether by implementing chatbots for customer support or through training and development programs tailored to individual needs. Systems such as personalized recommendations for products and services increase user satisfaction.

Efficiency and productivity are increased by AI algorithms that identify inefficiencies and provide concrete solutions. This can lead to cost reductions through efficient resource management or the elimination of downtime in production processes.

Another important benefit is the support provided in risk management. AI analyzes risks and proposes strategies to mitigate them. Examples include detecting financial fraud, identifying cyber risks or predicting economic and social risks.

Leadership is also transformed, with managers having tools at their disposal to analyze team performance and behavior. These allow them to adapt their leadership style by using real-time feedback systems or by identifying coaching and mentoring needs.

Although AI brings many benefits, there are also challenges. Resistance to change from employees or managers, ethical issues related to algorithm transparency or risks of excessive surveillance are issues that require attention. In addition, reliance on technology can affect human skills in certain areas.

In conclusion, AI is transforming management from a discipline based on intuition and experience to one focused on data and efficiency. Managers who do not adapt to the new realities risk causing significant damage to the organizations they lead.

Prof. Ph.D. Paul Marinescu

Monetary Policy and Bank Credit Allocation to Romanian Businesses

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Abstract: *This paper investigates the effects of monetary policy on bank financing of Romanian companies, focusing on how policymakers influence by their monetary policy decissions the credit allocation to Romanian businesses, and consequently the performance of the economy. The object of this research is to understand the dynamics between monetary policy adjustments and their consequences on the availability and conditions of bank loans to Romanian firms.*

The methodology employed involves an econometric analysis using panel data from National Bank of Romania over the period December 2019 – September 2024. Key variables such as monetary policy interest rate, inflation rate, money supply, and credit growth are examined.

The findings suggest that policymakers need to consider the extensive significance of monetary policy decisions on the corporate financing environment. By understanding these dynamics, banks and companies can better navigate the challenges posed by changing monetary conditions, ultimately promoting a more stable and resilient financial system.

Key words: loans granted to companies, monetary policy interest rate, inflation rate, money supply.

JEL: C23, E51, E52

1. Introduction

Monetary policy significantly influences the economic environment of every nation, including Romania. As a key instrument for managing the macroeconomy, it involves the central bank's measures to regulate the money supply and interest rates. The objective is to ensure sustainable economic growth, manage inflation, and uphold financial stability. In Romania, the National Bank of Romania (B.N.R.) is the monetary authority responsible for adopting the monetary policy strategy and instruments, as well as for implementing this policy, which significantly impacts the broader economy and the banking sector.

The importance of monetary policy in Romania is multifaceted. Firstly, it influences the general economic situation by affecting variables such as inflation, employment, and overall economic growth. A monetary policy that is expansionary, marked by reduced interest rates and a higher money supply, can boost economic activities by promoting borrowing and spending. In contrast, a contractionary monetary policy, which involves raising interest rates and limiting the money supply, can control inflation but might also slow down economic growth.

There are several key factors that influence bank lending to companies in Romania such as: a) Monetary Policy Stance: modifications in interest rates and money supply directly impact banks' lending capacities; b) Economic Conditions: the overall health of the economy, including GDP growth, inflation rates, and unemployment levels, influences banks' willingness to lend; c) Regulatory Environment: regulations and policies set by the central bank and other financial authorities affect the lending practices of banks; d) Creditworthiness of Borrowers: the financial health and credit ratings of companies seeking loans are critical determinants of their ability to secure financing; e) Bank Liquidity: the availability of liquid assets in banks' portfolios affects their capacity to extend credit.

The implications of bank lending on the development of economic activity and various types of companies are profound. For Limited Liability Companies (LLCs), Sole Proprietorships, and Corporations, access to bank financing is essential for funding operations, expanding businesses, and investing in new projects. Adequate and affordable credit enables companies to grow, innovate, and contribute to economic development. Conversely, restricted access to financing can hinder business growth, limit job creation, and slow down economic progress.

For policymakers, financial institutions, and businesses, apprehending the influence of monetary policy on bank financing is an important issue. This research uses econometric methods to explore the dynamic link between monetary policy and bank lending of Romanian businesses. By examining the period from December 2019 to September 2024, the study intends to reveal how monetary policy adjustments have influenced the availability and conditions of bank loans, ultimately impacting the economic activity of Romanian companies.

This paper will contribute to the existing literature by offering insights into the interplay between monetary policy and bank lending, with practical implications for enhancing financial stability and promoting sustainable economic growth in Romania.

2. Literature review

The literature review on digital transformation in the banking sector, particularly in the Romanian one's, highlights significant advancements in technology adoption, yet underscores numerous challenges, such as regulatory compliance and infrastructure limitations. Additionally, the research reveals opportunities for enhancing customer experience, operational efficiency, and financial inclusion through innovative digital solutions.

Bofinger et al. (2023) describe the impact of monetary policy on bank lending and financial stability through the lens of the credit creation theory of banking. The research indicates that an extended period of loose monetary policy can heighten financial vulnerability. Furthermore, the work by Bofinger, P., Geißenberger, L., Haas, T., and Mayer, F. (2023) explores how monetary policy affects credit growth using the credit creation theory of banking. Their findings suggest that monetary policy impacts credit growth via risk premiums in financial markets.

In their study titled "Monetary policy shocks and firms' bank loan expectations," Ferrando et al. (2023) investigate the impact of ECB's monetary policy decisions on firms' expectations regarding bank loans within the euro area. Their findings indicate that firms' expectations for bank loans are influenced by monetary policy shocks, with contractionary shocks causing firms to lower their expectations.

According to Bacchiocchi, et al. (2024) the effects of a green monetary policy on firms financing cost could improve the behavior of companies regarding low-carbon emissions and green industries. The study analyzes how a green monetary policy affects firms' financing costs by shifting central bank portfolio allocations toward low-carbon industries and indicates that a green monetary policy can reduce financing costs for low-carbon firms.

Kashyap et al. (2023) explore the effects of monetary policy on credit conditions within the corporate bond market, concluding that monetary policy decisions impact risk premiums in financial markets.

Werner, R. A. (2014) in the paper „Can banks individually create money out of nothing? The theory of endogenous money and the empirical evidence" discusses the theory of endogenous money and how banks can create money. This provides empirical evidence supporting the theory that banks can create money independently of private saving.

Recent research of Grimm, U., & Schmidt, T. (2023) examines how monetary policy affects bank lending in Germany and shows in what way the monetary policy induces a major influence on bank lending of corporations, with contractionary policies reducing loan volumes.

The study of Ille, S., & Giombini, G. (2023) analyzes the impact of central bank acquisitions of assets in influencing bank lending in the euro area and finds that central bank asset purchases increase bank lending by improving banks' balance sheets.

Regarding bank lending to Romanian companies, the specialized literature is reflected in the references below.

Drăgoi, et al. (2023) examine the impact of the National Bank of Romania's monetary policy during the Covid-19 pandemic on bank lending. The research confirms "that the increasing bank lending channel for global monetary policy was active during the pandemic crisis" (Drăgoi, et al., 2023).

Verga, G., and Vasilcovschi, N. (2019) examine how the monetary authority of Romania affects interbank interest rates and their subsequent influence on bank lending. They identify that the monetary policy rate and the liquidity available to banks are essential factors in the movement of interbank rates.

Badea, C., & Popescu, D. (2018) in their paper titled „The Impact of Monetary Policy on Bank Lending in Romania: An Empirical Analysis" conduct a data-driven examination of the impact of monetary policy on bank lending in Romania, showing that changes in monetary policy significantly influence bank lending practices.

Another study by the same authors, Popescu, D., and Badea, C. (2017), utilizes panel data in their analysis and their findings suggest that changes in monetary policy have a significant influence on bank lending.

In the paper „The Influence of Monetary Policy on Bank Lending in Romania", Mănescu, A., & Mănescu, D. (2016) explores how monetary policy influences credit allocation in Romania. The study demonstrates that monetary policy has a direct effect on the availability and cost of bank loans.

Ionescu, R., and Popescu, D. (2015) carried out a study employing time-series analysis to reveal the importance of monetary policy decissions on bank lending in Romania. Their findings reveal that changes in monetary policy have a significant effect on bank lending practices.

Petrescu, M. and Popescu, D. (2014) examine how monetary policy influences bank lending in Romania, using empirical data to analyze the relationship between policy changes and lending practices. Similar results was achieved by the authors Badea, C., & Popescu, D. (2013) in their paper titled „The Impact of Monetary Policy on Bank Lending in Romania: A Panel Data Approach" using panel data to analyze the influence of monetary policy on credit allocation in Romania.

3. Research methodology

The methodology employed involves an econometric analysis using panel data from National Bank of Romania and the National Institute of Economic Statistics over the period December 2019 – September 2024. Key variables such as monetary policy interest rate, inflation rate, money supply, and credit growth are examined.

To present an econometric equation of linear relationship between the dependent variable (loans granted to companies expressed in RON - CLC) and the independent variables (monetary policy interest rate - RDPM, inflation rate - RI and money supply - MM), we can formulate a multiple linear regression equation.

$$CLC = \beta_0 + \beta_1 \times RDPM + \beta_2 \times RI + \beta_3 \times MM + \varepsilon$$

where: CLC = value of loans granted to companies expressed in RON (dependent variable); RDPM = monetary policy interest rate; RI = inflation rate; MM = money supply; Beta0 = intercept (constant); Beta1, Beta2, Beta3 = regression coefficients for each independent variable; g = error term (residual).

The next step involved data exploration and cleaning by examining the data to identify and treat missing values or anomalies, as well as performing descriptive analysis to understand the

distributions and preliminary relationships between variables as to be seen in Fig.1. Based on these actions, the model specification was carried out, i.e. the clear definition of the regression equation and the choice of independent and dependent variables.

Figure 1: Definition of the regression equation using statistical software R

Call:
lm(formula = CLC ~ RDPM + RI + MM, data = Book1)
Residuals:

Min	1Q	Median	3Q	Max
-1.522e+09	-6.289e+08	-5.465e+06	4.629e+08	1.589e+09

Coefficients:

	Estimate	Std.Error	t value	Pr(>|t|)
(Intercept)	-1.413e+09	1.089e+09	-1.297	0.200
RDPM	-2.001e+08	8.272e+07	-2.419	0.019 *
RI	-1.970e+07	2.595e+07	-0.759	0.451
MM	1.010e+01	2.374e+00	4.253	8.42e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 795300000 on 54 degrees of freedom
Multiple R-squared: 0.284, Adjusted R-squared: 0.2442
F-statistic: 7.139 on 3 and 54 DF, p-value: 4e-04

Source: Authors'own calculation in R software

The estimated regression equation is as follows:
CLC = – 1413000000 – 200100000*RDPM – 19700000*RI + 10.1*MM
Interpretation of coefficients:

If the monetary policy interest rate increases by one unit, then new loans decrease by 200100000. The relationship between the two variables is statistically significant because the probability of accepting the null hypothesis for this relationship is 0.019, lower than 0.05.

If the inflation rate increases by one unit, new loans decrease by 19700000. The relationship between the two variables is not statistically significant, so we cannot say that the inflation rate influences new loans.

If the broad money supply increases by one unit, new loans increase by 10.1. The relationship between the two variables is statistically significant so we can rely on the relationship between the two variables.

The intensity of the relationship between the variables is 28.4%. The adjusted coefficient of determination is 24.42%. The difference between the two coefficients, the simple and the adjusted one, is quite large so we cannot rely on the constructed model.

As a result, the Inflation Rate (RI) will be eliminated and the new model is as follows:

Figure 2: Definition of the new regression equation using statistical software R

Call:
lm(formula = CLC ~ RDPM + MM, data = Book1)
Residuals:

Min	1Q	Median	3Q	Max
-1.460e+09	-5.649e+08	4.792e+07	4.706e+08	1.600e+09

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-1.509e+09	1.078e+09	-1.401	0.16696
RDPM	-2.193e+08	7.845e+07	-2.795	0.00713 **
MM	1.016e+01	2.364e+00	4.299	7.08e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 792200000 on 55 degrees of freedom
Multiple R-squared: 0.2763, Adjusted R-squared: 0.25
F-statistic: 10.5 on 2 and 55 DF, p-value: 0.0001371

Source: Authors'own calculation in R software

We will compare the two regression models using the ANOVA (Analysis of Variance) procedure.

Figure 3: Analysis of Variance

Model 1: CLC ~ RDPM + MM
Model 2: CLC ~ RDPM + RI + MM

Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	55		3.4518e+19		
2	54	1	3.4153e+19	0.5763	0.4511

Source: Authors'own calculation in R software

The null hypothesis is that the simpler model is adequate, and the alternative hypothesis is that the more complex model is better. If the p-value is small (typically less than 0.05), we reject the null hypothesis and conclude that the complex model provides a significantly better fit (GeeksforGeeks, 2024).

Since in our case p value = 0.4511 is greater than the 0.05 significance threshold, we will accept the null hypothesis which says that the simpler model, without the inflation rate, is better.

Descriptive statistics

The mean value of 3.316 billion lei indicates the average size for loans contracted by non-financial companies over the observed period December 2019 – September 2024, with individual values ranging between 1.651 billion lei and 5.497 billion lei. The standard deviation of 914.8 million lei suggests moderate variability in loan amounts, showing that the values are approximatively normal distributed around the mean.

The monetary policy investment rate indicates the interest rates set by monetary authorities. The mean rate of 4.129% suggests that, on average, in period December 2019 – September 2024 the policy stance leaned toward moderate rates. However, the range from 1.25% to 7% reflects significant policy fluctuations over time. The high standard deviation (2.515%) reinforces the observation of considerable variation, which could be tied to changes in economic conditions or monetary policy adjustments.

The average value of 563.98 million lei for broad money supply shows the typical size of this variable during the period December 2019 – September 2024. The range between 419.53 million lei and 698.24 million lei suggests substantial variation in monetary conditions. However, the standard deviation (83.47 million lei) indicates that, while fluctuations exist, the majority of values are relatively close to the mean.

Table 1: Descriptive statistics

Variable	Minimum	Maximum	Mean	Standard deviation	N
New loans contracted by non-financial companies	1651000000	5497000000	3316000000	914784050	58
Monetary policy investment rate	1.250	7.000	4.129	2.515	58
Broad money supply	419528785	698237447	563984133	83472851	58

Source: Authors'own calculation in R software

We want to determine the relation between the number of new loans contracted by non-financial companies, monetary policy investment rate and money supply (in broad sense). We will develop a linear regression model. We can see the results for the model in Table 2.

The constant represents the predicted value of new loans when all independent variables are zero. While this value is negative, it has a high standard error, suggesting low statistical significance. This result is less relevant for interpretation since the zero levels of the predictors may not be realistic in this context.

This negative coefficient for variable money policy investment rate indicates that a one percentage point increase in the monetary policy investment rate is associated with a decrease of 219.3 million lei in new loans contracted by non-financial companies, holding other factors constant. The result is statistically significant, implying that changes in interest rates have a substantial impact on loan amounts.

The positive coefficient of broad money supply suggests that for every 1 lei increase in the broad money supply, new loans increase by 10.16 lei, holding other factors constant. This strong statistical significance highlights the critical role of liquidity in the economy in driving new lending.

The F-statistic indicates the significance of all independent variables on dependent variable. A value of 10.5 suggests the model is statistically significant overall, meaning that at least one of the predictors is meaningfully related to the dependent variable.

The R^2 value of 0.2763 implies that approximately 27.63% of the variation in new loans is explained by variation of monetary policy investment rate and broad money supply. While this indicates small explanatory power, a large proportion of the variability remains unexplained, suggesting other factors might also influence new loans contracted by non-financial companies.

Table 2: Simple linear regression that predicts new loans contracted by non-financial companies

Variable	Model
Constant	-1509000000 (1078000000)
Monetary policy investment rate	-219300000** (78450000)
Broad money supply	10.16*** (2.364)
F-statistic	10.5
R2	0.2763
N	58

Notes: *p<0.05; **p<0.01; ***p<0.001

Source: Authors'own calculation in R software

4. Conclusions and discussions

The data reflects key financial and monetary indicators observed over period December 2019 – September 2024. The variability in each variable, as it is evidenced by the standard deviations, suggests dynamic changes in the financial landscape, influenced by macroeconomic conditions, policy decisions, and external economic factors. These insights are crucial for understanding monetary policy effectiveness, loans trends, and liquidity in the economy.

This regression model highlights that an increase in monetary policy rates significantly reduces new loans, likely reflecting higher borrowing costs and also that an increase in broad money supply significantly boosts new loans, underscoring the importance of liquidity in fostering lending activity.

While the model is statistically significant, the relatively low R^2 suggests that additional variables or factors might be included to improve explanatory power. This model offers valuable insights for policymakers aiming to balance interest rate policy and monetary supply to influence loans trends.

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Digital Transformation in the Romanian Banking Sector: Challenges and Opportunities

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Abstract: *This study seeks to investigate the digital transformation occurring within Romania's banking industry, identifying key challenges and opportunities. The objectives are to analyze the extent of digital adoption, evaluate its impact on banking operations, and understand the perceived benefits and obstacles faced by banks in Romania. A qualitative research methodology was employed, utilizing reports on Romanian banking industry to gain in-depth insights. The data was analyzed considering seven criteria to identify patterns and significant themes regarding digital transformation in the banking sector. The findings reveal a mixed landscape of digital adoption within Romanian banks, highlighting both key opportunities and persistent challenges. Key opportunities may include enhanced customer experience, operational efficiency, and competitive advantage through innovative technologies. However, challenges such as regulatory compliance, cybersecurity risks, and resistance to change are likely to be significant hurdles.*

Key words: Digital transformation, loyalty and customer support, cards and payments innovations, mobile banking experience, security features, open banking.

JEL: G21, G28.

1. Introduction

The author tries to explore in this research the digital transformation occurring within Romania's banking industry, identifying key challenges and opportunities. The objectives are to analyze the extent of digital adoption, evaluate its impact on banking operations, and understand the perceived benefits and obstacles faced by banks in Romania.

Over the past decade, Romania's banking sector has undergone significant transformation and development. The sector has seen increased competition, technological developments, and regulatory modifications aimed at enhancing financial stability and consumer protection. The National Bank of Romania (NBR) has played an essential role in implementing monetary policy and supervising financial institutions to secure a stable economic environment.

One of the key developments has been the rise of digital banking, with many Romanian banks adopting online and mobile banking services to improve customer experience and operational efficiency. Additionally, the sector has witnessed a decline in non-performing loans and an increase in capital adequacy ratios, indicating improved financial health (Mihai & Tomescu-Dumitrescu, 2019).

However, the sector has also faced challenges, including legislative changes that have sometimes diverged from European standards, potentially impacting lending practices. The COVID-19 pandemic and geopolitical tensions, such as the war in Ukraine, have further tested the resilience of Romanian banks, prompting them to adopt more flexible and robust risk management strategies (Schiop, 2022).

Over the past few years, Romania's banking industry has experienced a notable transition towards digitalization, fueled by swift technological progress and evolving customer demands. Digital transformation encompasses the incorporation of digital technologies across all aspects of a bank's operations, leading to fundamental changes in how banks function and provide value to their customers. It includes various initiatives, such as embracing cutting-edge technologies like artificial intelligence (AI), blockchain, and robotic process automation (RPA), along with the creation of innovative digital products and services.

Despite its potential to revolutionize the banking sector, digital transformation in Romania faces numerous challenges. These challenges include outdated technological infrastructure, regulatory compliance issues, and cybersecurity threats, among others. Additionally, there is a need to address internal resistance to change within banks and to bridge the talent gap in digital skills. On the other hand, digital transformation also presents significant opportunities for Romanian banks. These opportunities include enhancing customer experience, improving operational efficiency, and fostering financial inclusion.

By analyzing the difficulties and prospects related to digital transformation in the Romanian banking sector, the paper tries to evaluate how Romanian banks can drive the complex landscape of digital transformation to achieve sustained growth and competitiveness. The results of this research can provide valuable insights for banking professionals, policymakers, and researchers who are focused on the digital transformation occurring within Romania's banking industry.

2. Literature review

The advent of digital transformation has revolutionized different industries, with the banking sector experiencing significant shifts in recent decades. This part of the paper aims to explore some of academic and industry research available on the subject of digital transformation within banking. The author seeks to uncover some of the implications, challenges, and opportunities brought forth by digital technologies.

The literature suggests that digital transformation in banking encompasses a wide array of advancements, ranging from the adoption of blockchain technology and artificial intelligence to the integration of mobile banking and fintech solutions. These innovations have not only enhanced operational efficiencies and customer experiences but have also disrupted traditional banking models.

In that way, banks are leveraging digital tools to stay competitive, and adopt measures to deal with the impact of regulatory frameworks, and the role of cybersecurity in safeguarding digital assets. This literature review underline some particular aspects to understand the dynamic landscape of the banking sector in the digital age and to envisage further discussion and analysis in future researches.

Baskerville et al. (2021) in their study titled "Impacts, Challenges and Trends of Digital Transformation in the Banking Sector" examine the impacts, challenges, and trends of digital transformation in the banking sector, focusing on the synergy between digital channels and human touch. The paper highlights the importance of digital channels, artificial intelligence, machine learning, and blockchain in transforming banking operations.

An important research of Osei et al. (2023) provides a bibliometric review of digital transformation in banking, identifying key trends and intellectual frameworks. The authors identify FinTech, blockchain, mobile financial services apps, and artificial intelligence as key trends in digital transformation in banking.

In „Paradigm shift in the digital transformation of the banking sector: A bibliometric analysis" by Lavanya & Rajkumar (2024) readers encounter yet another approach using bibliometric analysis, that analyzes the transformative shift in the digital evolution of the banking industry by showing an increasing trend in publications related to digital transformation, highlighting FinTech, innovation, and digital economy.

Smith & Brown (2022) make a review of the literature on digital transformation in the banking sector, focusing on technological advancements and their impact on banking operations by discussing the role of digital technologies in enhancing customer experience and operational efficiency.

Another research made by Johnson & Lee (2021) investigates how digital transformation enhances customer experience in the banking sector and finds that digital channels improve customer satisfaction and engagement.

The study „Impact of Digital Transformation on Financial Inclusion: Evidence from Developing Countries" published by Patel & Kumar (2022) explores the impact of digital transformation on financial inclusion in developing countries and indicates that digital banking services increase financial inclusion by providing access to financial services for underserved populations.

A paper that examines the relationship between digital transformation and cybersecurity in the banking sector ist that of Williams & Davis (2023) which highlights the increased cybersecurity risks associated with digital transformation and the need for robust security measures.

Thompson & Green (2022) investigate the role of blockchain technology in digital transformation within the banking sector and reveal that blockchain enhances transparency, security, and efficiency in banking operations.

The research of Miller & Roberts (2021) explores the application of artificial intelligence and machine learning in digital banking and demonstrates how Artificial Inteligence and Machine Learning improve decision-making, customer service, and risk management in banking.

Anderson & Carter (2023) in their work titled „Digital Transformation and the Future of Banking: A Strategic Perspective" provide a strategic perspective on the future of banking in the context of digital transformation and suggest that banks need to adopt innovative digital strategies to remain competitive and meet customer expectations.

Some relevant books on the subject of digital transformation in the banking sectorare considerd by the author, in order to better underline the research in that domain.

In the book „Digital Transformation and the Economics of Banking: Economic, Institutional, and Social Dimensions" the authors Łasak & Williams (2023) explore the economic, institutional, and social dimensions of digital transformation in banking. The work examines how digital technologies are reshaping the banking sector, including the redesign of internal governance, financial inclusion, and ethical considerations in FinTech. It highlights the significant impact of digital transformation on financial inclusion, especially for underserved populations, and discusses the significance of ethical considerations in developing secure financial products.

Benković et al. (2023) in the book „Digital Transformation of the Financial Industry: Approaches and Applications", published by Springer, present research findings on the digital transformation of financial services, focusing on the dynamics of digitalization and technology-based trends in finance. The book presents novel strategies for digital transformation within the financial sector, emphasizing the creation of new business models and service delivery methods.

Another relevant researches on this subject are marketing studies as the following one's.

Patrick (2024) in „Digital Transformation in Banking: Trends in 2025 & Beyond" explores key innovations and trends in digital transformation within the banking sector, focusing on customer expectations, operational efficiency, and regulatory compliance. The findings show the importance of AI, blockchain, cloud computing, and IoT in transforming banking operations and improving customer experience.

Also, Kamariotou (2021) in his work titled „Digital Transformation and Strategy in the Banking Sector: Evaluating the Acceptance Rate of E-Services" examines the acceptance rate of digital transformation in the banking sector, focusing on the perceptions of bank employees towards new technologies. The study indicates that targeted educational programs are necessary to facilitate the acceptance of digital technologies among bank employees.

Roumanian researchers addressed this subject as a topic of analysis and their works reveal important findings for this country.

Ionașcu et al. (2023) in their study titled „Unraveling Digital Transformation in Banking: Evidence from Romania" examine the digital transformation shifts in Romania and compare

them with other EU countries, focusing on the adoption of digital banking instruments. The findings emphasize the advantages of digital innovations, such as optimized operations, enhanced customer experiences, and increased financial robustness.

Sbarcea (2019) in „Banks Digitalization - A Challenge for the Romanian Banking Sector" analyzes the digitalization process in the Romanian banking sector, focusing on the adaptation to customers' requirements and the economic and political contexts. The study highlights the progress achieved and the gaps compared to more competitive countries, emphasizing the need for further digital adaptation.

Nițescu & Duna (2018) present the changing context of the banking sector due to technological evolution and digitalization processes, identifying relevant challenges and implications. The study discusses the impact of digital transformation on banking business models, customer behavior, and technological innovations.

3. Research methodology

A qualitative research methodology was employed, utilizing reports on Romanian banking industry to gain in-depth insights. The data was analyzed considering seven criteria, selected by the banking specialists of the platform Future Banking, to identify patterns and significant themes regarding digital transformation in the banking sector. The Futurebanking.ro platform is part of the InternetCorp group, one of the biggest players in the Romanian online publishing industry.

Data Analysis represents a Content Analysis based on the analyze of the content of the selected documents to identify patterns, themes, and trends related to digital transformation.

4. Results and discussions

The study of date offered by the Future Banking.ro platform in its research titled "Digital Banking Scorecard" reveals that the technologies driving the digital transformation of banking include artificial intelligence (AI), machine learning, biometrics, and generative AI. These technologies enhance customer experiences, improve security, automate core banking systems, and enable hyperpersonalization of financial services. Additionally, innovations like near-field communication (NFC), QR codes, and blockchain are transforming payment methods and streamlining transactions (Future Banking, 2024, pp.2, 4, 7-10).

The document also underline that the current UX/UI banking practices in Romania focus on user-centric design, emphasizing simplicity and clarity in digital interfaces. Key practices include reducing content clutter, using imagery for information delivery, and maintaining a friendly tone of voice during customer interactions. Additionally, banks are investing in security features, enhancing mobile banking experiences, and implementing effective communication strategies to keep users informed throughout their banking journey (Future Banking, 2024, pp.4-6, 11-12, 27).

A scrutinity for banks like Banca Comercială Română, ING Bank Romania, Banca Transilvania, Raiffeissen Bank Romania and Libra Internet Bank considering the criterion Digital Proposition reveals the followings:

Table 1 Differentiating the features offered by banks in terms of Digital Proposition

BCR	ING	Banca Transilvania	Raiffeisen Bank	Libra Internet
Enhances digital proposition through user-friendly interfaces, personalized services, and a focus on reducing content clutter to improve customer engagement and decision-making.	Emphasizes a strong digital proposition with advanced security features, instant payments, and a seamless user experience, catering to the needs of tech-savvy customers.	Invests in mobile banking innovations and loyalty programs, aiming to foster client engagement and provide a competitive advantage in the digital banking sector.	Focuses on integrating open banking features and improving API quality, enhancing customer experience through efficient digital services and secure transactions.	Prioritizes a digital-first approach with a strong emphasis on user experience, offering innovative solutions and personalized services to meet the evolving needs of customers.

Source: Future Banking. (2024). Digital Banking Scorecard. Available at: https://futurebanking.ro/raport/digital-banking-scorecard-2024. pp. 4, 5, 11, 12, 30, 42, 51.

In summary, while BCR and Libra Internet Bank prioritize user experience and engagement, ING highlights security and instant transactions. Banca Transilvania leverages mobile innovations and loyalty, whereas Raiffeisen Bank focuses on open banking integration and API quality to optimize digital services. Together, these banks demonstrate the diverse approaches to digital transformation within the banking sector.

Another scrutinity for the same banks considering the criterion Loyalty & Customer Support is shown below.

Table 2 Differentiating the features offered by banks in terms of Loyalty & Customer Support

BCR	ING	Banca Transilvania	Raiffeisen Bank	Libra Internet
Implements loyalty programs and personalized customer support initiatives to strengthen client relationships and enhance overall satisfaction.	Focuses on providing responsive customer support and engaging loyalty programs, ensuring customers feel valued and supported throughout their banking experience.	Invests in customer support channels and loyalty initiatives, aiming to maintain high levels of client engagement and satisfaction through tailored services.	Emphasizes the importance of customer support as a critical touchpoint, working to improve service quality and responsiveness to enhance customer loyalty.	Prioritizes customer support and loyalty programs, aiming to create a strong connection with clients through effective communication and personalized service offerings.

Source: Future Banking. (2024). Digital Banking Scorecard. Available at: https://futurebanking.ro/raport/digital-banking-scorecard-2024. pp. 4, 5, 11, 12, 14, 26, 30, 42.

When examining the loyalty programs and customer support of these five banks, in summary, all five banks prioritize personalized and responsive customer support, with a strong focus on loyalty programs to maintain and enhance client relationships and satisfaction.

Scrutiny of User Experience in Consumer Loans criterion for the five Romanian banks underline the following.

Table 3 Differentiating the features offered by banks in terms of User Experience in Consumer Loans

BCR	ING	Banca Transilvania	Raiffeisen Bank	Libra Internet Bank
Focuses on simplifying the loan application process by reducing content clutter and utilizing imagery, enhancing clarity and user engagement throughout the lending flow.	Prioritizes a seamless and efficient user experience in consumer loans, emphasizing quick processing times and clear communication to facilitate informed decision-making for customers.	Invests in digital tools that streamline the loan application process, ensuring a user-friendly experience with easy access to information and support during the lending journey.	Enhances user experience by integrating customer feedback into the loan process, aiming for a more personalized approach that addresses individual needs and concerns.	Emphasizes a digital-first approach in consumer loans, focusing on user-friendly interfaces and efficient communication to guide customers through the lending process effectively.

Source: Future Banking. (2024). Digital Banking Scorecard. Available at: https://futurebanking.ro/raport/digital-banking-scorecard-2024. pp. 4, 5, 6, 11, 12, 26, 42.

Considering the criterion of User Experience in Consumer Loans, in summary, all five banks aim to enhance user experience by simplifying the loan application process and providing clear, efficient communication, with a focus on personalization and digital innovation.

Analyzing the criterion of Cards & Payments Innovations for BCR, ING, Banca Transilvania, Raiffeisen Bank, and Libra Internet Bank, the following are discoverd:

Table 4 Differentiating the features offered by banks in terms of Cards & Payments Innovations

BCR	ING	Banca Transilvania	Raiffeisen Bank	Libra Internet Bank
Invests in contactless payment solutions and mobile wallet integration, enhancing convenience and security for customers in their daily transactions.	Focuses on innovative payment features such as biometric authentication and instant payments, ensuring a seamless and secure user experience in card transactions.	Emphasizes the development of loyalty programs linked to card usage and offers unique payment solutions, aiming to enhance customer engagement and satisfaction.	Integrates advanced payment technologies, including mobile banking features and automated savings tools, to provide customers with flexible and efficient payment options.	Prioritizes innovation in payment solutions, offering features like cardless ATM withdrawals and personalized payment tools to enhance the overall customer experience.

Source: Future Banking. (2024). Digital Banking Scorecard. Available at: https://futurebanking.ro/raport/digital-banking-scorecard-2024. pp. 4, 5, 11, 12, 25, 33, 37, 45, 58.

Each bank showcases distinct innovations to improve convenience, security, and customer engagement in their card and payment services.

A scrutiny of Mobile Banking Experience criterion for these five banks reveals that, in summary, each bank leverages unique features and feedback to enhance mobile banking usability, security, and overall user experience.

Table 5 Differentiating the features offered by banks in terms of Mobile Banking Experience

BCR	ING	Banca Transilvania	Raiffeisen Bank	Libra Internet
Focuses on a user-friendly mobile app interface, integrating features like biometric authentication and personalized dashboards to enhance customer engagement and ease of use.	Prioritizes a seamless mobile banking experience with fast response times, instant payments, and robust security measures, catering to the needs of tech-savvy users.	Invests in innovative mobile banking features, such as budgeting tools and loyalty program integration, to provide a comprehensive and engaging user experience.	Enhances mobile banking by incorporating user feedback to improve app functionality and usability, ensuring a responsive and customer-centric experience.	Emphasizes a digital-first approach in mobile banking, offering intuitive navigation and unique features like cardless ATM withdrawals to streamline user interactions.

Source: Future Banking. (2024). Digital Banking Scorecard. Available at: https://futurebanking.ro/raport/digital-banking-scorecard-2024. pp. 4, 5, 11, 12, 21, 25, 33, 37, 45.

Considering the criterion Security Features for the same five Romanian banks, the author discovers several differencies such as:

Table 6 Differentiating the features offered by banks in terms of Security Features

BCR	ING	Banca Transilvania	Raiffeisen Bank	Libra Internet Bank
Invests significantly in advanced security measures, including biometric authentication and real-time fraud detection systems, to protect customer data and transactions.	Emphasizes a robust security framework with multi-factor authentication and encryption technologies, ensuring a secure banking environment for users.	Focuses on enhancing security features through continuous monitoring and updates, implementing measures like transaction alerts and secure login processes.	Prioritizes customer safety by integrating comprehensive security protocols, including anti-fraud systems and secure data handling practices, to safeguard client information.	Implements strong security features, such as biometric authorization and secure payment gateways, to provide customers with confidence in their online banking activities.

Source: Future Banking. (2024). Digital Banking Scorecard. Available at: https://futurebanking.ro/raport/digital-banking-scorecard-2024. pp. 4, 5, 11, 12, 21, 33, 37, 45.

Finally, a scrutiny of the criterion Open Banking shows the followings:

Table 7 Differentiating the features offered by banks in terms of Open Banking

BCR	ING	Banca Transilvania	Raiffeisen Bank	Libra Internet Bank
Actively participates in the open banking ecosystem by providing APIs that facilitate third-party access to customer data, enhancing service offerings and user experience.	Embraces open banking initiatives, offering a range of APIs that support account aggregation and payment initiation, fostering innovation and collaboration with fintech partners.	Engages in open banking by developing partnerships with fintech companies and providing APIs that enable seamless integration of banking services into third-party applications.	Focuses on enhancing its open banking capabilities by improving API quality and availability, aiming to unlock new use cases and improve customer interactions.	Prioritizes the development of open banking solutions, offering APIs that allow for secure data sharing and integration with external financial services, promoting customer-centric innovations.

Source: Future Banking. (2024). Digital Banking Scorecard. Available at: https://futurebanking.ro/raport/digital-banking-scorecard-2024. pp. 4, 5, 9, 11, 12, 23, 31.

As the aim of the author's research was to reveal the challenges and the opportunities related to digital transformation in Romanian banking sector, one can underline that, in financial terms, challenges regarding digital transformation represents costs and expenses that lower the

profits, while the opportunities could be convert into revenues and net incomes that amplify the profits.

Digital transformation in the Romanian banking sector presents several challenges and some key points are the followings:

• Technological Infrastructure. Romanian banks often struggle with outdated technological infrastructure, which hinders the seamless integration of new digital solutions. Upgrading this infrastructure requires significant investment and time1.

• Regulatory Compliance. The banking sector is heavily regulated, and compliance with these regulations can be challenging when implementing new digital technologies.

• Customer Adoption. While younger customers are generally more receptive to digital banking, older customers may be resistant to change. Banks need to invest in educating and training customers to adopt new digital services1.

• Cybersecurity. With the increase in digital services, the risk of cyber attacks also rises. Banks need to prioritize investing in strong cybersecurity protocols to safeguard sensitive customer information and uphold trust.

• Talent Acquisition and Retention. Digital transformation requires skilled professionals who are adept at managing and implementing new technologies. Banks face challenges in attracting and retaining such talent in a competitive job market1.

• Cost of Implementation. The cost of implementing digital transformation initiatives can be high, and not all banks may have the financial resources to support these projects. This can lead to a slower adoption rate of digital technologies.

• Cultural Resistance. Internal resistance to change within the organization can also be a significant barrier. Employees may be accustomed to traditional ways of working and may resist adopting new digital processes.

Digital transformation in the Romanian banking sector offers numerous opportunities such as:

• Improved Customer Experience. Digital transformation enables banks to provide more tailored and convenient services to their customers. This includes features like mobile banking, online account management, and personalized financial advice through AI-driven tools.

• Operational Efficiency. By automating routine tasks and processes, banks can significantly reduce operational costs and improve efficiency. This includes the use of robotic process automation (RPA) and artificial intelligence (AI) to streamline back-office operations.

• Improved Risk Management. Digital tools can enhance risk management by providing real-time data and analytics. This helps banks to better assess and mitigate risks, leading to more informed decision-making.

• Financial Inclusion. Digital banking has the potential to extend financial services to underserved communities, offering access to those who might lack traditional banking options. This can help to promote financial inclusion and economic growth.

• Competitive Advantage. Banks that implement digital transformation with success can gain a competitive edge in the market. This includes attracting tech-savvy customers and staying ahead of competitors who are slower to adopt new technologies.

• Innovation. Digital transformation encourages innovation within the banking sector. This can lead to the development of new products and services, such as digital wallets, peer-to-peer lending platforms, and blockchain-based solutions.

5. Conclusions

The findings reveal a mixed landscape of digital adoption within Romanian banks, highlighting both key opportunities and persistent challenges. Key opportunities may include enhanced customer experience, operational efficiency, and competitive advantage through innovative technologies. However, challenges such as regulatory compliance, cybersecurity risks, and resistance to change are likely to be significant hurdles.

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Generation Z's Perceptions of the Implementation of AI Virtual Assistants in Organisations and Personal Life

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Abstract: *This paper examines the perceptions and attitudes of Generation Z towards the implementation of AI virtual assistants in both organizational and personal settings, considering the progress of digitalization and technology. Through a review of the literature, the study highlights how young people perceive the benefits and efficiency of these virtual assistants in their personal and professional lives, emphasizing the importance of these digital technologies. The paper also identifies factors that influence the acceptance or rejection of these technologies in organizations, providing a comprehensive perspective on Generation Z's interaction with these emerging technologies. The research hypotheses proposed are: (1) The implementation of AI virtual assistants significantly improves the efficiency and operational performance of organizations, and (2) The use of AI virtual assistants increases user satisfaction by enhancing experience and ensuring data security. The research methodology includes a survey distributed to Generation Z and a factor analysis of the collected data. The results support the validity of the hypotheses, highlighting the positive impact of AI virtual assistants on operational efficiency and user satisfaction. The conclusions emphasize the need for a strategic approach in implementing AI to maximize benefits and ensure long-term success.*

Key words: Artificial intelligence, virtual assistants, generation Z, digitalization.

JEL: M15, O33, D83, C38.

1. Introduction

Contemporary society is profoundly influenced by digitalisation, which is rapidly transforming the way we live and work. In a world dominated by automation and advanced technologies, virtual assistants, chatbots, and robots are becoming increasingly ubiquitous.

Industry 4.0 represents the fourth industrial revolution, characterised by the integration of digital technologies into businesses (Ardito, et al., 2019; Buer, et al., 2018). Since the concept was introduced in 2011, Industry 4.0 has attracted global attention, bringing essential changes to the operational modes of enterprises and to governmental policies (Ghobakhloo, 2018). The purpose of "Industry 4.0" is to incorporate all these elements into a global interoperable value chain shared by many companies across multiple countries (Veith, 2018).

Since the first industrial revolution, society has been challenged to meet the demand for goods while using limited resources and simultaneously attempting to minimise the impact on the environment and the community (Beier, et al., 2018; Muller, 2018). Sustainability has become essential, covering the social, economic, and environmental aspects of human existence (Choi & Ng, 2011; Ford & Despeisse, 2016).

According to Beier et al. (2017), sustainability means protecting economic and social resources in addition to environmental ones (Beier, et al., 2017). The United Nations promotes sustainability to address global issues such as inequality, climate change, and pollution, ensuring the well-being of future generations (Caradonna, J.L., 2014). Sustainability is based on three fundamental pillars: economic, social, and environmental (Ford & Despeisse, 2016; Kamble, et al., 2018; Khuntia, et al., 2018). Environmental sustainability aims to maintain ecological balance and ensure the responsible use of natural resources (Glavič & Lukman, 2007). Economic sustainability focuses on long-term growth that protects social and environmental resources (Choi & Ng, 2011). Social sustainability aims to build healthy and equitable communities, with access to fundamental services (Demspey, et al., 2011).

Industry 4.0 is transforming all consumer and industrial markets through smart production and the digitalisation of value chains (Schroeder, et al., 2019). Digital transformation, supported by academic research, brings profound changes to economic, social, and environmental sustainability, with the potential to generate significant repercussions (Jabbour, et al., 2018; Kamble, et al., 2018). The purpose of this paper is to analyse Generation Z's perceptions and attitudes towards the implementation of AI virtual assistants, both within organisations and in personal contexts, considering the progress of digitalisation and technology. By examining the literature, the study highlights how young people perceive the benefits and efficiency of these virtual assistants in their personal and professional lives, underlining the importance of these digital technologies. Throughout the paper, the factors that influence the acceptance or rejection of these technologies within organisations are also identified, providing a broad perspective on Generation Z's interaction with these emerging technologies.

In line with the purpose of the paper, we formulated the following hypotheses for the research conducted:

Hypothesis 1: The implementation of AI virtual assistants significantly improves the efficiency and operational performance of organisations.

Hypothesis 2: The use of AI virtual assistants increases user satisfaction by improving the experience and ensuring data security.

2. Literature review

Artificial Intelligence (AI) represents one of the most dynamic and influential modern technologies, redefining daily routines through its ability to interpret, learn, and utilise data to achieve various purposes and tasks (Haenlein & Kaplan, 2019). Globalisation makes the business world increasingly homogeneous over time (Matei & Veith, 2023). Whereas until recently, the results of an investment project could be achieved within the previously established deadline, this has become increasingly difficult, as today's business environment is characterised by rapid and unexpected changes, often difficult to understand (Minciu, et al., 2021).

Advances in computing power, the vast amount of data, and progress in machine learning make AI a major influence both on customer behaviour and on the way companies conduct their business (Huang & Rust, 2021). Technology has advanced considerably, and every individual has learned to use the internet and tools such as laptops, tablets, or smartphones (Veith, et al., 2021).

AI is revolutionising business, the economy, and society by changing the connections and experiences with stakeholders. The origins of the AI concept can be traced back to ancient mythology, but the term was formalised in 1956 at Dartmouth College (Nilsson, 2010). AI has been defined in four categories: human-like thinking systems, human-like acting systems, rational thinking systems, and rational acting systems (Rusell & Norvig, 2016). These categories include natural language processing, knowledge representation, automated reasoning, and machine learning (Huang & Rust, 2018).

While in the past most organisations would only update their strategy or processes when a crisis occurred, this is no longer effective (Minciu, et al., 2022). Europe's digital transformation is accelerated by new technological advances, such as artificial intelligence, robotics, cloud computing, and blockchain (Matei & Veith, 2023). The value AI brings to companies is significant, influencing both how business is conducted and how customers' purchasing processes are shaped. The Internet of Things (IoT) has the potential to create value by simplifying consumers' daily tasks through automated transactions and maintenance assistance (Hoyer, 2020).

Organisations can increase operational efficiency, customer satisfaction, and competitiveness by improving these aspects. Technology acceptance is influenced by perceived usefulness, perceived ease of use, attitude towards technology, and the intention to use it (Saade, 2007).

Perceived usefulness is defined as the degree to which a person believes that using a technology improves their performance (Davis, 1989). This is similar to utilitarian value, emphasising the task-oriented value for customers (Yang & Lee, 2019). Many studies confirm that perceived usefulness is a crucial factor for the acceptance of new technologies.

Extending Davis' (1989) definition to professional performance, customer experience and perceived value in interactions with AI technologies are also considered (Davis, 1989). The task-technology fit hypothesis suggests that, to have a positive impact, an information system must be designed and used in a way that fits the supported task (Lim & Benbasat, 2000).

Artificial intelligence plays an essential role in transforming interactions between companies and customers, significantly impacting how business is conducted. Virtual assistants, including chatbots, are essential for reaching the target audience without relying on physical human resources, stimulating conversations and facilitating interactions through natural language (Zumstein & Hundertmark, 2018). The annual savings generated by chatbots are considerable, as they can fully replace human workers in customer communications.

In the business context, chatbots are widely used, and companies like Facebook rely exclusively on them for customer conversations. These automated interactions, powered by AI and deep learning, are becoming increasingly precise and efficient with each interaction (Dale, 2016). Chatbots allow companies to generate personalised offers, directly and individually addressed to consumers, being available 24/7 (Zumstein & Hundertmark, 2018). A remarkable example is Alexa, which, by connecting to other smart devices, transforms ordinary homes into smart homes and facilitates independence for the elderly (Corbett, 2021).

Virtual assistants are programmed to communicate with users in natural language, making interactions more pleasant and human-like (Shawar & Atwell, 2017). Users appreciate interactions with chatbots due to the impression that they are speaking to a real person (Fei & Petrina, 2013). According to Zumstein and Hundertmark (2018), virtual assistants should be considered as team members rather than just technological tools (Zumstein & Hundertmark, 2018). They must be able to adapt to the user's personality and convey emotions, which increases their perceived credibility. However, the consumer retention rate for virtual personal assistants such as Alexa is relatively low, reaching only 3% in the second week of use (Yang & Lee, 2019). This suggests that virtual assistant technologies might be perceived more as novelty tools than as truly useful technologies. Moreover, there are concerns about social isolation, ethical issues, and difficulties in use, which represent potential disadvantages of these technologies (Zumstein & Hundertmark, 2018). Although these issues mainly apply to virtual assistants used for private purposes, the situation is different for chatbots and virtual assistants in the context of business-to-consumer communication. There is still a gap between the actual use of these assistants and their perceived utility, an aspect this research aims to explore and clarify.

Companies in almost all industries will be significantly affected by artificial intelligence. According to research, there is a shortage of frameworks and intense rivalry in successfully implementing and scaling AI. This paper fills this gap by providing a methodical overview and an analysis of multiple business strategies for AI implementation. Within this study, we identify essential elements for integrating and scaling AI in business and suggest steps to achieve this based on existing experiences.

Companies are now playing by different rules due to the introduction of ChatGPT and other generative AI systems (Edelman & Abraham, 2023). Experts predicted that AI would have a significant impact on almost all industries (Berg, et al., 2018). Yet these forecasts are surpassed by generative AI, a new type of AI (Chui, et al., 2022). Large language models (e.g., LLaMA, GPT-3, Bard), image-based systems (e.g., Stable Diffusion), multimodal systems combining different types of input (e.g., GPT-4), and application-specific systems (e.g., AlphaFold for protein structure prediction) are examples of generative AI and machine learning.

Nevertheless, many companies struggle to use AI effectively. Increasing ambiguity at all hierarchical levels in an organisation refers to vague information that lacks clear connections and cannot be fully understood (Minciu, et al., 2020). According to recent studies, most AI attempts are unsuccessful (Browder, et al., 2022). Why does this happen, and how can companies leverage AI to their advantage? Companies must effectively integrate and scale AI into their operations to fully capitalise on the opportunities offered by these technologies. This requires the practical implementation and development of AI. To implement AI technologies effectively, companies must increase operational efficiency or develop new value-creation capabilities based on AI. Remaining competitive will be challenging for many companies if they do not embrace and adapt to AI technologies.

A thorough examination of the strategies that companies can use to implement and scale AI is essential, as most firms still struggle with this aspect of managing their business and the need to adopt AI technology to remain competitive in the long term. On the other hand, limited research has been conducted on the application and scaling of AI in business (Makarius, et al., 2020). Companies lack clear guidance in managing these procedures. In particular, businesses need frameworks to facilitate AI adoption and scaling (Kanioura & Lucini, 2020).

Artificial intelligence is becoming increasingly important for business. McCarthy (2007) described AI as "the science and engineering of making intelligent machines, especially intelligent computer programs" (McCarthy, 2007). In particular, approaches "concerned with the question of how to build computer programs that improve automatically with experience" (Mitchell, 1997), such as machine learning, neural networks, and deep learning – which are relatively new – are driving significant changes for businesses (Lakshmi & Bahli, 2020).

One of the biggest change drivers that businesses face today is the shift towards large-scale AI application across virtually all functions and business areas (Acemoglu & Restrepo, 2020). Nearly every aspect of a company's operations, including decision-making, production, marketing, supply chain management, logistics, recruitment, and more, is expected to be affected by these changes (Holmstrom, 2022). The potential and necessity for adopting AI technologies are, for the most part, evident to companies. However, AI implementation is more difficult than many might think, similar to previous stages when new technologies were adopted in business. A significant number of enterprises encounter substantial challenges in adopting AI (Zolas, et al., 2020).

To ensure that AI systems can independently contribute to a firm's value creation, businesses must efficiently structure themselves to manage and maintain these systems and their contributions to business operations. Furthermore, AI myopia (Balasubramanian, et al., 2022) and the inability to recognise interdependence within the company (Raisch & Krakowshki, 2021) suggest that organisations are likely to encounter numerous issues in using AI to enhance value creation and efficiency (Kemp, 2023).

Artificial intelligence is frequently mentioned as a component of digital technologies in general. Compared with other waves of technological progress, the current wave of change is very different. According to Hanelt et al. (2021), modern technologies, such as IT, are distinct from earlier technologies. Digital technologies reshape firm boundaries and cause a more fundamental

shift even in organisations' business models. The academic literature provides little insight into analysing the unique process of change related to artificial intelligence. Since AI drives a fundamentally new breakthrough for businesses in "offloading cognitive work from humans to computers," such analysis is necessary and should be conducted independently from other digital technologies such as cloud computing (Peretz-Andersson & Torkar, 2022). Therefore, this study examines how businesses change as they first become AI-ready and then advance to scale the use of technology. Well-known AI users such as Google and Uber structure their entire business around their AI systems (Johnson, et al., 2022). By integrating previous research on technology adoption with this practical understanding of AI enterprise operations, we aim to examine the organisational and technological adjustments required for businesses to successfully initiate and execute the AI revolution.

Businesses and organisations can greatly benefit from applying artificial intelligence, which fundamentally changes how these entities operate. Automating mundane and repetitive tasks through AI can increase operational efficiency, allowing employees to focus on more complex and valuable work, thereby freeing human resources and improving organisational performance and productivity. AI can also help reduce costs by eliminating human errors and optimising resources, such as reducing energy consumption or improving inventory management (Brynjolfsson & McAfee, 2014).

AI has the potential to deliver major competitive benefits beyond enhanced operational efficiency. Organisations can make faster, better-informed decisions, adapt more effectively to market changes, and anticipate customer needs through data evaluation and insights generation. AI's potential to personalise the consumer experience can lead to higher levels of loyalty and customer satisfaction. Thus, integrating artificial intelligence into business can improve internal processes and lead to new business ventures and enhanced market positioning (Davenport & Ronanki, 2018).

3. Research methodology

The sample used in this research consisted predominantly of members of Generation Z, who had previously interacted with virtual assistants or were likely to use such technologies. According to the research results, 96.9% of respondents were aged between 18 and 25, 2.9% were between 25 and 40, and only 0.2% were over 40 years old.

In this study, a questionnaire was distributed via email and social media using a link generated by Google Forms, which facilitated its creation and distribution. Respondents, mostly students from the University of Bucharest across various specialisations, had the freedom to choose the optimal moment to answer the 15 proposed questions. A few participants from outside the university, namely friends and acquaintances, also took part.

Participants were required to be at least 18 years old to complete the questionnaire and to agree to the Informed Consent Form. Throughout the questionnaire, students received clear instructions to avoid any ambiguities regarding specialised terminology. All questions were mandatory, and each item allowed only a single response to prevent issues related to data validation.

Data Collection

The survey was conducted over three months, from October to December 2023, and recorded 521 valid responses. Among these, 63% were female, and 96.9% came from urban areas, reflecting the primary target group of the research – young people interested in artificial intelligence and virtual assistants.

The number of responses collected was sufficient according to the factor analysis used. To be valid, this statistical method requires a sample at least five times larger than the number of variables analysed, plus ten additional participants (Sreejesh, et al., 2014). The questionnaire included 45 ordinal variables, meaning the minimum required participants would have been 235. With 521 valid responses, the research sample was adequate to ensure statistical relevance.

The results show that Generation Z participants possess advanced digital and AI-related skills. From a gender perspective, no significant changes were found in the use of digital platforms, although some differences were observed in relation to traditional gender roles (Schor, et al., 2016). Young people, especially students, represent the most significant segment of digital platform users due to their higher levels of training and education (Smith, 2016).

Data Analysis

After performing the Cronbach's Alpha test, factor analysis was used to group the factors that influence customers' perception of AI virtual assistants. This analysis was essential for handling the large number of variables, providing results that were easy to interpret and visualise graphically. The variable groups relevant to the use and implementation of virtual assistants are displayed in the resulting components.

Factor analysis explores three main aspects: identifying the factors that explain correlations among variables; identifying a new, smaller set of uncorrelated variables to replace the original set of correlated variables; and enabling the application of further statistical analyses. Reducing the number of variables accelerates data processing and reveals hidden patterns in the relationships between data (Sreejesh, et al., 2014). This methodology has been applied across various fields, including operations research, psychology, industrial management, as well as social sciences in general (Hair, 1995). The number of components selected in factor analysis depends on the amount of variance explained. For example, if a single component with six variables represents more than 80% of the variance, that component is retained in the analysis (Eden, et al., 2020). Exploratory Factor Analysis (EFA) is used to identify the number of factors influencing the variables and to analyse which variables "fit" together (DeCoster, 1998).

4. Results and discussions

The interpretation of the data obtained from the questionnaires applied to students on the topic of the perception regarding the implementation and use of AI virtual assistants in organisations was carried out using SPSS, with the support of factor analysis. The results indicate an excellent suitability of the sample for this analysis method, as highlighted by the KMO value of 0.942. This suggests that the correlation patterns among the variables are compact, and factor analysis is appropriate. A KMO value close to 1 indicates a high proportion of common variance among

variables, which makes the relationships between them strong enough to identify the underlying factors.

Bartlett's Test of Sphericity provides information on the correlations among variables. The approximate Chi-Square value of 12,234.109, the degrees of freedom of 990, and the significance level of 0.000 indicate that our variables are significantly correlated. The test rejects the null hypothesis that the correlation matrix of the variables is an identity matrix, which would have meant that the variables are orthogonal (independent) and that factor analysis would not be suitable.

The high KMO values and the significance of Bartlett's test indicate that our sample is suitable for factor analysis. The variables are significantly correlated, justifying the use of this method to identify latent factors within the dataset.

The interpretation of the communalities table is essential for understanding the extent to which individual variables contribute to the total variance explained by the factors extracted from factor analysis. The communality values for each variable indicate the proportion of the total variance explained by the extracted factors. In our dataset, all variables have a communality value higher than 0.5, demonstrating that the variance explained by each individual variable is high. The variables "User Experience" and "Associated Costs" have the highest values, 0.738 and 0.745 respectively, indicating that a considerable part of the general variance is explained by these two factors.

The total variance table shows the extraction of four important components from the total of 45 variables. The first component has an eigenvalue of 14.393, explaining 31.984% of the total variance. The second component has an eigenvalue of 3.132 and explains 6.96% of the variance, bringing the cumulative variance explained by the first two components to 38.945%. The third component explains 5.290% of the total variance, and the fourth component 3.978%. Therefore, the first four components explain 38.945% of the total variance, as presented in the table below.

Table 1: Total explained Varince

Nr.	Initial Eigenvalue			Extracted Sum of Squared Loadings			Rotated Sum of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	14.393	31.984	31.984	14.393	31.984	31.984	6.078
2	3.132	6.960	38.945	3.132	6.960	38.945	4.814
3	2.381	5.290	44.235	2.381	5.290	44.235	4.345
4	1.790	3.978	48.213	1.790	3.978	48.213	4.231

Source: Authors' own research.

The values in the "Extraction Sums of Squared Loadings" are identical to the initial values because the extraction method uses all components. After rotation, the eigenvalues are recalibrated to facilitate interpretation, without altering the total amount of variance explained. The first three components each explain more than 5% of the total variance, and the first four components

explain approximately 48.213% of the variance, representing the most significant factors in the context of the studied data.

The label "Efficiency and Operational Performance" underlines the importance of using virtual assistants to optimise business processes. This component, built on twelve distinct variables, focuses on improving efficiency, completing tasks rapidly, and reducing operational costs. The variables included measure overall efficiency, the speed of task implementation, and the impact of virtual assistants on operational costs, as well as their adaptability and accessibility.

The concept of support and facilitation in daily personal activities is the main focus of the second component, "Assistance and Facilitation in Daily Activities." This component includes seven variables assessing how virtual assistants facilitate day-to-day tasks and enhance user experience, such as efficiently managing household duties, providing relevant information, and offering the necessary support in various daily scenarios.

The third component, "Enhanced Experience and Security," based on six variables, focuses on improving the user experience and ensuring a high level of security and privacy. It reflects users' concerns and needs in their interaction with AI virtual assistants, covering aspects such as automation, accessible interfaces, personalisation, and the quality of the information provided, along with data security and confidentiality.

The last component, "Shopping Experience and Financial Management," consists of six different variables and relates to financial management elements, data security in the context of commercial transactions, and the shopping experience. This component represents customers' expectations and concerns regarding the purchasing process and the management of financial resources, highlighting how virtual assistants enhance both shopping experiences and the efficient management of personal finances.

The component "Shopping Experience and Financial Management" draws attention to the importance of virtual assistants in clients' financial and commercial interactions. By evaluating the ways in which these assistants improve the shopping experience and expense management, this research contributes to a comprehensive understanding of customers' perceptions of the role of virtual assistants in this context.

The factor analysis identified four main components that explain a significant proportion of the total variance. The first component, "Efficiency and Operational Performance," reflects the importance of using virtual assistants to optimise business processes. The second component, "Assistance and Facilitation in Daily Activities," highlights the role of virtual assistants in easing daily tasks and improving the user experience. The third component, "Enhanced Experience and Security," emphasises the need to provide a pleasant and secure interaction with virtual assistants. The final component, "Shopping Experience and Financial Management," focuses on the influence of virtual assistants on the shopping experience and the management of financial resources.

These results underline the importance of virtual assistants in various aspects of users' lives and contribute to a deeper understanding of how they can enhance both efficiency and user experience in different contexts.

The results obtained from the factor analysis allow us to evaluate the validity of the two

hypotheses proposed at the end of the Introduction section. Firstly, the sample adequacy for factor analysis, indicated by a KMO value of 0.942, suggests that the correlation patterns among the variables are compact and appropriate for this method. Bartlett's Test of Sphericity also confirmed the significant correlations among the variables, with a Chi-Square value of 12,234.109 and a significance of 0.000, supporting the relevance of factor analysis.

The first hypothesis states that the implementation of AI virtual assistants significantly improves the efficiency and operational performance of organisations. The main component identified, "Efficiency and Operational Performance," explains 31.984% of the total variance, with an eigenvalue of 14.393. This suggests that virtual assistants play a crucial role in enhancing efficiency and operational performance by enabling rapid task completion and reducing operational costs.

The variables included in this component were selected to measure overall efficiency, task implementation speed, and the impact of virtual assistants on operational costs. The results show that the variables "User Experience" and "Associated Costs" have communality values of 0.738 and 0.745, respectively, indicating that these variables contribute significantly to the resulting model and are relevant for interpreting the results. These data support the hypothesis that AI virtual assistants can improve efficiency and operational performance, thus validating the first hypothesis from an empirical research perspective. This finding is consistent with previous studies highlighting the importance of using AI to automate repetitive tasks and improve operational processes (Brynjolfsson & McAfee, 2014). Additionally, the literature underlines that technology adoption is influenced by perceived usefulness and ease of use, aspects that contribute to enhancing organisational efficiency and performance (Venkatesh, et al., 2018). Moreover, AI, through its ability to interpret and utilise data to achieve various goals and tasks, is redefining the way companies conduct business (Haenlein & Kaplan, 2019). Advances in computing power and machine learning allow companies to leverage AI to anticipate consumer behaviour and optimise internal processes (Huang & Rust, 2021).

The second hypothesis suggests that the use of AI virtual assistants increases user satisfaction by improving the experience and ensuring data security. The component "Enhanced Experience and Security" explains 6.96% of the total variance, with an eigenvalue of 3.132, indicating a significant influence on both user experience and data security.

The variables included in this component were selected to cover various aspects of user experience, such as automation, accessible interfaces, personalisation, and the quality of the information provided by virtual assistants. Additionally, the emphasis on data security and confidentiality addresses the growing concerns of users regarding the protection of personal information.

The results of the factor analysis show that the first four components, including "Enhanced Experience and Security," explain approximately 48.213% of the variance, suggesting that these factors are the most significant in the context of the studied data. This observation validates the hypothesis that the use of AI virtual assistants can improve user satisfaction by providing a pleasant and secure experience.

The literature emphasises the importance of virtual assistants in facilitating user interactions through natural language and providing precise, personalised responses (Zumstein &

Hundertmark, 2018). These findings are supported by the literature, which highlights the relevance of pleasant and secure interactions for users (Shawar & Atwell, 2017). Moreover, studies show that users appreciate the effectiveness of virtual assistants based on the speed and accuracy of their responses, which contributes to increased satisfaction and loyalty (Venkatesh, et al., 2018).

Both hypotheses are validated by the results of the factor analysis as well as by the literature. The implementation of AI virtual assistants significantly contributes to improving the efficiency and operational performance of organisations, confirming the first hypothesis. Similarly, the use of AI virtual assistants enhances user satisfaction by improving the experience and ensuring data security, thus supporting the second hypothesis. These conclusions highlight the importance of AI virtual assistants in various aspects of users' lives and emphasise the significant benefits these technologies can bring in the context of both organisational processes and user experience.

5. Conclusions

The implementation of AI requires a strategic approach with clearly defined steps for long-term success. The first stage consists of identifying and clearly defining the business objectives that AI can support. Companies must conduct an internal assessment to determine the processes and areas that would benefit the most from AI technology. For example, analysing the supply chain to identify optimisation opportunities or using AI to enhance customer experience through advanced personalisation.

The next step is organisational readiness, which includes ensuring that teams possess the necessary competencies and developing an organisational culture that supports AI adoption. This may involve training employees in new technologies and processes, as well as recruiting AI specialists to fill existing skills gaps. Business management plays an essential role in meeting these new requirements, ensuring the conditions for dynamic capacity development, effective learning, and innovation. It is crucial that organisational leadership actively supports AI adoption and encourages a culture of innovation and adaptability.

The effective integration of AI into business processes requires adequate technological infrastructure. Companies must invest in hardware and software compatible with AI technologies, as well as in data management solutions that enable the efficient collection, storage, and analysis of the data needed to train AI models. This step is critical to ensuring the efficient and scalable implementation of AI across the organisation.

Following initial implementation, companies must monitor and evaluate the performance of AI systems. This involves analysing outcomes and adjusting AI models to improve their accuracy and efficiency. Continuous feedback from users and clients is essential for the ongoing enhancement of the systems and for adapting them to the evolving needs of the business.

To maximise AI's benefits, companies must be willing to invest in ongoing research and development. AI technologies evolve rapidly, and companies that wish to remain competitive must stay informed about the latest advancements and be ready to adapt and integrate technological innovations into their operations. This commitment to continuous innovation can provide significant competitive advantages and ensure the long-term sustainability of the organisation.

In conclusion, artificial intelligence has the potential to fundamentally transform how companies operate. The efficient adoption and integration of AI can bring substantial benefits, ranging from increased operational efficiency and cost reduction to improved customer experience and competitive advantage. However, the success of AI implementation depends on a well-defined strategic approach, organisational readiness, and a continuous commitment to innovation and adaptation. Companies that wish to thrive in the digital era must be prepared to embrace these changes and invest in the development and scaling of AI technologies to secure their long-term success.

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The influence of organisational culture and effective communication on volunteer engagement in student NGOS

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Abstract: *This study explores the influence of organizational culture, effective communication, and personal and professional development opportunities on the engagement and satisfaction of volunteers within student NGOs. The quantitative analysis of 223 volunteer responses highlighted that most are aware of the organizational culture and consider risk preparedness vital. The importance of an efficient leader in coordinating activities was also emphasized. The results confirm the hypotheses that a well-defined organizational culture and development opportunities significantly contribute to volunteer retention and active involvement, supported by the literature. In conclusion, the study underscores the necessity of a positive organizational culture for the long-term success of student NGOs.*

Key words*:* Volunteering, student NGOs, organizational culture, effective communication.

JEL: L31, M14, D23, C83.

1. Introduction

In recent years, the labour market has undergone major changes, influencing Generation "Z" both positively and negatively. This generation is often considered the generation of technology and speed, frequently losing appreciation for traditional activities, such as reading books or enjoying nature, and showing a tendency to want everything to be done instantly, with a simple press of a button (Grzesiak, 2018).

The COVID-19 pandemic amplified these tendencies, affecting both the mental and physical health of many individuals, especially young people. In 2021, over 5.4 million people took a mental health screening, an increase of nearly 500% compared to 2019 (Mental Health, 2021). According to a study conducted by Mental Health America, approximately 73% of those who took the test were young people aged between 11 and 24, suggesting that the generation most affected by the pandemic was Generation "Z", deprived of an environment conducive to the development of social skills at a crucial age. Student associations offer an optimal context for the personal and social development of young people, providing volunteering opportunities that contribute to skill-building and social life. The deprivation of these experiences and the shift of activities to the online environment represented a significant barrier for young people who wished to assert themselves and discover their own aspirations. The labour market often demands professional experience even from young graduates, which generates anxiety among them. It is difficult to study a field and simultaneously acquire practical experience, requiring considerable effort in both directions. The student environment, particularly student NGOs, supports Generation "Z" through activities and projects that facilitate the acquisition of experience and the development of skills required in the labour market. The COVID-19 pandemic also disrupted the activities of student NGOs, resulting in a generation of young people facing difficulties in asserting themselves and clarifying their own aspirations. Nevertheless, student associations have continued to develop, offering projects and job opportunities in various fields for young people.

Volunteering involves responsibility and dedication, not only to avoid disappointing colleagues but also to create and help other people. Although the main purpose of volunteering is to help the community, the benefits are primarily felt by the volunteer, offering the opportunity to discover new perspectives, to appreciate what they have, and to motivate themselves to overcome their own limits.

The questionnaire used in this research was completed by student volunteers who are members of associations at the University of Bucharest, representing the exact target group required for this study. Thanks to ASUB, the questionnaire was easily distributed to a large number of students from all faculties of the University, ensuring adequate representation and the validity of the results. Thus, this paper aims to examine students' perceptions and attitudes towards volunteering and student NGOs, highlighting the benefits and challenges associated with these activities and providing insight into the impact they have on young people's personal and professional development.

2. Literature review

The specialised literature highlights the positive influence of volunteering on young people, emphasising that it contributes to shaping responsible adults with a developed civic spirit (Quezada, 2014). Daniel Hart and Michael J. Sulik (2014) state that volunteering provides a valuable perspective on prosocial life. Through volunteering, researchers can observe the various influences on prosocial behaviour, including emotions, personality traits, family, and social institutions (Wilson, 2000).

Student associations have existed almost as long as educational institutions themselves. They offer students opportunities for personal and professional development, helping them to improve their leadership skills and to find their own voice (Komives, Longerbeam, Owen, & Mainella, 2006). In 2015, it was reported that more than one in four first-year students was a member of a student association (Rios-Aguilar & Eagan, 2015).

In Romania, student associations continue to shape young people into responsible adults and to prepare them for an active professional life. At the University of Bucharest, there are 19 student associations, each representing the students of its respective faculty and offering opportunities in the corresponding field of study. The University of Bucharest Student Association (ASUB) is the umbrella association representing all the others and is a member of the National Student Union of Romania (USR), a national student federation (University of Bucharest, 2024; National Student Union of Romania, 2024).

The Influence of the Covid-19 Pandemic on Volunteering and Student NGOs

The Covid-19 pandemic, caused by the SarsCov 2 virus, generated significant global changes starting in 2020. Human society was forced to adapt rapidly to the new conditions imposed by the pandemic, without prior preparation. These conditions deeply influenced each individual's life, modifying professional, social, and educational activities (Rump & Eilers, 2020). The lack of adequate preparation led many people to encounter difficulties in managing emotions and maintaining an active social life.

An international study conducted by UNICEF and Gallup revealed that 1 in 5 young people, aged between 15 and 24, show low interest in activities and feel depressed (UNICEF & Gallup, 2021). The changes imposed on the education system, such as moving courses online and restricting face-to-face activities, had negative consequences on students, forcing them to give up their social lives and adapt to a period characterised by the lack of physical interactions. This situation led to increased levels of stress, anxiety, and depression, while irritability and difficulties in concentration rose significantly (Brooks et al., 2020).

The pandemic also created gaps in the labour market, severely affecting the economy. Moreover, whereas until recently organisations would update their strategies only when problems arose, this is no longer possible if companies wish to remain competitive (Minciu et al., 2022). Many people lost their jobs due to the necessity of digitising positions or shifting to remote work.

In this context, students and volunteers were also affected, with many being among those seeking employment. Students searched for various activities to occupy their time, but most did not contribute to their personal development, which amplified their sense of uselessness. Many

spent their time watching films and series on Netflix, and very few practised sports to clear their minds and keep their bodies active. Engaging in so few useful and recreational activities led to various worries about their own lives and future. The SARS-CoV-2 virus affected a range of industries, from mining to electronics, automobiles, transport, and logistics (Minciu et al., 2020). Student association activities were also affected, being moved online. Volunteers made additional efforts to remain calm and to continue their volunteer work, seeking ways to spend time together remotely, using online platforms to see each other and communicate in real time (Netflix Party, Zoom).

The Covid-19 pandemic had a profound influence on volunteering and student NGOs, affecting activities and volunteer morale. Adapting to the new conditions was difficult, but the efforts to maintain volunteering activities were remarkable, highlighting the resilience and dedication of the young people involved in these organisations. The pandemic accelerated digitalisation in many fields of activity (Matei & Veith, 2023). This forced digitalisation became essential for carrying out various activities and maintaining an active social life. It was necessary to identify new technologies for processing a large volume of data and to develop artificial intelligence to support activity in organisations and companies (Urbach & Ahlemann, 2019). Thus, the recent achievements in the field of information and communication technology (ICT) have been remarkable.

The pandemic forced the transfer of activities to the online environment, with education being among the first domains that had to adapt to these new conditions. Digitalisation became vital for the continuation of studies, with pupils and students being required to adapt to online courses (Stanciu, 2022). Moreover, digitalisation is a factor that contributes to the transition towards a circular economy. Student associations also had to adapt and find solutions to continue traditional projects in the online environment.

Human Resources in the Context of the Covid-19 Pandemic

Human resources became more difficult to coordinate, and maintaining volunteer interest and supporting activities relied heavily on effective management and the involvement of each association's board. In a time of crisis, managers had to set clear objectives to provide the team and volunteers with confidence, while simultaneously giving them a sense of stability and security (Mendy, Stewart, & VanAkin, 2020). The COVID-19 pandemic did not influence only the economic environment but also the lives of all citizens (Veith & Dogaru, 2020). Carrying out any type of activity within student associations relies on the creativity and willingness of volunteers to implement projects and contribute to the association's growth. Appropriate leadership is necessary, adapted to the needs of those directly involved (volunteers) and indirectly involved (students for whom the projects are implemented).

Due to the diversity of ideas and solutions based on the personal experiences of each individual, it is vital to have human resource management that brings together these ideas and leverages them to identify the optimal solution. Usually, HR management is handled by an authorised, experienced person who can capitalise on volunteers' ideas without discouraging them. Proponents of the interactional approach to competitive advantage perceive human resources as mediators between strategy and performance outcomes or as creators of relationships within the

network of student associations and in the business environment. They also see human resource management as a developer of HR skills and capabilities and as a performance enhancer. The smooth running of an association relies on the process of recruiting, integrating, and motivating volunteers, who represent the main source of action. Student volunteers want to identify with the actions undertaken and to align with the objectives of the organisation they belong to. It is important for them to participate in the organisation's development process and in decision-making, thus achieving personal fulfilment (Hermeier, 2019).

Personal fulfilment suggests that the self is not fully satisfied until the activity is completed. This provides a strong desire to carry out various types of activities and focuses on the deepest ambition (Gewirth, 1998). Achieving personal fulfilment leads to skill development, learning new abilities, and building a character of which the individual can be proud. All these aspects influence the overall state of the organisation and its activity; therefore, the method chosen for recruiting new volunteers and for growing and developing human resources is relevant.

Leadership and Management in the Context of Student NGOs

The beginning of the 20th century brought novelty to the field of leadership, introducing the notion of "management". This concept came with various challenges, including the difficulty of identifying a clear definition. Specialists argue that management includes actions, functions, and processes through which organisational objectives are achieved (Zlate, 2004). There are two schools of thought regarding the definition of management: the first argues that leadership and management are one and the same, while the second considers that these notions are completely different. The latter argues that a good leader is not necessarily a good manager, and vice versa (Algathani, 2014). The editors of the Encyclopaedia of Leadership state that there is no universally accepted definition of leadership (Goethals, Sorenson, & Burns, 2004). Leadership behaviour involves specific actions through which a leader directs and coordinates the activity of their group members (Fiedler, 1967).

Table 1: Comparison Between Leader and Manager – Characteristics

Authors	Leader Characteristics	Manager Characteristics
(Zaleznik, 1977)	Focus on people	Focus on structure and systems
	Takes risks	Minimizes risks
	Vision and strategies	Plans and budgets
	Long-term perspective	Short-term perspective
(Bennis, 1994)	Develops	Maintains
	(Bennis, 1994)	Focuses on control
	Why? What?	When? How?
	Innovates	Manages
(Certo, 1997)	Soul	Mind
	Visionary	Rational
	(Certo, 1997)	Analytical
	Courageous	Structured

(Kotter, 2006)	Shows emotions	Does not show emotions
	Involves employees in decision-making	Employees' choices are limited
	Strategy	Operational
(Northouse, 2007)	Motivating, inspiring	Checks and solves the problem
	Meets needs	Takes corrective action
	Seeks commitment	Provides jobs
(Lunenburg, 2022)	Acts decisively	Acts responsibly
	(Northouse, 2007)	Manages change
	Uses influence	Uses authority

Source: Algathani, D. (2014). Are leadership and management different? A review. Journal of Management Policies and Practices, 71-82

Managers are accustomed to carrying out their activity in an environment with a clearly defined organisational structure, ensuring the achievement of objectives and the control of performance. Leaders, on the other hand, are those who adapt to change by establishing and developing a clear vision, guiding the team towards its fulfilment (Bertocci, 2009). Leaders create an appropriate environment for the team, paying attention to its members and making them feel like an integral part of the group.

Managers, in contrast, are focused on individual performance and the evaluation of deviations from the initial plan, giving less attention to the team's needs and desires (Bertocci, 2009). It can be stated that the differences between leadership styles represent an advantage for both men and women, as they develop the leadership skills required today to be a good manager (Veith & Costea, 2019). Leaders are characterised by strong personality traits and human and conceptual skills. These qualities allow leaders to focus on the working style of each team member, offering them support and confidence. Managers, on the other hand, are technical individuals, focused on achieving objectives and results, without becoming emotionally involved (Zlate, 2004).

Future orientation is a characteristic of leaders, as they wish to implement their ideas quickly, which can sometimes lead to impulsiveness. Managers, however, prefer behavioural uniformity to ensure success (Zlate, 2004). Both managers and leaders must work to earn the trust of the team, be able to acknowledge their mistakes and learn from them, and make efforts for the organisation's success (Kumaran, 2012). In conclusion, within an organisation, optimal effectiveness is achieved when leadership and management are widely exercised by well-prepared individuals (Kumaran, 2012).

3. Research methodology

For this study to achieve the desired results, it was considered that the most suitable research method is the questionnaire. In the specialised literature, the questionnaire is defined as an investigative tool based on a series of written questions, which can be completed in different formats. Symbols or suggestive images can be used to create an environment that is easy to interpret by respondents, thus ensuring highly accurate results. It is important that the answers are expressed using common words in specific contexts to avoid difficulties in understanding and to facilitate the choice of the most appropriate response (Chelcea, 2007).

To create the questionnaire, "Google Forms" was used, being an easy and efficient option for respondents. The questionnaire consists of three parts: an introduction, along with the definition of the concepts underlying the questions; closed-ended questions; and demographic data through which respondents can be classified to create a clear picture of the target group participating in the study.

The questionnaire consisted of 14 questions, of which 11 were questions evaluating multiple factors and 3 questions required the evaluation of a single factor. To maintain respondents' interest, the questions were formulated to cover a wide range of topics relevant to the activity of student NGOs. Thus, the respondent had the opportunity to recall the activities in which they participated and to analyse the information they possessed about the NGO they are part of. The questions had a closed structure, facilitating the entire process and minimising response time. Open-ended questions were avoided because they would have increased the response time, forcing respondents to come up with their own answers, which could have led to abandoning the completion of the questionnaire. The study was conducted post-pandemic to realistically reflect the current context. The significance of this period is notable, as students had returned physically to campuses, in faculty hallways and in the offices of the associations. Recruitment was carried out face-to-face again, and the activities and projects of student associations returned to a physical format with a large number of participants. The questionnaire was distributed between November 2023 and January 2024, covering a period of recruitment for new members in NGOs. Thus, the questionnaire was completed by both students with experience in student volunteering and those without experience. This ensured a more varied, realistic, and solid range of responses. A total of 223 responses were collected, the questionnaire reaching a large number of student associations, most of which operate at the level of the faculties within the University of Bucharest. All 223 responses were valid and correctly analysed.

Of the 223 responses, 52.9% came from students aged between 18 and 21, indicating that they are in the first years of university and at the beginning of their student volunteering experience. Additionally, 21.1% of respondents were newly recruited, having only recently become members of an NGO. Approximately 78.9% of respondents had at least one year of experience in the associations and their projects. Regarding gender, 39% of respondents were male, while 60.1% were female. 0.9% did not identify with either gender or preferred not to answer the question. It can be concluded that women are predominant in student volunteering, suggesting a greater openness of women towards involvement in organisational and community activities. The collected data were analysed to obtain viable responses for the proposed hypotheses. The

method of analysis used was factor analysis. The analyses were performed using SPSS (Statistical Package for Social Sciences), created by IBM to facilitate statistical analyses.

Factor analysis was chosen due to the type of variables analysed, which are ordinal. A Likert scale from 1 to 5 was used to obtain ordinal variables. Some studies mention potential issues regarding the Likert scale and internal validity (Toutenburg & Heumann, 2008).

The empirical research had as a starting point my own activity within a student organisation at the University of Bucharest. Spending most of my student life in this environment, I wanted to highlight the activity of student NGOs and emphasise how they influence the lives of young people aged between 18 and 26.

Each student organisation has its own organisational culture, which allows identification and recognition externally. From representative colours and crests to the projects carried out, the environment of student volunteering offers diverse opportunities for personal and professional development. This study focuses on young people aged 18 to 26, the most socially active and engaged group. Once leaving home and entering the university environment, the desire for involvement and belonging to a group increases. Student volunteering provides the ideal environment for discovering and developing creativity and personal skills. The aim of this research was to determine what information volunteers possess about NGO activities and how favourable they perceive the student volunteering environment to be for learning and development. Based on these responses, specialised literature was selected and an analysis of the student volunteering environment was carried out. The quantitative empirical research used in this study responded to the following hypotheses through the use of statistical tools:

Hypothesis 1: Student NGOs that place a strong emphasis on effective communication and mutual support have higher levels of member engagement and satisfaction.

Hypothesis 2: A well-defined organisational structure and the personal and professional development opportunities offered by student NGOs significantly contribute to the retention and active involvement of volunteers.

4. Results and discussions

To verify the possibility of using factor analysis, the data processing began with the Kaiser-Meyer-Olkin (KMO) test. The KMO value obtained was 0.796. This indicates a good level of sampling adequacy for factor analysis. The KMO value ranges between 0 and 1, and a value above 0.6 is considered acceptable, with values closer to 1 being ideal. A value of 0.796 suggests that a sufficient percentage of variability among the variables was captured and that factor analysis is likely to be useful. Factor analysis shows that most variables have communalities above 0.5 after extraction, indicating good adequacy of the data for the factorial model. For example, for the variable "familiarity with organisational culture," approximately 69.1% of the variance is explained by the extracted factors. However, there are also some variables with lower values (e.g., "Reputation risks" with 0.485), which may be less representative for the extracted factors.

The Bartlett test checks the null hypothesis that the correlation matrix among variables is an identity matrix, meaning that the variables are unrelated and factor analysis is not suitable.

The Bartlett test has an approximate chi-square value of 3886.252, with a significance level (Sig.) of 0.000. This means that we can reject the null hypothesis and conclude that there are sufficient correlations among the variables to justify conducting factor analysis.

Based on these results, the data are adequate for factor analysis. Most variables have communalities above 0.5 after extraction, which indicates good data adequacy for the factorial model. For example, for the variable "familiarity with organisational culture," approximately 69.1% of the variance is explained by the extracted factors. Still, there are a few variables with lower values (e.g., "Reputation risks" with 0.485), which may be less representative for the extracted factors. This suggests that the majority of variables are suitable for factor analysis and are well represented by the extracted factors.

The "Communication and Support" component represents a significant proportion of the total variance (19.073%). This suggests the existence of a dominant factor or a dimension of organisational culture that is highly present in respondents' answers. This could be, for instance, the degree of involvement or the members' satisfaction with the NGO's mission. The "Structure and Organisation" and "Personal and Professional Development" components together explain almost 17% of the additional variance, representing other important dimensions such as internal communication and support for personal development, contributing significantly to the organisational culture of NGOs.

Applying Kaiser's criterion (retaining only factors with eigenvalues greater than 1), the first 19 components were considered, which explain 83.244% of the total variance. This suggests a complex organisational culture, with many sub-dimensions that could include leadership, organisational ethics, norms, and values shared among members. Applying a rotation (such as Varimax) helps clarify the factor structure. For example, Component 1 after rotation now explains 11.157% of the variance, suggesting that rotation has helped better differentiate the specific dimensions of organisational culture.

Subsequent factors, after Component 19, contribute very little to the total variance, indicating that the additional dimensions they might represent are far less relevant to the organisational culture model in student NGOs.

Component "Communication and Support": This appears related to communication and support within the organisation, with high factor loadings for the variables "easy communication," "supportive environment," "colleagues' opinion/work evaluation," "efficient leader," and "values feedback."

Component "Structure and Organisation": Shows high loadings for "organisation mode," "rules/norms," and "adopted behaviours."

Component "Personal and Professional Development": Includes elements related to personal and professional development, with high factor loadings for "opportunities for professional development," "opportunities for personal development," and "opportunities for development in the organisational environment."

Component "External Communication": Component 4 has a high factor loading for "communication with associations," suggesting a connection with external communication or inter-organisational relationships.

Component "Risk Evaluation and Management": Factor 5 appears associated with risk evaluation and management, indicated by the loadings for "prioritisation of occurrence probabilities," "prioritisation of project impact," and "combination of probability and impact."

Other Identified Dimensions:

• Internal Processes: Includes aspects related to internal processes, such as "implementation of internal process regulations," "increasing communication in internal processes," "increasing transparency in internal processes," and "simplification of internal process procedures."

• Demographics: Related to demographics, with the variables "Gender" and "Age" having high loadings.

• Experience in Student Associations: Suggests an aspect linked to individual experience in student NGOs.

The analysis highlights the different dimensions of organisational culture and risk management in student NGOs. Each factor represents a group of conceptually related variables, influencing how NGO members perceive and interact with organisational culture. For example, "Communication and Support" suggests that an open communication environment and mutual support are key components of organisational culture in these organisations. Similarly, "Risk Evaluation and Management" indicates the importance of risk evaluation processes in decision-making.

Communication and Support: This factor suggests that student NGOs place strong emphasis on effective communication and building a supportive environment. In such organisational cultures, members are likely encouraged to share ideas and feedback, and leaders are seen as efficient and value everyone's contributions. This environment can improve morale and member engagement, facilitating an open exchange of ideas, which can lead to innovations and continuous improvements.

Structure and Organisation: The high loadings of this factor for variables related to organisational structure and rules indicate the importance of a well-defined culture, with clear norms and rules. This can contribute to organisational efficiency, as members understand expectations and how they should behave, leading to better coordination of activities.

Personal and Professional Development: This factor underlines the value that student NGOs place on development opportunities for both individuals and the organisation as a whole. A culture that supports personal and professional growth can attract and retain talents, as members feel valued and see a clear path for their advancement.

External Communication: This factor seems to indicate the importance that student NGOs place on communication with other associations and external entities. An organisational culture that prioritises good external relations can be essential for partnerships, collaborations, and external support.

Risk Evaluation and Management: The loadings for risk prioritisation indicate a culture that focuses on prudent risk management. Such a culture can help NGOs navigate a complex and often uncertain environment, ensuring they are well-prepared for challenges and able to minimise the negative impact of risks on their projects.

Internal Processes: Aspects related to internal processes, such as implementing regulations and increasing transparency, suggest that NGOs value clarity and efficiency in their internal activities. An organisational culture that promotes the simplification of procedures can improve

agility and responsiveness to change.

Demographics: Factor loadings for "Gender" and "Age" may reflect demographic diversity within NGOs and how these characteristics can influence members' experiences and perspectives.

Experience in Student Associations: This factor shows the importance of prior experience in student associations and how it can affect organisational culture. Members with more experience can bring valuable knowledge and play an important role in mentoring and guiding new members.

Based on the component transformation matrix, we calculated the correlation between the resulting components. These correlations were as follows:

Communication and Support (Component 1) – Strongly associated with Structure and Organisation (Component 2) rotated (0.702), suggesting that in the organisational context, communication and support are closely linked to how structure and organisation are perceived or implemented.

Structure and Organisation (Component 2) – Shows a strong negative correlation with Component 2 rotated (-0.525). This indicates a possible change in perception or the importance of structure and organisation after rotation, meaning that these aspects may be reconsidered or redefined in the context of transformation.

Personal and Professional Development (Component 3) – Maintains a relatively good alignment with Component 3 rotated (0.501), suggesting that personal and professional development remains a stable and consistent component in organisational culture, even after the restructuring of the factors.

External Communication (Component 4) – Retains a very strong correlation with Component 4 rotated (0.864), indicating that external communication is a fundamental aspect that does not change substantially with rotation and remains a core element of student NGO activities.

Risk Evaluation and Management (Component 5) – Has a strong negative correlation with External Communication (Component 4) rotated (-0.584), which may suggest that risk evaluation and management are perceived in contrast to external communication or that these two domains require different approaches within the organisation.

Internal Processes (Component 6) – Shows a moderate negative correlation with Component 6 rotated (-0.332), possibly indicating that internal processes change or are re-evaluated within the factor reorganisation.

Components 7 to 11 – Show lower correlations with the rotated factors, indicating that these factors may have a smaller impact or are less well-defined after rotation.

Demographics (Component 9) and Experience in Student Associations (Component 10) – Are not present in the matrix provided, suggesting that these factors were not considered significant or were not rotated in this specific matrix. It may be necessary to examine another matrix or additional data to understand how these factors are affected by rotation.

This analysis highlights the various dimensions of organisational culture and risk management in student NGOs. Each factor represents a group of conceptually related variables that can influence how NGO members perceive and interact with the organisational culture. For example, "Communication and Support" may suggest that an open communication environment and mutual support are key components of organisational culture in these organisations. Similarly,

"Risk Evaluation and Management" may indicate the importance of risk evaluation processes in decision-making.

Hypothesis 1: Student NGOs that place a strong emphasis on effective communication and mutual support have higher levels of member engagement and satisfaction.

The literature highlights the essential role of communication and support in developing prosocial behaviour and engagement among young people. Daniel Hart and Michael J. Sulik state that volunteering provides a valuable perspective on prosocial life, allowing observation of various influences on behaviour, including emotions and social interactions (Hart & Sulik, 2014). In the context of student NGOs, effective communication and mutual support are fundamental for building a positive organisational culture.

The empirical results of this study confirm the hypothesis, showing that "Communication and Support" explains a significant proportion of the total variance (19.073%). This demonstrates that NGOs that prioritise open communication and mutual support have more engaged and satisfied members. The variables "easy communication," "supportive environment," "colleagues' opinion/work evaluation," "efficient leader," and "values feedback" had high factor loadings, indicating that these factors are essential for member engagement and satisfaction. The factor analysis results support this hypothesis. The "Communication and Support" component explained a significant proportion of the total variance (19.073%), indicating that this factor plays a crucial role in the organisational culture of student NGOs. The KMO value of 0.796 and the Bartlett test results (approximate chi-square 3886.252, Sig. 0.000) suggest that the data are adequate for factor analysis and that the variables related to communication and support are well represented in the factorial model.

Specifically, variables such as "easy communication," "supportive environment," "colleagues' opinion/work evaluation," "efficient leader," and "values feedback" had high factor loadings within this component. This suggests that members of NGOs who perceive an environment of open communication and mutual support have a more positive organisational experience. This environment facilitates the exchange of ideas, innovations, and continuous improvements, which can contribute to a high level of engagement and satisfaction.

Moreover, the rotated analysis showed that "Communication and Support" is strongly associated with "Structure and Organisation" (0.702), suggesting that effective communication is closely linked to how structure and organisation are perceived or implemented. This confirms the hypothesis that NGOs with strong internal communication and mutual support have more engaged and satisfied members.

Hypothesis 2: A well-defined organisational structure and the personal and professional development opportunities offered by student NGOs significantly contribute to volunteer retention and active involvement.

Previous studies highlight the importance of well-defined organisational structures and development opportunities for volunteer retention and engagement. Burke (2005) argues that modern organisations must respond to challenges such as increasing productivity, expanding into the global market, and developing a skilled and flexible workforce, all facilitated by a clear organisational structure and development opportunities.

The results of this study confirm the hypothesis, showing that "Structure and Organisation" and "Personal and Professional Development" together explain almost 17% of the additional variance. Variables such as "organisation mode," "rules/norms," and "adopted behaviours" indicate

that a well-defined organisational structure contributes to efficiency and activity coordination, thereby facilitating volunteer retention.

Personal and professional development opportunities, highlighted by the variables "opportunities for professional development," "opportunities for personal development," and "opportunities for development in the organisational environment," are essential for attracting and retaining talent. Additionally, Komives, Longerbeam, Owen, and Mainella (2006) emphasise that student associations provide personal and professional development opportunities, helping students enhance their leadership skills. This is confirmed by the results of this study, which show that personal and professional development remains a stable and consistent component of organisational culture, contributing significantly to active volunteer involvement. The results obtained from the empirical research also support this hypothesis. The "Structure and Organisation" and "Personal and Professional Development" factors together explain almost 17% of the additional variance. Variables such as "organisation mode," "rules/norms," and "adopted behaviours" had high loadings for the "Structure and Organisation" component, indicating the importance of a well-defined structure for organisational efficiency. Regarding "Personal and Professional Development," the variables "opportunities for professional development," "opportunities for personal development," and "opportunities for development in the organisational environment" showed high factor loadings. This suggests that NGOs offering clear development opportunities attract and retain talent more easily, as members see a clear path for advancement and feel valued. Moreover, the rotated analysis revealed that "Personal and Professional Development" maintains a relatively good alignment with the corresponding rotated factor (0.501), indicating that this aspect remains stable and consistent in organisational culture, even after the restructuring of factors. This confirms that NGOs investing in their members' personal and professional development achieve better retention and active volunteer involvement.

The discussion of the two hypotheses formulated in this study confirms the importance of effective communication, mutual support, a well-defined organisational structure, and personal and professional development opportunities in student NGOs. These results emphasise the importance of fostering a positive organisational culture that promotes open communication, mutual support, and continuous development to ensure the long-term success of student NGOs.

5. Conclusions

Starting from the main objective of the study, the quantitative analysis allowed for the creation of an overview of the environment of student NGOs by examining the responses of 223 volunteer members of at least one student association. The questions were structured as percentages and analysed according to the answers provided and the context in which they were collected.

The specialised literature formed the basis of this description, helping to create a clear picture of what volunteering means, the risks associated with this field, and its influence on those who choose to be part of these groups. The COVID-19 pandemic had a significant impact on students and volunteers, and this paper demonstrated how it affected the young generation and their lifestyle.

Being a member of a student association provided the opportunity to carry out the analysis from a realistic perspective, with concrete knowledge of how the activities are conducted. The questions were formulated to cover as many aspects of a student association as possible, to distinguish the organisational culture from the projects and activities specific to other NGOs.

The questionnaire highlighted the importance of an organisational culture, identified the risks faced by student associations, and underlined the need for a well-prepared leader with values compatible with those of the NGO. According to the information presented earlier, most volunteers are aware of the risks and consider preparation for them vital. In addition, volunteers are familiar with the organisational culture of the association they belong to, even if they have been involved in volunteering for only a short time, and they acknowledge the importance of a competent leader for the efficient implementation of projects.

This study highlighted the importance of effective communication, mutual support, a well-defined organisational structure, and opportunities for personal and professional development within student NGOs. These elements are essential for the engagement, satisfaction, retention, and active involvement of volunteers. The results of this study underline the importance of cultivating a positive organisational culture in student NGOs, one that promotes open communication, mutual support, and continuous development, to ensure the long-term success of these organisations. Implementing these practices can significantly contribute to increasing young people's involvement in volunteering activities and to their personal and professional development.

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Robotics and AI „The next boom in productivity"

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Abstract: *The integration of robotics and artificial intelligence (AI) is rapidly transforming industries across the globe, heralding a new era of productivity and efficiency. This study investigates the profound influence of these technologies on various sectors, including airport management, manufacturing, healthcare, logistics, and the shifting landscape of global manufacturing hubs. The purpose of this research is to highlight how robotics and AI are not only enhancing operational capabilities but also reshaping business strategies and economic models.*

Robotics and AI technologies are becoming essential tools for improving efficiency, reducing costs, and driving innovation. In airport management, for instance, these technologies streamline operations, enhance security, and improve passenger experiences, leading to significant cost savings and increased traffic. In manufacturing, the combination of human expertise and machine precision boosts productivity and lowers labour costs, while in healthcare, AI and robotics improve patient care and clinical outcomes.

The importance of this study lies in its exploration of the strategic benefits and investment potential of robotics and AI. As these technologies continue to evolve, they offer unprecedented opportunities for busi-

nesses to achieve competitive advantage, enhance service delivery, and meet the growing demands of the global market. By understanding the transformative potential of robotics and AI, investors and business leaders can make informed decisions that will drive future growth and productivity across various sectors.

Key words: Robotics, Artificial Intelligence (AI), investments, productivity, automation, implementation.

JEL: O33, L86, L23, O32

1. Introduction

The rapid advancement of robotics and artificial intelligence (AI) is revolutionising multiple industries, marking a significant shift in how businesses operate and innovate. This study examines the transformative effects of these technologies across various sectors, including airport management, manufacturing, healthcare, logistics, and global manufacturing hubs. Although many companies were not used to operating in the virtual space, they had to adapt and choose from the multitude of solutions available on the market (Veith & Dogaru, 2020) in order to remain competitive. The integration of robotics and AI not only enhances operational efficiency and security but also drives substantial cost reductions and productivity gains.

As global competition intensifies, the need for innovation and efficiency in operations has never been more critical. Employee motivation is key to achieving organizational goals, encompassing both external and internal factors that drive employees to excel in their work. Digitization can solve some of the problems related to the workforce, both by simplifying work and by replacing humans with robots, leading to an efficient and sustainable increase in labor productivity (Veith, 2018). Robotics and AI have emerged as pivotal tools in this quest, offering unprecedented capabilities in automation, data analysis, and machine learning. Recent studies highlight significant improvements in various sectors due to these technologies, such as streamlined passenger processing in airports, enhanced productivity in manufacturing through collaborative robots, and improved clinical outcomes in healthcare with AI-driven diagnostics and robotic surgery.

The changes brought about by technological innovations have created significant pressure on companies, which are feeling the full impact of the fourth industrial revolution. The logistics sector exemplifies the profound influence of AI and robotics on supply chain management, while geopolitical shifts prompt a reevaluation of global manufacturing hubs, with new destinations leveraging these technologies to maintain competitive advantage. New technologies, to which new ones are constantly being added, require the creation of clear and well-documented methodologies and structures (Voica, et al., 2021).

The objectives of this research are to explore current knowledge on robotics and AI integration, examine recent advancements, and assess their strategic benefits. By providing a comprehensive analysis, this study aims to inform business leaders, policymakers, and investors about the potential of robotics and AI to drive future productivity and economic success. Understanding these dynamics is crucial for making informed decisions that will shape the future landscape of various industries.

2. Literature review

Robotics has its roots in the early industrial era, when basic automation devices were created to carry out repetitive and ordinary activities. For the next few decades, control engineering and computers continued developing, furthermore, the possibility to create complex robots results in the opportunity to carry out various jobs.

George Devol and Joseph Engelberger unveiled the first industrial robot in 1956, which was a huge turning point in the history of robotics.

Robots became a common tool in the manufacturing sector by the 1970s, especially in the manufacturing of automobiles (Elliott & Soifer, 2022).

The subsequent decades saw the creation of more compact and adaptable robots that could be employed in a variety of industries thanks to developments in electronic and software engineering as well as shrinking.

Modern robotics is developing quickly thanks to the combination of machine learning (ML) and artificial intelligence (AI), which allows robots to interact with their surroundings on their own and carry out increasingly complicated tasks (Borboni, et al., 2023).

The most well-known sectors using robotics extensively are manufacturing, healthcare, logistics and transportation.

Robots are employed in a variety of production processes because of their accuracy, consistency, and speed, including the welding process, assembling, and wrapping. Another industry where robots can be extremely helpful to medical personnel in diagnosing, operating, and fast recovery of patients from injuries is healthcare (Elliott & Soifer, 2022).

Robots can also be employed in distribution centres and automated warehouses in the transportation and logistics sector to process orders more quickly and accurately (LAC, 2024).

The topic of intelligent robots is on the rise and has the potential to completely transform a number of sectors by improving consumer experiences, production, and efficiency. It is the process of integrating artificial intelligence (AI), machine learning (ML) and sophisticated sensing technologies into robotic systems to allow them to sense and interact with their surroundings on their own, learn from mistakes, and adjust to changing circumstances (Mohamed, 2023).

Making robots capable of intricate interactions with humans and other automated systems is the aim of smart robotics (Chiacchio, et al., 2018).

It is anticipated that as related industries like artificial intelligence and sensing technologies progress, robotics will play a bigger role in opening up fresh opportunities for innovation. Simultaneously, issues pertaining to data privacy, economic dislocation, ethical considerations, and environmental concerns need to be addressed.

3. Research methodology

This study uses various methods to examine the influence of Robotics and AI on productivity across various industries. The research methodology integrates both primary and secondary data collection and analysis methods to provide a good understanding of the technologies' effects and implications.

Additionally, the paper includes a critical review of the challenges and barriers to adoption, providing a balanced perspective on the potential and limitations of these technologies.

1. Data Collection

a. Literature Review: A thorough review of existing literature was conducted to gather secondary data on the implementation and influence of Robotics and AI in different sectors. Sources included academic journals, industry reports, white papers, and case studies.

b. Case Studies: Detailed case studies were developed for specific industries, including airport management, manufacturing, healthcare, and logistics. These case studies were based on publicly available data and company reports.

c. Statistical Data Analysis: Quantitative data was collected from industry reports and databases to measure the influence of Robotics and AI on productivity, cost savings, and operational efficiency.

2. Data Analysis

Quantitative Analysis: Descriptive and inferential statistics were used to analyze the quantitative data. Measures such as mean and median were employed to assess the relationship between the implementation of Robotics and AI and productivity metrics.

3. Integration of Findings

The findings from both qualitative and quantitative analyses were integrated to provide a comprehensive view of the influence of Robotics and AI on productivity. Triangulation was used to validate the results by comparing and cross-verifying data from different sources and methods.

4. Limitations

The study acknowledges several limitations, including the reliance on secondary data for some case studies. Additionally, the rapid evolution of Robotics and AI technologies may result in findings that quickly become outdated.

5. Future Research Directions

The methodology outlines areas for future research, including longitudinal studies to track the long-term effect of Robotics and AI, and cross-industry comparisons to identify best practices and lessons learned from different sectors.

4. Results and discussions

The integration of robotics and AI technologies in Turkish airports has reshaped operations, enhancing efficiency and security.

Enhanced efficiency in the Turkish airports is definitely boosted due to adding Self-service kiosks that reduce check-in and baggage drop times by 50%, saving passengers an average of 10 minutes per process. This efficiency leads to a 30% reduction in operational costs, totaling $2 million annually.

When it comes to improving security, automated passport control gates cut immigration wait times by 60% and boast a biometric identification accuracy rate exceeding 99.5%, fortifying security measures significantly.

Robotics adoption reduces labour costs by 25%, equating to $1.5 million annually, while boosting operational productivity by 20%, generating an extra $3 million in revenue per year,

which can definitely be seen as cost savings (HIDOT, 2016).

As we delve into the competitive advantage, Turkish airports witness a 15% increase in passenger traffic, equivalent to 2 million additional passengers annually, and a 10% rise in airline partnerships due to improved efficiency and security.

In the process of regulatory compliance, proactive measures ensure a 95% adherence rate to data privacy, security, and passenger rights regulations, fostering trust among passengers and authorities.

The strategic integration of robotics and AI in Turkish airports provides tangible benefits, from cost savings to increased passenger traffic. As airports continue to innovate, they set new standards for efficiency, security, and passenger experience, solidifying their position as leaders in the global aviation industry.

Table 1: Title Impact of Self-Service Kiosks and Automated Passport Control Gates

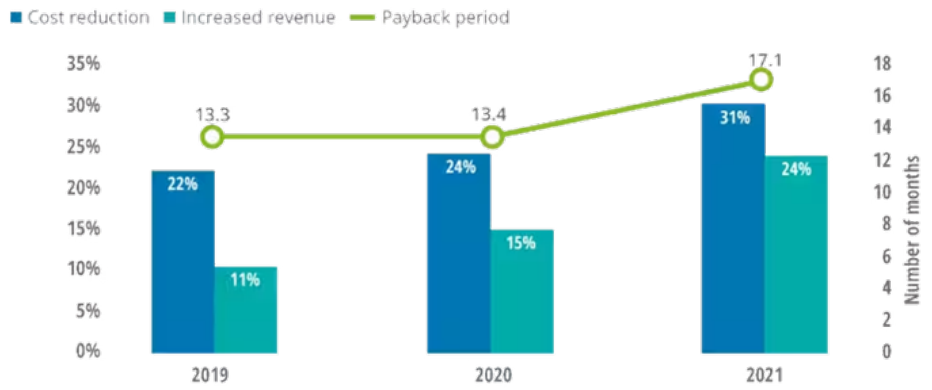
Metric	Before Implementation	After Implementation	Improvement (%)
Check-In Time (minutes)	20	10	50%
Baggage Drop Time (minutes)	10	5	50%
Immigration Wait Time (minutes)	15	6	60%
Operational Costs (annual)	$6 million	$4 million	33%
Passenger Traffic Increase	-	2 million	15%

Source: Authors' own research.

The integration of Artificial Intelligence and Robotics has revolutionised manufacturing, extending its influence across industries. This collaborative intelligence between humans and machines drives productivity, efficiency, and innovation, making investing in robotics and AI imperative for the future of manufacturing.

AI and robotics automate tasks with precision and adaptability, enhancing efficiency and reducing operational costs by up to 30%. According to a study by Deloitte, companies implementing robotics see a 30-50% increase in productivity and a 15-30% reduction in labour costs. This is the era 5.0 of the manufacturing revolution indeed.

Figure 1: Results of AI and robotics enhancing efficiency



Source: Deloitte Analysis

Furthermore, integrating AI-driven robotics with human expertise (collaborative intelligence) fosters flexibility and responsiveness in meeting customer demands while maintaining quality standards. A report by McKinsey & Company highlights that collaborative robots can increase productivity by 30% and provide a return on investment (ROI) within 6-24 months (McKinsey, 2023).

Regarding diverse applications, beyond manufacturing, collaborative intelligence drives innovation in healthcare, logistics, agriculture, and research. According to the International Federation of Robotics (IFR), the global market for service robots in these sectors is expected to reach $31 billion by 2023.

Despite the potential benefits, integrating robotics into food manufacturing poses challenges due to delicate handling requirements and adherence to hygiene standards. However, a report by PwC estimates that automation and robotics could save the food industry $65 billion annually by 2022 (PWC, 2018).

Nonetheless, while robotics offer enhanced efficiencies, they cannot replace human labour entirely, especially in developing regions. A study by Oxford Economics predicts that while automation will replace 20 million manufacturing jobs by 2030, it will also create 15 million new jobs, emphasising the need for a balanced approach (Oxford economics, 2019). To sum up, collaborative intelligence is a transformative shift in manufacturing, driving productivity, efficiency, and innovation. By harnessing the collective capabilities of humans and robots, this pattern promises to shape the future of work and production across industries, making investing in robotics and AI an efficient and strategic move for a better future in the manufacturing industry (Borboni, et al., 2023).

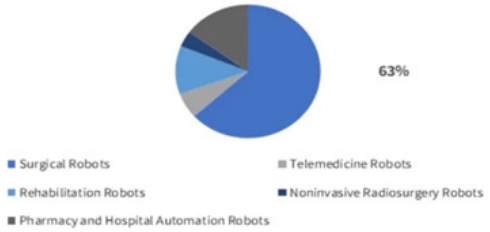
In healthcare, the integration of robotics and AI introduce a transformative opportunity to revolutionise patient care and clinical outcomes. Here's a concise overview of the relevant consequences and investment potential in this blooming field.

Robotics in healthcare extends over service, assistive, socially assistive, teleoperated, and interventional robots. Autonomous robots are expected to support clinical tasks, reducing

operational costs by up to 30%. Correspondingly, socially assistive robots (SARs) will enhance the human-robot interactions and are anticipated to autonomously engage in augmenting patient care and facilitating data collection. Advanced AI will enable robots to provide health education, reminders, and coaching, driving productivity by 15-30%.

Furthermore within 5-10 years, robots will extract valuable data from wearable sensors and adapt dynamically to changing environments. While surgical applications advance, acceptance barriers persist among healthcare staff and patients, emphasising the need for responsible implementation strategies. As remarked earlier, successful integration is the key to acceptance. This key requires a holistic approach, focusing on innovation, usability, acceptability, privacy, reliability, safety, training, cost management, and change management. Evidence-based research and stakeholder engagement are crucial, with an estimated market size of $2.8 billion by 2025.

Figure 2: Global Medical Robots Market Share by Product, 2022 (GMI, 2023)



Source: www.gminsights.com

Addressing usability concerns, ensuring privacy, reliability, and safety, and providing end-user training are paramount. Managing expectations regarding robot appearance and behaviour is key, with a projected ROI within 6-24 months for collaborative robots. Based on comprehensive research and expert insights, investing in robotics and AI in healthcare presents a compelling opportunity for organisations to enhance patient care, improve clinical outcomes, and drive innovation in the healthcare industry.

Robotics and AI integration in logistics, exemplified by Amazon, revolutionise supply chain management.

The role of robotics and AI is reflected by automation reducing costs by up to 40%, enhancing efficiency and competitiveness. As a result, automation boosts order processing speed by 30-40%. Furthermore, technological advancements like IoT, AI, and cloud computing drive digitization, with the global smart logistics market expected to reach $30.2 billion by 2025.

When it comes to decision making, machine learning reduces forecasting errors by up to 50%, optimising supply chain performance and elevating its progress. Prioritising multiple-criteria decision making (MCDM) in logistics boosts operational efficiency by 15-20%. (Mohamed, 2023)

Looking into the future of logistics, 4.0 initiatives drive innovation, with a projected compound annual growth rate (CAGR) of 11.7% for the logistics automation market (Radivojević &

Milosavljević, 2019).

As a result of the implementation of robotics and AI, evidence illustrates that employee engagement leads to a 25% productivity increase and a 10% turnover decrease.

Eventually, in Amazon's case, implementation of robotics in logistics showcases the transformative effect of automation. By deploying over 200,000 robots in its fulfilment centres, Amazon has increased operational efficiency, reduced order processing time by 20-40%, and lowered operational costs by 20%, according to a report by CNBC. This case study underscores the expandability and business influence of robotics in logistics, highlighting the potential for significant cost savings and productivity enhancements through strategic automation initiatives.

To conclude, robotics and AI drive innovation, efficiency, and competitiveness in logistics, offering significant cost savings and productivity enhancements, as demonstrated by Amazon's successful implementation. (Furman, 2018)

Table 2: Timeline: Evolution of Logistics Automation

Year	Key Advancement
2000	Introduction of basic automation
2010	Adoption of AI for inventory management
2020	Implementation of robotics in fulfilment centres
2025	Integration of IoT and AI for smart logistics

Source: Authors' own research.

For decades, China has been the primary global manufacturing hub, driven by low labour costs, government support, and infrastructure. Recent trends see companies reevaluating this reliance due to rising costs and geopolitical concerns.

Starting out with China's economic reforms in the late 70s that attracted companies with low costs and incentives, but challenges like quality control and political instability persist.

Nowadays major companies like Intel, Microsoft, Nike, and Dell consider relocating manufacturing to mitigate risks and enhance supply chain resilience.

Countries like Vietnam, India, and Mexico are emerging manufacturing destinations that offer lower costs and stability. With India's aggressive growth initiatives, it attracts significant investment, exemplified by Apple's manufacturing shift (FORBES, 2023).

Integration of robotics and AI become essential for efficiency and competitiveness in diversifying manufacturing locations. Consequently, robotics streamlines tasks like picking and packing, reduce costs and increase productivity, whilst AI-driven analytics optimize decision-making and supply chain agility.

Additionally, robotics and AI reduce reliance on single-source suppliers and mitigate risks associated with geopolitical tensions and disruptions that can become a reason for manufacturing migration.

The exiting of manufacturing from China signals a pivotal shift in global business strategies. As companies diversify production locations to boost resilience, robotics and AI integration

become crucial. By embracing advanced technologies and exploring new manufacturing destinations, businesses can navigate market complexities while ensuring growth and efficiency.

5. Conclusions

In conclusion, it's critical to recognize and welcome the significance that robotics and AI will have on a variety of sectors, including manufacturing, logistics, healthcare, airport administration, and global manufacturing hubs. These technologies promote innovation, lower prices, and increase efficiency. Important discoveries include increased factory productivity, improved airport management efficiency, and revolutionary possibilities in healthcare. Logistics is a prime example of how costs may be reduced, and as manufacturing hubs move, robotics and artificial intelligence become more important to stay competitive. Ultimately, the paper emphasizes how strategically significant these technologies will be in determining future economic success and productivity across all industries.

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Strategic Imperatives and Market Dynamics for the Auto Leader in the European Business Landscape. Study Case: Volkswagen Group

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Abstract: *This paper examines the Volkswagen Group's strategy actions in the European automotive sector amid regulatory changes, customer movements, and the aftermath of the "Dieselgate" incident. Using a combination of qualitative and quantitative approaches, it investigates Volkswagen's organizational structure, conducts a SWOT analysis, and develops a SMART goal targeted at restoring market trust and increasing environmental credibility. The suggested approach prioritizes electric car adoption, pollution reduction, and open communication. Stakeholder involvement is addressed using an Influence-Interest Matrix, which emphasizes cooperation. The report finishes with an implementation Gantt chart that underscores the necessity for agility and cooperation in Volkswagen's desire of European sustainable mobility leadership.*

Key words: Strategic positioning, Analysis, Business, Market.

JEL: L62, M14, Q55, M11.

1. Introduction

The European automotive industry is undergoing profound transformation driven by shifting consumer preferences, environmental regulations, and technological disruption. As one of the leading global car manufacturers, the Volkswagen Group is navigating a complex landscape marked by the transition toward electric mobility, the legacy of the Dieselgate scandal, and increasing regulatory and stakeholder pressure. This study explores the strategic response of Volkswagen in this dynamic context, focusing on its efforts to regain public trust, reinforce environmental responsibility, and secure a competitive position in the evolving European market.

By examining key internal and external factors that shape the company's trajectory—including organizational restructuring, innovation strategies, and stakeholder engagement—this paper provides insight into how major automotive players adapt to both challenges and opportunities. The analysis integrates perspectives on technological advancements such as artificial intelligence and robotics, positioning them as enablers of transformation across production and customer engagement processes. Against this backdrop, the case of Volkswagen serves as a relevant example for understanding how strategy, technology, and reputation management converge in the pursuit of sustainable leadership.

2. Literature review

The Volkswagen Group belongs to the field of automotive industry sector. Consequently, this industry consists of the organizations that specialize in designing, finishing, assembling, marketing and selling cars. Volkswagen is a necessary global car production industry specializing in developing lots and litters of auto from passenger cars, light commercial vehicles, and trucks. Volkswagen, as one of the most successful car brands which generates over €250 billions of turnover per annum, reinforces its leading position in the world automobile manufacturing business (Cosmin Gaultier, 2021).

Volkswagen, in the auto market, keeps time steady, as it manages to occupy a significant place and always finish at the upper brackets of the list of the largest car companies, based on global sales. It has a wide product collection which includes from small cars to high- end vehicles purposely to offer different consumers with an option to choose their preferred vehicle. Volkswagen being the mainstay of European automotive industry, it nourishes a significant part of the economic growth as well as innovation process in the regions. On the other hand, the business always upgrades its work processes in line with the structure of European law and environmental initiatives, so it follows the trend of environmental agenda in the region and customers' preferences (Cosmin Gaultier, 2021; Witter, 2017).

Over the recent years the EU started puting into practice steadily tightening emission regulations which will make positive impact to the air quality and above all help to diminish the greenhouse gases emissions. Such laws are calls of the day where they set yearly emission limits for new vehicles and have ushered car companies like Volkswagen to modify to cleaner technologies - electric and hybrid systems. Being unfamiliar with the stipulated specifications comes with the penalties of heavy fines and bad corporate reputation (Rik Oldenkamp, 2016).

The so-called "Dieselgate" scandal where Volkswagen secretly cheated on emissions tests by installing diesel vehicles with illegal defeat devices to fake emissions results has severely affected consumers' confidence of the brand and their trust towards regulators and stakeholders. The after-financial performances and the market-perception of the company are the hundreds of billion euros of the fines, legal settlements and recall costs which is as consequence of this scandal (Turna, 2022, Kopp, 2007).

As the European Environment Agency figures show, transport is one of the main sources of greenhouse gas emissions in the EU, contributing about 27% to the total set of emissions in 2019. The EU's demanding emission reduction targets require a quick shift towards the production of zero-emission vehicles, consequently forcing carmakers to speed up their transition to low-emission technology (Greenhouse gas emissions from transport in Europe, 2023).

After the Dieselgate scandal, Volkswagen's sales in Europe dropped as the company lost its market share in significant markets such as Germany and the UK. Volkswagen noticed that more and more customers became doubtful about its environmental claims, and this resulted in some of them to switch to competitors which were perceived as environmentally friendly.

3. Research methodology

The research methodolohy used on this paper is a combination of methods, aimed at comprehensively investigate the impact of Volkswagen Group's strategic initiatives within the European business environment. This approach combines qualitative and quantitative methods to gather rich and diverse data, ensuring a thorough analysis of the research objectives. The methodology was specifically structured to explore this extremely complex field.

Qaualitative data is collected through an assessment of pertinent literature, including academic journals, such as Rik Oldenkamp, Rosalie van Zelm, Mark A.J. Huijbregts (2016), Gaultier, Marcello (2021), industry reports and official publications from regulatory authorities such as the European Union. This literature study provides context and theoretical foundation for the research, assisting in identifying major topics and trends in the European automobile sector.

In the qantitative part of the study, the research is based on an analysis of data provided (Frank Witter, Chief Financial Officer at Volkswagen, Oct. 2017). It subsequently will be processed to use statistical analysis to get the trend among the variables, relation and patterns in connection with the release of the market, profiles of the and competitive positioning of the group.

Also, a comparison is to show both Volkswagen Group and its competitors' presence in the European automotive market in case of indication on the company's competition. This component calls for a comprehensive assessment of the financial performance, market and strategic schemes on the competitive context in the attempt to create a contrasting picture of Volkswagen's advantageous edge. Therefore, the purpose of this article is not limited to analyzing the specialized literature; it also presents certain key aspects from which valuable lessons can be learned (Veith & Dogaru, 2020).

Thus, the research paper completes the image of strategic management in a european space employing information of qualitative data and appropriate information. By doing this, strategy can be guided along with tactics that can be implemented further down the road.

4. Results and discussions

The organizational structure of Volkswagen Group is at the center of the operational framework, presenting an hierarchical picture of the organization and connections of influences, responsibility, and communication within the company. The success or failure of an initiative aimed at organizational change is determined by the effectiveness of the implementation of planned processes (Voica, et al., 2021). As a transnational automotive business, the organizational structure of the Volkswagen as represented by its versatility and theology as it supports different countries and business segments. Considering the context created by the fourth industrial revolution, the challenges faced by organizations are significant, involving all branches of the economy (Veith & Costea, 2019).

The Executive board of the enterprise with the highest level executives is on top of organizational structure, and it is responsible for the organization's strategic direction, financial performance, and all decision-making processes. The CEO occupies the position of the Executive Board Chair, and this manager has unlimited power to set the corporation's direction and balance the interests of stakeholders.

Below the Executive Board, Volkswagen abandons flat hierarchy by pursuing the divisional organizational structure. However, such organizational structure is based on business units or divisions and not on the product lines, geographic regions, or brands, different from that of the subsidiaries under them. This structure allows each segment to have wide autonomy, with each having its own division management, headed by a divisional CEO or president, overall in charge of the day-to-day operations and performance of their division. (Volkswagen, 2022)

These divisions next comprise or departments to which are dedicated to performing functions like research and development, production, marketing, sales and finance. Functional departments' heads are functional managers or directors, who perform the task of strategic initiatives implementation, and reach the objectives of department.

Besides that, the executive team of the company also makes use of matrix structure that puts together teams of colleagues from different areas of expertise in order to ensure smooth interpersonal communication and cohesion. In effect, the involvement of the right partners guarantees synergy and sharing of knowledge, which in turn makes innovation a natural product and the attainment of organizational goals easier and more efficient.

Additionally, the company puts a lot of emphasis on its multi-national management style, which has regional offices and subsidiaries in various countries all over the world. This way, different decisions can be processed in a framework of regional markets along with the localized market dynamics, cultural peculiarities and peculiarities of regulation. (Volkswagen, 2022)

SWOT Analysis Positioning

Strengths (Internal, Positive)

- Brand Reputation: Brand strength of the Volkswagen Group at the international level is based on the fact of customer loyalty, and trust which affects competitive advantage into a positive way. (VRIO)
- Global Production Network: The global production network is a unique resource of the

company that allows for efficient production and distribution which, in turn, help save money and enable quick response to the changing circumstances. (VRIO)

- R&D Capabilities: The Volkswagen Group's investment in research and development encourages innovation and can lead to the development of technologies such as zero-emissions vehicles and autonomous driving giving the company a significant competitive edge. This fact was also considered as an important factor in VRIO assessments.

Weaknesses (Internal, Negative):

- Dependency on Traditional Fuel Vehicles: While Volkswagen is eager for electric vehicles technology investment, the traditional fuel vehicles are still the main ones. This factor can be viewed as a serious hazard in the context of the rise in regulation and a shift in consumer preferences.
- Dieselgate Scandal Fallout: The reverberation from the Dieselgate scandal has seriously spoilt the image of Volkswagen and brought upon a considerable amount of financial penalties. The main problem of the rebuilding the trust and image repairing the company still occurs.
- Complex Organizational Structure: A difficult organizational structure of Volkswagen formed by many departments and brands may be a reason for the decrease in productivity and decision-making impartiality and to screen the management's view.

Opportunities (External, Positive):

- Growing Demand for Electric Vehicles: The public consciousness about the environmental issue as well as the government programs create the demand for electric cars.VW is positioning itself at the forefront of the electric vehicles trend by allocating huge investments into the development of EV technologies.
- Emerging Markets Growth: The generations-to-come marketers are certainly those critical points of a rise in the economy, the result of which the demand for automobiles would also upswing. The company's strategic foothold and positioning in these markets demonstrate its preeminent place in the chain of events.
- Advancements in Autonomous Driving: VW is able to create a new market niche because of the introduction and implementation of autonomous driving technology that is not only make the manufacturing process safer but also makes it easier to tune the process in relation to the change of consumer needs.

Threats (External, Negative):

- Intense Competition: In the automotive industry which is a highly competitive segment, many global and local players participate in the game devising ways how to take the leadership. High prices among competitors and rivalry between them, in particular, are threats of proving the company's leadership on the market.
- Regulatory Uncertainty: Stricter regional emission requirements and regulatory adjustments will urge to a holdback in some areas with stricter environmental regulations. To meet and sustain conformity will likely incur substantial expenses and the upgrade may also impact the level of profitability.
- Technological Disruptions: Digitization embracing multi-modal transport alongside shared mobility has caused automotive business models to be prone to being competitive and

disrupted. It is, therefore, vital that nothing is done to minimize stagnation which thrives in the volatile market conditions. As a result, the priority for Volkswagen lies in adaptation and innovation to be able to beat the competition.

The matrix exposes the strategy use of the organization to correlate the strength with the growth opportunities while the weakness is counteracted and unfavorable threats are removed by the proactive and active approach. This study, however, shows the need for strategic foresight and the leader's mind when it comes to the multi-sided nature of the automotive landscape.

Set a SMART Objective for Your Company's Problem

After the Dieselgate scandal, Volkswagen's main priority is to gain market trust and enhance its environmental credibility within the European Union by implementing a comprehensive sustainability strategy focused on electric vehicle (EV) adoption, emissions reduction, and transparent communication, resulting in a measurable increase of 15% in customer perception scores within five months.

In order to fulfill its smart objective that is to restore the market trust and increase it environment credibility, Volkswagen must deploy a multifaceted sustainability strategy that will have electric vehicles adoption, emissions reduction and transparent communication as its core. It implies the conduction of such an in-depth study that will include the review of existing sustainability strategies and an elaborate assessment of market EV adoption trends and their emission regulations in EU. The objectives must be straightforward and measurable such as increasing adopting the EVs and lowering the carbon emissions during the manufacturing process and improving the transparency in environmental report. Implementation requires huge investments both in improved EV technologies, decreasing emissions, and the use of open communication. It is crucial to have cooperative collaboration among key members of the society, such as the senior managers, a team of sustainability experts, and the marketing teams in the manner success of the process will be achieved. Through a systematic review of whether the KPIs established had the objective tha would restore public confidence and environmental credibility within the European Union. Hence integrity of communications is the vital matter that ensures whether sustainability goals are made known, progress is reported, and achievements are made public to the stakeholders. Through an integration of multifaceted communication platforms and an involvement of the main actors, there is a better diffusion of information and huge participation among stakeholders. The use of KPIs in the routine assessment tool empowers the company to pinpoint the areas where it succeeds or needs some improvement in order to get in line with the general objective of improving a customer's perception of the brand during the provided timeframe. This cooperative effort can therefore be used to repair blow by blow the market reputation of the brand and its credibility with regard to the environment in the European Union. (Belzowski, 2017)

Identification of Competitive Advantage:

One of the key competitive advantages of Volkswagen includes a mixed set of strengths, mainly characterized by a highly recognizable brand and its innovative R&D base, which can be combined with a wide manufacturing network spanning the globe. These attributes combined make up the foundation of most sustainable enterprises within current business environment. The brand of Volkswagen appears to take a top-notch position among its competitors,

with customers regarding the product as trustworthy and reliable. In the same vein, the giant volumes of R&D budgets stand for the company's strong will to innovate and harness its technological potential, consequently leading to the discovery of breakthroughs in sustainable mobility. Furthermore, Volkswagen's manufacturing system integrated within the world regions has a strategic advantage resulting from involving efficient production processes and connection with supplier market.

These strategical advantages of the carmaker company determine its strong position in the automotive industry (particularly at the European Union (EU) context). The consumer demands for trusted brands and environmentally conscious carrying mode match the core abilities of VW, so VW can take advantage of its strength in the market which are changing and popular with the younger generation. Beyond that, R&D facilities greatly empowers VW to be ahead of the competition as it works its way to the top by continuously striving to create greener technologies. The value of alternative resources, recognized by their rarity and organizational plan that creates unique distinctiveness of products and technological brand support gains supplementary competitive advantage of the company. (Rugraff)

At the EU level, Volkwagen stands to gain from the negotiating environment where sustainability and green principles are top priorities, which are in concordance with its strategic orientation. For Volkswagen, the EU single market offers to remove trade barriers, thus helping it to accomplish production and distribution with no technical hitches and to maximize its global organization of production. Therefore, EU funding programs offer funding channels for research and innovation, enhanced with VW's R&D capabilities, which ultimately secures its lawful position within the EU market. As a whole, those EU-specific features along with others give Volkswagen an added competitive edge therefore becoming the future guiding light of the increasingly dynamic market of automobiles

Influence- Interest Matrix

High Influence, High-Interest stakeholders: Regulators and shareholders come under the heading of that group. The corporation has to closely communicate with regulators to be able to meet compliance and transparency requirements, and the shareholders are not left out of the process with a focus on Environmental sustainability and good governance issues.

High Influence, Low Interest stakeholders: The competitors also have a significant influence but at the same time might lose interest in the projects. Engaging Industries or partners in collaborations is one of the ways that will influence decision-making in the direction of sustainability initiatives.

Low Influence, High Interest stakeholders: Local communities as well as environmental organizations want the company to reduce their environmental impacts but these parties often have little leverage and can influence only very small fraction of results. Embracing them in the community through community outreach and sustainability initiatives can equally help to get the word out of community support.

Low Influence, Low Interest stakeholders: These are examples of stakeholders including some of the suppliers or the associations from the industry whose need is limited to being informed on the progress made but they do not necessarily have to be greatly engaged.

Strategic Implications and Actions

In light of the Influence-Interest Matrix analysis, Volkswagen must adopt strategic actions to effectively manage stakeholder relationships in pursuit of the SMART objective. By developing strong collaborative relationships with stakeholders, particularly steering committees, who are the gatekeepers and are concerned about the problem, Volkswagen can ensure active involvement in problem-solving processes. Regular dialogues and soliciting feedback provide stakeholders with the opportunity to feel valued as partners in achieving the objective. Organizing cooperations with relevant entities, such as trade associations, environmental groups, and governmental institutions, boosts Volkswagen's reputation and capability to solve the issue. Mutual trust and cooperation involve partners networking, coordinating, and designing activities where both parties are involved.

Supervision of the process involves assessing stakeholders' perceptions and engagement through frequent measurement and evaluation. Stakeholder feedback review informs modifications in information dissemination strategies to maintain alignment of interests between stakeholders and appropriate company response. Utilizing digital outlets and analytic setups measures the effectiveness of communication efforts early on. Transparency in progress and outcomes ensures timely and substantive updates for participants and stakeholders, allowing them to participate actively.

Reflecting on the EU's Unique Business Environment, Volkswagen must navigate regulatory complexities to maximize EU-specific market advantages. The European Commission and European Parliament are influential authorities in creating policies and regulating procedures that target VW business and stakeholders. EU funding mechanisms, such as EU's Funds, Horizon Europe, and collaboration grants, serve as genial sources of financial injections for research, innovation, and sustainability projects. Strategic advocacy in the EU establishes Volkswagen as a credible corporate contact, fostering better changes in the European industry sector and enhancing its reputation. Through these efforts, Volkswagen can not only profit but also contribute to positive changes in the European business landscape.

Strategy Formulation and Justification

Following thorough analysis and identification of Volkswagen's competitive advantage in its strong brand reputation, extensive R&D capabilities, and global production network, the most appropriate strategy for addressing the identified problem and achieving the SMART goal is product development and differentiation.

This approach builds on Volkswagen's strengths in innovation and brand awareness while tackling shortcomings such as the Dieselgate crisis and increased regulatory scrutiny. Volkswagen can capitalize on possibilities in the European Union's single market by focusing on developing innovative and sustainable mobility solutions, as customer preferences for environmentally friendly vehicles expand.

The chosen strategy of product development and differentiation aligns with Volkswagen's core strengths and market opportunities. Through VW's emphasis on its well-known brand and using a secure R&D infrastructure, this company should offer futuristic inventions adapted to the vibrant market and come up with creative solutions to the problems faced by society. In connection with specialized services on European market Volkswagen, it is possible to go beyond

the crisis of Dieselgate, as well as many regulatory barriers with the help of the issued report. The competition is the result of the help that this company gets which makes it more competent. Besides the case of maximally using strengths that the brand has now, the new approach will also generate the to adapt modern and sustainable vehicle technologies inside the main manufacturing center.

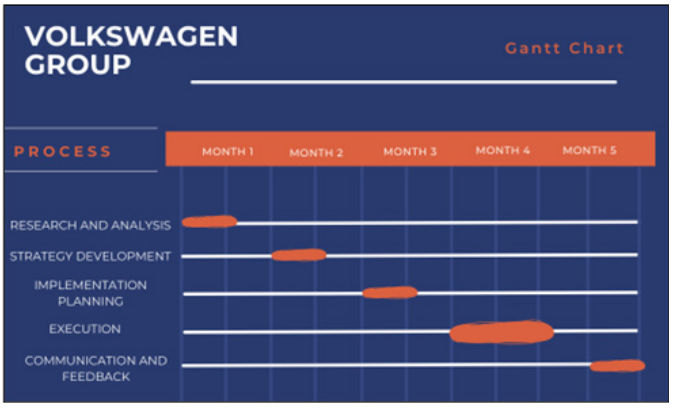
Moreover, the increase in product development and diversification of Volkswagen contributes to the creation of different choices of sustainable transportation for the European Union and the rapid growth of electric cars. The company will be able to develop innovation in the research for new technology which will be used in developing the products line. This will in turn able to meet the consumers' expectations and also the government's laws and regulations while the firm can still maintain a competitive edge over its competitors. Therefore, this strategic plan is not only right track for the organizations to achieve the SMART goal, but also sets Volkswagen as the market leader in the European automobile industry meaning to long term growth and sustainability.

Gantt Chart Creation

The Gantt chart is a project management tool that visually depicts the schedule of tasks and their durations within a project. Primarily, Gantt charts are applied for planning the project, scheduling, and monitoring of the activities' progress. They endeavour to set up a sequence of tasks, their durations and critical milestones as this pictorial presentation for the project managers and team members. If projects have dependencies or lag times, then the Gantt chart can be used to schedule project management and coordination, thus eliminating delays and reducing the need for resource reallocation.

The incorporation of a Gantt chart in the Volkswagen Group strategic activities repositions the theoretical bases of Project Management from a mere inactive theory to an active strategic development strategy. In the formulation of the Volkswagen Gantt chart is used to help the automaker group address matters such as post-Dieselgate issues while at the same time working to gain prominence as a leading environmentally friendly automobile provider in Europe. The chart is a practical development potential activity inception and follow-up towards realization of SMART objectives.

Figure 1: Gantt Chart of the Volkswagen Group



Source: Authors' own research.

Research and Analysis: This task entails undertaking extensive market research and analysis to better understand current customer opinions, regulatory needs, and industry trends. It is critical for informing the creation of a successful sustainability plan that is tailored to satisfy consumer expectations and regulatory requirements.

Strategy Development: During this phase, Volkswagen will develop a comprehensive sustainability strategy centered on electric car uptake, emissions reduction, and open communication. Volkswagen can successfully handle the issues brought by the Dieselgate affair while also enhancing its environmental reputation by developing a clear and focused approach

Implementation Planning: Volkswagen will disclose its plans for performing the sustainability strategy, including resource allocation, timetables, and responsibilities. This phase ensures that the plan is transformed into actionable steps, allowing for more efficient implementation.

Execution of Sustainability efforts: This task entails carrying out the planned sustainability efforts, such as manufacturing electric cars, lowering emissions, and improving communications channels. Volkswagen could restore customer trust and demonstrate its commitment to environmental responsibility by properly implementing these efforts.

Communication and feedback: Volkswagen will communicate openly with stakeholders to offer updates on sustainability activities and solicit input. This enables ongoing development and assures alignment with customer expectations, resulting in a demonstrable gain in customer perception scores.

5. Conclusions

To sum up, the research paper has highlighted Volkswagen Group's strategic plans within the dynamic European business environment with the emphasis on problems of sustainable transport and the possibility of entering the European market. The Environmental Assessment is among the major strategies that Volkswagen uses to mitigate such market barriers that are currently blocking the company's former growth and influence. Thereby, VW management chose to deal with issues that arose after that company was caught in the act of the scandalous Dieselgate. The project which has its SMART objectives set based on two things such as credibility of electric vehicles market and environmental sensitivity as the main players in the electric vehicle adoption, Co2 emission reduction and the above all transparent communication.

The Volkswagen Company upholds its brand reputation and relies on research and development abilities as well as global production to ensure a strategic approach through the products improvement process. This strategy abducts the possibility of EV market in the EU, since it is oriented to respond to tastes and preferences of the EU's consumer's who wish to drive vehicles which are less harmful to environment, while also handling regulatory issues. Volksvagen plans to stick to the principle of proactive buffering which would be followed by the continuous monitoring and application of strategic partnership actions that will ensure the development of a correctly applied sustainability strategy. The project regards the challenge for agility, flexibility, and working together to deal with complex issues for the Volkswagen Group, as a key to staying on top amongst the competitors in the sustainable mobility market leadership within the European region.

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Perceptions of Generation Z regarding the implementation of AI virtual assistants in organisations and personal environments determining factors in the adoption of electric vehicles: An analysis of consumer preferences and perceptions

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Abstract: *This paper examines the perceptions and attitudes of Generation Z towards the implementation of AI virtual assistants Currently, electric vehicles are becoming an increasingly prominent topic in public discussions, covering economic, technological, and environmental aspects. The electric vehicle market is in an intense stage of development, characterized by favorable political changes, significant technological advancements, improvements in charging infrastructure, and extensive concerns regarding environmental impact. To expand the adoption of electric vehicles, it is essential to analyze and understand consumer perception and attitude. This refers to the beliefs, thoughts, and opinions of individuals. The objective of this study is to identify and analyze the determinants of electric vehicle adoption by consumers, as well as to evaluate the influences these factors have on the automotive industry in the context of the transition to electric vehicles. The quantitative analysis was conducted through a survey addressed to individuals interested in electric vehicles to understand how they perceive and relate to this transition in the automotive industry. The data obtained was processed using SPSS, providing a clear perspective on the evolution of consumer preferences and perceptions over time. The results indicate that price, maintenance costs, vehicle autonomy, and environmental impact are crucial factors influencing the decision to purchase electric vehicles. These findings can guide marketing strategies and public policies to encourage widespread adoption of electric vehicles.*

Key words: Electric vehicles, vehicle autonomy, customer perception, environment protection.

JEL: Q55, M31, L62, C83.

1. Introduction

Concerns regarding climate change and its impacts have become a major global priority. With a significant share, the transport sector accounts for approximately 24% of direct CO_2 emissions resulting from the combustion of fossil fuels (IEA, 2020). Accordingly, in line with global concerns, the European Commission has set ambitious targets to be achieved by 2030 under the "Energy Strategy," including a reduction of at least 40% in greenhouse gas emissions compared to 1990 levels. Moreover, the 2050 target is to transform the entire European Union into a net-zero greenhouse gas emission economy (European Commission, 2019). Interest in environmental protection and the global recession have been factors that favoured the development of the green economy. Furthermore, investment projects implemented within organisations are increasingly drawing attention to the concept of sustainability (Minciu, et al., 2021). In this context, in Europe, digital transformation has been accelerated both by the pandemic and by new technological advancements such as artificial intelligence, robotics, cloud computing, and blockchain (Veith, et al., 2021). Additionally, depending on the evolution of the sector in which an organisation operates, adaptation and change are key elements ensuring development and survival (Minciu, Dobrea, & Loghin, 2022).

As environmental challenges have increased, the automotive industry has reconsidered the traditional approach to vehicle mobility in response to these changes. Among the emerging trends, the shift from conventional internal combustion engines to electric vehicles has attracted considerable attention among consumers (Degirmenci & Breitner, 2017). The adoption of electric vehicles is perceived as a promising direction to address environmental concerns in the transport sector (Wang, et al., 2017).

In the context of governmental efforts to facilitate the adoption of electric vehicles through programmes and promotional incentives/initiatives, the market penetration of electric vehicles in Romania remains modest but increasing compared to 2022, accounting for 10.6% of all registered cars in 2023 (Acea, 2024). To consolidate the market share of electric vehicles, it is essential to analyse and understand consumer perceptions and attitudes. Therefore, the present study aimed to test the following hypotheses:

Hypothesis 1: Electric vehicles have become part of an emerging global industry, establishing a new trend for the automotive sector.

Hypothesis 2: The existence of extended driving range for electric vehicles, along with improved infrastructure, can suggest a higher likelihood of adopting such a vehicle.

Hypothesis 3: The positive environmental impact and the reduction of noise pollution influence consumers' decisions to purchase electric vehicles.

Hypothesis 4: The purchase price and maintenance costs of electric vehicles are determining factors in consumers' purchasing decisions.

2. Literature review

The review of the specialised literature aims to provide a detailed analysis of the concept of the electric vehicle, as well as the challenges associated with it. To date, humanity has experienced three industrial revolutions, the first occurring at the beginning of the 17th century, triggered by the invention of the steam engine (Veith, 2018). Thus, the transport sector has represented and continues to represent an essential element of contemporary social structure, acting as a key factor in driving economic progress and creating employment opportunities (Krishna, 2021). Consequently, electric vehicles have emerged as an essential support for society, offering a viable alternative to conventional internal combustion engine vehicles. Due to market conditions, companies from various sectors are seeking to consolidate their market position (Matei & Veith, 2023). At present, the electric vehicle market offers a diverse range, including hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), as well as fully battery electric vehicles (BEVs).

Hybrid electric vehicles (HEVs) are powered by both a conventional internal combustion engine and an electric propulsion system. The battery is considerably smaller and is used exclusively to power the electric motor. Battery charging does not rely on an external electricity source but rather on capturing energy through regenerative braking, which would otherwise be lost in vehicles with solely thermal propulsion.

Plug-in hybrid electric vehicles (PHEVs) are similar to the hybrids mentioned above, featuring a propulsion system that includes both an internal combustion engine and an electric motor. The main difference lies in the extended battery capacity, which can also be charged from external electricity sources (Samaras & Meisterling, 2008). Although PHEVs have a larger battery and a more powerful motor, these types of vehicles allow for driving solely on the electric motor at high speeds, but only for short distances (Clement-Nyns, et al., 2010).

Battery electric vehicles (BEVs) operate entirely using a propulsion unit consisting of one or more electric motors, powered by the energy stored in their batteries. These vehicles do not rely on a conventional internal combustion engine and require an external electricity source to recharge the battery. Similar to other types of vehicles, BEVs can also recharge their batteries through a process known as "regenerative braking," in which the residual energy released during braking is converted into electricity and then returned to the battery for later use (Zhang, et al., 2012).

Due to their simplified construction, electric vehicles provide increased user comfort. During operation, they do not generate greenhouse gas emissions and are characterised by a high level of quietness, which benefits the environment. Moreover, thanks to electric propulsion, electric vehicles deliver instant torque, offering immediate acceleration.

The initial purchase cost is a major obstacle for consumers, being one of the primary reasons for hesitating to adopt an electric vehicle. The continuous development of new technologies in the manufacturing of electric vehicles, alongside ongoing efforts to increase driving range, contributes to the higher final selling price of such vehicles (Noel, et al., 2020).

Concerns related to the driving range of electric vehicles represent a major issue for consumers. This barrier is defined as the psychological fear or anxiety caused by the limited range of

an electric vehicle (Noel, et al., 2019). Limited driving range, combined with an underdeveloped charging network, increases consumer apprehension regarding the availability and usefulness of such vehicles, particularly for long-distance travel, especially outside urban areas (Huang, et al., 2016). Another aspect to consider is the time required to charge these vehicles. Although considered a less severe issue, this factor represents another barrier to the adoption of electric vehicles. Consumers perceive charging time as inconvenient compared to the refuelling process of conventional vehicles, due to the difficulty of quickly recharging the battery (Brückmann, et al., 2021).

The transition to electric vehicles and technological advancements are reshaping the automotive industry. They mark a fundamental change in the perception of mobility, bringing unprecedented efficiency and connectivity to the automotive sector (Athanasopoulou, et al., 2019). Each technological breakthrough opens a new stage in automotive history, resulting in cleaner and more efficient mobility.

Renault

With a vast global presence, Renault Group continues to strengthen its position in the automotive industry, focusing on innovation and sustainability. The Group, operating in over 130 countries, with over 106,000 employees and 2.235 million vehicles sold in 2023, aims to develop mobility that brings people closer together. In the electrified vehicle segment, Renault ranked third in Europe, mainly due to the success of the Renault Megane E-Tech Electric model, holding a market share of 2.2%. Furthermore, sales increased significantly by 19.7% compared to 2022 (Renault Group, 2024). The Group has remarkable expertise in electrification, forming partnerships with Mitsubishi Motors and Nissan. It is engaged in an extensive transformation process that includes technology and service development, as well as the launch of a new range of competitive and well-balanced electrified vehicles (Sandu, 2022).

Unveiled in January 2021, "Renaulution" is a strategic plan designed to change Renault Group's direction, shifting from a volume-oriented strategy to one focused on sustainability, quality, and innovation (Renault Group, n.d.). A key element is the valorisation of the group's industrial assets alongside strengthening its leadership in the European electric vehicle segment (Renault Group, n.d.). The company aims to enhance efficiency, speed, and performance in engineering and production processes, benefiting from the technological expertise of the Renault-Nissan-Mitsubishi alliance to respond to market demands more quickly and effectively. Special attention is also given to improving efficiency in design and production to reduce fixed costs and optimise variable costs globally (Renault Group, 2021).

Within the "Renaulution" plan, Renault aims to transform into a "next-gen" automotive company by creating five independent entities, each with a clearly defined identity and mission, essential for adapting to the future challenges of the automotive industry. These entities include: Horse / Power, Ampere, Alpine, Mobilize, and THE FUTURE IS NEUTRAL (Renault Group, 2022b).

Ampere, the first European "pure player" specialising in electric vehicle and software development, is an autonomous entity within Renault Group responsible for the transition to electric mobility in Europe. It plays a crucial role in the group's transformation, focusing on the development, manufacturing, and marketing of electric vehicles. Based in France, Ampere has 11,000

employees, 35% of whom are engineers. Its goal is to democratise electric vehicles in Europe, offering cars accessible to the general public.

While the electric vehicle market is experiencing significant growth, the company aims to become the European leader in this automotive segment. Through innovation and the commitment of a dedicated team, Ampere seeks to significantly expand its electric vehicle portfolio, providing competitive options for a wide range of customers. By 2030, Ampere will offer both advanced technology and the necessary infrastructure to transform Renault into a fully electric brand in Europe. In addition, Ampere will support Renault Group's objective of achieving carbon neutrality in Europe by 2040 and globally by 2050. The company is committed to ambitious goals for electric vehicle production and sustainability. Its primary target is to produce 1 million units by 2031, alongside a secondary goal of building 480,000 electric vehicles annually starting in 2025. Ampere demonstrates a strong commitment to the future of electromobility.

ElectriCity, with its multiple locations in Douai, Maubeuge, and Ruitz, along with the Cléon plant, represents one of the largest and most competitive electric vehicle hubs in Europe (Renault Group, 2022a). In the near future, the plant aims to produce vehicles at the highest standards, in a reduced timeframe of up to 10 hours per unit. ElectriCity provides a unique local ecosystem, concentrating approximately 75% of suppliers within a 300 km radius, contributing to cost optimisation and carbon footprint reduction. Another key element is the European electric vehicle value chain. Ampere engages in strategic collaborations with prominent partners such as Vulcan, Valeo, Whylot, and Vitesco Technologies, among others. This partnership aims to leverage top industry know-how, ensure sustainable supply, and maintain clarity and control over costs and performance (Renault Group, 2022b).

Lastly, another essential aspect is the revolutionary SDV (Software-Defined Vehicle) technology, in partnership with Qualcomm Technologies and Google, which enables continuous vehicle updates throughout its lifecycle. These partnerships will allow Renault Group to reduce costs, enhance efficiency, flexibility, and development speed, while providing users with timely experiences thanks to ongoing software innovations and updates.

BMW AG

BMW Group is one of the most prominent automotive companies in Germany, recognised as a globally successful car manufacturer. Its portfolio includes three prestigious brands: BMW, Mini, and Rolls-Royce, each designed to address a distinct market segment, thus contributing to the group's market expansion. With over 30 production plants worldwide, the group benefits from an extensive production network, complemented by a global sales network spanning over 140 countries. Long-term strategic thinking and social responsibility define BMW Group's upward trajectory. From the outset, the company has followed a clear path, focusing on sustainability and efficient resource management, from the supply chain and production to the end use of its products.

Economically, the year 2023 marked a remarkable success for BMW Group, with significant sales growth. A total of 2,555,341 vehicles were sold worldwide, reflecting a 6.5% increase compared to the previous year and reaching a new internal record. Electric vehicles contributed significantly to this success, representing 15% of total sales. Specifically, 376,183 units were sold

globally, showing an impressive 74.4% increase over the previous year. These figures indicate rising consumer interest in electric vehicles, confirming the upward trend towards sustainable mobility and future technologies (BMW Group, 2024a).

Seventy-five years after the launch of its first internal combustion vehicle, the iconic Munich plant is preparing to end the production of conventional engines, marking the beginning of a new era. In 2026, the plant will start parallel production of the "Neue Klasse" electric sedan, and by the end of 2027, production will be exclusively electric. This milestone will make the Munich plant the first BMW Group production site to fully transition to electric mobility. To achieve this transition, the company will invest approximately €650 million in adapting and modernising the production line (BMW Group, 2024b).

3. Research methodology

Any quantitative empirical analysis involves data collection through observation, questionnaires, experimentation, and/or interviews with the aim of generating insights, a process that requires converting the collected data into numerical values (Weathington, et al., 2012). For the purposes of this empirical quantitative research, a questionnaire was selected as the primary tool, which must be designed in a logical and attractive manner for respondents, enabling them to answer all questions with ease (Chelcea, 2007).

The questionnaire used in this research was created online using the "Google Forms" platform and was distributed between November and December 2023. To conduct this research, the questionnaire was sent to a broad audience via social media networks as well as by email. The only eligibility criterion for participation was that respondents had to be adults, i.e., over 18 years of age. Additionally, participants were required to provide consent by completing the "Informed Consent Form" before taking part in the questionnaire.

Mandatory questions, along with the restriction of one response per variable, ensured the consistency and validity of the collected data, preventing duplication and maintaining the integrity of the dataset. The questionnaire consisted of 20 questions organised into three distinct sections to analyse various aspects related to consumer perception and attitudes towards electric vehicles. Before completing the questionnaire, respondents were informed about the purpose of the research, the guarantee of anonymity for their responses, and were encouraged to answer honestly and thoughtfully. Above all, participation in the survey was voluntary, giving participants the freedom to decide on their involvement in the study.

The first section of the questionnaire aimed to collect information on the respondents' profiles. This included questions about age, gender, area of residence, and occupational status. The second section focused on respondents' personal beliefs about electric vehicles, asking participants to evaluate the importance of various aspects such as driving range, infrastructure and charging process, purchase price, and the current state of electric vehicles. The final section required participants to express their attitude towards electric vehicles. Questions addressed their level of interest in purchasing an electric vehicle, the preferred price range for acquisition, the ideal driving range, as well as the selection of key features considered important.

All questionnaire items were closed-ended, allowing for rapid data processing. This differs from the use of open-ended questions, which require more complex subsequent grouping and standardisation (Krausz Septimiu & Stegar Irinel, 2007). For many questions, a Likert scale was employed, where "one" represented total disagreement, and "five" indicated total agreement. Likert scales are widely used research tools, consisting of statements through which participants respond based on their perceived level of agreement or disagreement. Through these statements, respondents express their perceptions and attitudes regarding the topic under investigation. These values are subsequently analysed to assess both individual perception and that of the entire selected sample (Sreejesh, et al., 2014).

From the total of 412 responses collected, a clear profile of the participants in the study emerges. With an overwhelming majority of 96.84%, young adults aged 18–24 constitute the primary target group of the research. Additionally, the analysis reveals that 61.9% of respondents were female, representing a significant portion of the sample. Moreover, 72.08% came from urban areas, indicating the heightened interest in electric vehicles in densely populated regions. From an occupational perspective, most respondents were university students from the University of Bucharest, accounting for 85.4% of the total sample. Furthermore, participation also included other respondent categories from diverse social and professional backgrounds, including employees from both the private and public sectors, providing a more diversified perspective on the research topic.

In terms of analysing consumer perception and attitudes towards electric vehicles, the chosen research method was a mixed approach, combining primary empirical research with secondary research, offering a comprehensive perspective on the challenges and opportunities associated with electric vehicle adoption.

4. Results and discussions

The diversity of opinions among Generation Z has a significant impact on the future development of the automotive industry and the adoption of electric vehicles. Generation Z is characterised by openness towards innovation and sustainable technologies, which can make electric vehicles an attractive option for this age group. In the purchasing process, young people are influenced by multiple economic, technical, and environmental aspects, considering these to be important criteria in making such a decision (Wulandari, 2023). According to the specialised literature, consumers are more likely to buy from a brand that reflects their personal values and beliefs (Mitchell & Olson, 1981).

The first notable aspect is the purchase price, highlighted by 63.85% of respondents. This underscores the importance consumers attach to the initial cost of electric vehicles and the need for them to remain competitive compared to conventional fossil-fuel alternatives. Furthermore, 51.7% of respondents emphasised low maintenance costs as an essential factor in their decision to purchase an electric vehicle. By reducing the number of mechanical components involved in the functioning of a conventional vehicle, electric vehicles benefit from a simplified structure, with a lower tendency to wear. This results in reduced maintenance costs compared to traditional

internal combustion vehicles (Faria, et al., 2013). Lastly, over 45% of respondents highlighted the importance of monetary incentives (reduced taxes) as well as non-monetary incentives (such as free parking in cities) in the purchase decision process.

Continuing the analysis, aspects such as performance, design, and range are key factors in the purchasing decision for consumers. These characteristics are vital for electric vehicles due to their direct impact on the user experience regarding efficiency and effectiveness. Performance, noted by 50% of respondents, is influenced by the technological progress of these vehicles. This progress is driven by the immediate and precise torque delivered by electric motors, which contributes to good acceleration and provides a dynamic driving experience (Hori, 2009).

With a proportion of 46.11%, design represents another essential aspect for consumers when considering the purchase of electric vehicles. Design provides not only an aesthetic appeal but also has a significant impact on functionality. A crucial element of design is aerodynamics, which directly influences the vehicle's driving range. A lower drag coefficient helps reduce air resistance, thereby increasing the distance travelled per single battery charge (Li & Zhu, 2019).

A significant 44.66% of respondents consider driving range an important aspect in the decision to purchase an electric vehicle. Consumers are willing to pay more for features such as extended range, shorter charging time, high performance, and reduced emissions (Hidrue, et al., 2011).

Price, maintenance cost, incentives, performance, design, and driving range are not the only aspects consumers consider when intending to purchase an electric vehicle. The transition to electrification is perceived as a promising strategy to address environmental challenges, particularly in urban contexts. Compared to conventional alternatives, electric vehicles have the potential to significantly reduce both pollution and noise levels. In this research, 38.35% of respondents highlighted the environmental impact as an important factor in their decision to purchase an electric vehicle.

The factor analysis included 20 variables, based on the responses of all 412 participants. If any variable had shown inadequate or statistically irrelevant results, the applicability of the factor analysis would have been questioned. Therefore, the careful selection and inclusion of variables were essential steps in ensuring the validity and reliability of the results.

After verifying the correlations between variables, the first stage consisted of performing the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test. According to KMO, a value of 0.5 is considered the minimum threshold for continuing with factor analysis (Kaiser, 1974). The obtained value of 0.802 indicates an exceptionally reliable dataset. The method used for extracting communalities was Principal Component Analysis (PCA), a multivariate technique used for analysing data tables in which observations are characterised by multiple intercorrelated quantitative dependent variables (Abdi & Williams, 2010).

The initial values illustrate the variance estimates for all factors, which are always 1.000 for principal component extraction. The extraction value represents the estimated proportion of variance explained by all factors for each variable. As the communality value approaches 1.000, the more variance of that variable is explained by the components (Tavakol & Wetzel, 2020). Most extracted communality values exceeded the 0.5 threshold, indicating that each variable explains

a relatively high amount of variance, with few exceptions. Variables "Acord_afirmatie_VE" and "Statut ocupațional" recorded the lowest values, suggesting a weaker correlation with the other variables. The low value for "Acord_afirmatie_VE" implies a significant diversity of opinions regarding the current stage of development and the appropriate timing for purchasing electric vehicles. Similarly, the low score for "Statut ocupațional" indicates that socio-demographic aspects have minimal influence on electric vehicle perceptions among the sample group.

The highest communality values were observed for "Vârstă" (0.744), "Mediul de proveniență" (0.854), and "Compatibilitate_VE_nevoi_zilnice" (0.696). The variable "Vârstă" highlights its significant influence on how people perceive and relate to electric vehicles.

Out of the 399 respondents, 255 (63.9%) expressed a desire to purchase such a vehicle, indicating a notable shift in consumer preferences among young people aged 18–24. The advanced technology integrated into these vehicles particularly attracts younger populations, being well-aligned with a digital lifestyle. Incentives provided before and after purchase are important factors influencing their decision to adopt electric vehicles, offering accessible financial resources and long-term benefits. Additionally, this increased interest is associated with growing environmental awareness and the need for sustainable transportation alternatives.

The "Mediul de proveniență" (area of residence) variable highlights how geographical context influences the perception and adoption of electric vehicles.

According to the results regarding the relationship between "Mediul de proveniență" and "Preferință deținere vehicul electric", over 45% of respondents (187) expressed a desire to own an electric vehicle in urban areas. When used in cities, electric vehicles contribute to cleaner air and lower pollution levels, particularly in densely populated urban zones (Canals Casals, et al., 2016).

Furthermore, even among rural respondents, there is a noticeable tendency towards interest in electric vehicles. Seventy-six respondents expressed a desire to purchase an electric vehicle, exceeding the number of rural respondents who did not wish to own one.

The "Compatibilitate_VE_nevoi_zilnice" variable indicates the importance of compatibility between electric vehicles and consumers' daily needs. Factors such as driving range, charging infrastructure, and maintenance costs significantly influence how well EVs fit daily routines.

The next variables, in descending order of communality values, refer to aspects such as interest and openness towards EV ownership ("Preferinta_Detinere_VE" – 0.602), the ideal driving range for daily needs ("Autonomie_ideala_VE" – 0.592), and perception of cost differences between electric and conventional vehicles ("Diferenta_cost_cumparare_VE" – 0.568).

The first component, named "Perspectives on Electric Vehicles," included six key variables crucial for understanding consumer perception. The second component, "Utility of Electric Vehicles," included four variables exploring attitudes such as satisfaction with driving range, preferences for ownership, daily-use compatibility, and the evolution of general perception. The third component consisted of three variables related to gender, perceived ideal range, and annual mileage, named "Electric Vehicle User Profile."

The fourth component contained a single variable, "Vârstă" (Age). The next component included two variables related to occupational status and purchase priorities, with lower relevance among consumers, named "Purchase Priorities by Status." The final component also consisted of

a single variable, "Mediul de proveniență" (Area of Residence), considered one of the defining components of the dataset due to its influence.

Within the component matrix, the three highlighted components represent the main directions of consumer interest in electric vehicles, successfully explaining over 54% of the variability in the analysed dataset.

In light of the secondary research conducted and the reports issued by companies such as BMW and Renault, Hypothesis 1, which states that electric vehicles have become part of an emerging global industry, establishing a new trend for the automotive sector, has been confirmed. These reports provide a detailed perspective on the strategies and plans of these companies regarding the transition to electric mobility, offering a clear direction for the automotive industry. The approaches presented by Renault and BMW are strongly anchored in a sustainable vision of mobility. The shift towards electric vehicles is perceived as an essential step in providing a viable transport solution.

Both companies focus their plans on innovation and cutting-edge technology. The development of electric vehicles involves not only creating more efficient motors and batteries but also integrating connected features and services that meet the needs and preferences of consumers in the digital era. Offering attractive and accessible electric mobility options can strengthen these companies' market position and provide them with a competitive advantage over rivals. Moreover, in a context of increasing environmental concerns, governments worldwide are adopting policies and regulations that promote electric vehicles. Thus, BMW and Renault's strategies also represent a response to legislative changes and increasingly stringent requirements regarding carbon emissions and urban pollution. The directions outlined in BMW and Renault's plans regarding the transition to electric vehicles not only validate the hypothesis but also mark a significant paradigm shift in the automotive industry, steering it towards a sustainable, innovative, and competitive future.

Hypothesis 2: The existence of extended electric vehicle range and improved infrastructure suggests a higher likelihood of adoption.

This hypothesis is validated by the research. 44.66% of respondents considered driving range an important factor in the decision to purchase an electric vehicle. The results indicate that extended range provides consumers with freedom and flexibility, which are essential for adoption. Furthermore, the improvement of charging infrastructure is indirectly highlighted through the importance respondents place on technical and economic aspects, which are closely linked to the availability of adequate infrastructure.

Hypothesis 3: The positive environmental impact and noise pollution reduction influence consumers' decision to purchase electric vehicles.

This hypothesis is confirmed by the research results. Specifically, 38.35% of respondents highlighted environmental impact as an important factor in their purchasing decision. The reduction of pollution and noise is noted as beneficial for both general health and quality of life, underlining the growing environmental awareness among consumers. Consequently, ecological concerns and the desire to contribute to a cleaner and quieter environment are factors that positively influence the decision to purchase electric vehicles.

Hypothesis 4: The purchase price and maintenance costs of electric vehicles are determining factors in consumers' purchasing decision.

This hypothesis is validated by the findings. According to the collected data, 63.85% of respondents identified purchase price as an essential factor in their decision to buy an electric vehicle. In addition, 51.7% emphasised low maintenance costs as another key factor. These results underline that economic considerations play a crucial role in consumer decisions, confirming the hypothesis that price and maintenance costs are decisive in the adoption of electric vehicles.

In contemporary society, electric vehicles are gaining increasing importance, resonating with the growing concerns about environmental protection. Their position in the automotive landscape is expanding rapidly, directly influencing consumer perception and attitudes towards electric vehicles.

Electrification of transport, particularly in urban contexts, has the potential to significantly reduce CO_2 emissions as well as dependency on fossil fuels, highlighting the greater efficiency of electric motors compared to internal combustion engines.

This study analyses the factors influencing young people's perceptions and attitudes towards electric vehicles. The results indicate that economic, technical, and environmental aspects play a crucial role in the adoption process. Additionally, a well-developed charging infrastructure also represents an important factor in the transition to electric vehicles.

Understanding these factors is essential for promoting the widespread adoption of electric vehicles among young people and other consumer groups. Overall, the research results reflect a positive attitude towards electric mobility, with many respondents expressing the intention to purchase an electric vehicle in the near future.

The future prospects of electric vehicles appear promising due to advancements in battery technology, charging infrastructure, and supportive policies. Battery prices are expected to decline in the near future, making electric vehicles more accessible and attractive to consumers. The transition to electric vehicles offers the possibility to enhance the efficiency of cities worldwide while simultaneously promoting their sustainable development.

All four hypotheses formulated for this research are validated by the results. Economic, technical, and environmental factors play a fundamental role in consumers' decision to purchase electric vehicles. These results indicate that, to encourage EV adoption, manufacturers and policymakers must focus on price, maintenance costs, driving range, charging infrastructure, and environmental benefits of these vehicles.

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Strategic Alliances

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Abstract: *The purpose of this paper is to summarise, analyse and explain the concept of strategic alliances, as elaborated by Rosabeth M. Kanter holder of the Ernest L. Arbuckle Professorship at Harvard Business School, in her 1994 article for Harvard Business Review "Collaborative Advantage: The Art of Alliances''. In addition to Kanter's article, we will be using as reference on the topic some write-ups that analyse the real-world phenomena of strategic alliances on business development and the likelihood of successful alliances, namely "Strategic alliances: the silver bullet to recover and thrive in the new normal" by Deloitte "Why Strategic Alliances Fail: New CMO Council Report" by Kimberly A. Whitler from Forbes. We will be summarising these works and deciding whether they make a good case for strategic alliances or not, then conclude with our own thoughts on the concepts approached by these articles.*

Key words: Strategic alliances, success factors, risk analysis, critical evaluation.

JEL: L14, M10, L22, M16.

1. Introduction

A strategic alliance is a cooperative arrangement that permits two or more entities—such as businesses or organisations — to work together toward mutually beneficial objectives while maintaining their individual identities. These partnerships are created to take advantage of one another's advantages in terms of skills, resources, market presence, and strength in order to attain strategic goals that would be difficult or impossible to accomplish separately. In today's work environment, creating an atmosphere where employees collaborate with each other and engage in various projects together is essential.

Strategic alliances can be facilitated through various forms, including partnerships, joint ventures, co-marketing agreements, cooperative research and development projects, and distribution agreements.

Within the context of a strategic alliance, participant entities maintain their own identities and autonomy while working together to achieve shared goals. These partnerships can have a range of durations, from short-term agreements to long-term, binding commitments, depending on the particular interests and background information that are relevant to the parties involved.

2. Literature review

Ever since R.M. Kanter analysed the subject in the 1994 publication for the Hardvard Business Review magazine, more and more scholars and businesses have approached the subject from their own perspective.

Given the subjective nature of strategic alliances, and the rapid changes in the business environment, we note an increase in the studying and use of strategic alliances:

Table 1: Gates Usage of different strategies in achieving organisational growth in 2018 (in %)

M&A	Strategic Alliances	Joint Ventures	Organic Growth	Outsorcing
13%	31%	16%	23%	17%

Source: CEO Outlook, KMPG (2019)

In her 1994 article for the Harvard Business Review, Rosabeth defines alliances as "a fact of life in business today". She notes that decision makers are focused on increasing financial gains, instead of finding a balance between financial and human terms, as they are placing their attention on shareholder interest, and forget to give managers the means to create value. (Kanter 1994, 96). In the case of short alliances, the usual goals are to ease the process of market penetration and reduce cost of research and development, an example being Toyota partnering with BMW to create the Toyota GR Supra. However, for medium to long lasting partnerships, goals shift from gaining independent benefits, to creating mutual growth, as is the case with Wizz Air and Booking.com.

For the latter forms of alliances to prosper, certain criteria must be valid. Business alliances must generate value that surpasses the initial deal, the connection should evolve and create access

points for opportunities and the future. In a successful alliance collaboration is crucial, similar to the prisoner's dilemma, creation of value that benefits both parties equally is far more beneficial in the long run than just an exchange. They need a complex web of internal infrastructures that support learning and interpersonal relationships because they cannot be managed by formal procedures. From a continental perspective, North American companies have an opportunistic view of relationships, giving minimal importance to other aspects of partnerships, such as cultural and organisational. Asian companies blend relationships into their business model, and therefore are proficient at using them. European companies are in the middle of the scale (Kanter 1994).

The life of a business alliance shares similarities with that of a personal relationship. There are five steps in creating a successful alliance. In the first, called courtship, two businesses meet, become drawn to one another, and learn they are compatible. They decide and seal the agreement during the second phase, called engagement. Phase three finds the newly joined companies discovering they have different ideas about how the business should run, similar to a couple setting up housekeeping. Phase four involves the couples coming up with ways to reconcile their differences and learning how to get along. As old marrieds, each organisation finds in phase five that it has undergone internal changes as a result of adapting to the ongoing relationship. The selection of a suitable partner is a tedious and resource consuming process that can be reduced if businesses have a strong understanding of their internal factors, chemistry as personal and social interest of decision makers can affect the longevity of the alliance and compatibility with the CEOs of the candidate company. The latter implies similar future goals, appetite for risk, and even business philosophies.

The author gives a real-world example on the use of the aforementioned elements in selecting and building a partnership. The Foote, Cone & Belding and Publicis, both ad agencies with a respectable global ranking. What brought them together was the desire to expand their international reach and the announcement that one of their major clients was reducing its ad agencies by 95%. Both FCB and Publicis approached their expansion strategies with humility, which led to their willingness to cede power; they both felt that industry globalisation was weakening their competitive advantage and that they couldn't grow alone. They had both looked for the appropriate partner for a number of years without success, so they had enough experience with other possible partners to be happy with each other's qualities. Although each business excelled in areas where the other did not, the strengths each contributed to the partnership were about equal. The businesses shared few areas of direct business conflict, comparable experiences with shared clients, and comparable creative approaches and operating philosophies. Their joint efforts have yielded results that support those conclusions. Together, Publicis and FCB have run a pioneering international alliance since 1988, establishing a network of 173 agencies across 43 nations. When all of the partners are combined, the agency became the second largest in Europe, the second largest in North America, and the ninth largest worldwide.

The FCB-Publicis alliance serves as proof that, particularly in quickly evolving industries, prospective partners need to discover alignment with legacy, philosophy, and aspirations because possibilities of this nature are frequently fleeting and will not support a long-term partnership. Other opportunities cannot arise in a relationship that falters or dissolves as soon as the

initial project is finished (Kanter 1994).

This example illustrates the true power of alliances to create value even on a global scale when other people might get the wrong impression that independent development has the same effect as a partnership. The success of the alliance lies in the foresight abilities of the CEO's and focusing on long term goals and creating growth for both parties.

2.2 Threats

As both companies grow, many more people in many more roles will need to collaborate with members of the other company once actual initiatives get underway. Today, product life cycles are shortened due to dynamic demand, forcing organizations to focus on short-term innovation (Voica, et al., 2021). Furthermore, all the changes brought about by the new era of digitalization are occurring at a rapid pace, producing significant changes both at the organizational level and in the daily lives of individuals (Veith & Costea, 2019). Four factors make this wider involvement a threat to the promise made at the top:

1. Individuals in other roles might not feel the same level of connection and rapport that the CEOs did. In this context, one of the most important challenges managers face in leading teams, sometimes from a distance, is communication (Veith & Dogaru, 2020). In the early years of their collaboration, key executives from Publicis and FCB kept in constant contact by frequently visiting each other's headquarters. They had a great deal of informal and official time together. However, other staff members hadn't communicated with one another and occasionally needed persuading to collaborate with their foreign counterparts.

2. Workers might not be as committed as upper management and have less cross-cultural working experience. It's possible that they just perceive the operational reasons why the partnership doesn't make sense and are unaware of the strategic background. For instance, a team member working on a new financial product that would be introduced with a foreign partner frequently complained to his manager about the risks involved in the product and the challenges of introducing it; in fact, the team member even suggested ending the project. He was unaware that the foreign partner was a crucial gatekeeper for a profitable development agreement in a different nation. Senior management were willing to put up with this risky endeavour in the hopes of earning more money somewhere else.

3. Typically, just a small number of employees devote their entire time to the partnership. Others frequently overlook tasks pertaining to the new alliance because they are judged solely on how well they execute their primary duty. Venture managers frequently prioritise the events or executives of their own firm and defer to those of the partner since they are more worried about their own future in the parent company that hired them.

4. People who are only a rung or two below the top may be against the partnership and work to sabotage it. This is particularly true for companies with robust separate business divisions or for professional associations whose goals diverge from those of the company as a whole.

5.Cultural integration calls for the relationship's participants to be able to communicate effectively and understand one another's cultures in order to overcome their disparities (Kanter 1994).

3. Research methodology

In this paper, we adopted a qualitative approach based on the analysis of secondary sources. Our main reference is Rosabeth Moss Kanter's seminal article, "Collaborative Advantage: The Art of Alliances", published in the Harvard Business Review in 1994, which provides the theoretical foundation for our review. In addition, we examined two recent contributions on the topic of strategic alliances: Deloitte's report "Strategic alliances: the silver bullet to recover and thrive in the new normal" and Kimberly A. Whitler's article published in Forbes, "Why Strategic Alliances Fail: New CMO Council Report". Through critical reading and comparative discussion, we aimed to identify key themes, assess the strengths and limitations of the arguments presented, and formulate our own reflections on the role and effectiveness of strategic alliances in contemporary business environments. No primary data collection was conducted, as our work is focused on theoretical synthesis and interpretation.

4. Results and discussions

This article published by Deloitte on their website in 2019 tackles the issues companies faced during the COVID-19 pandemic, what changes occurred and what the present business environment influences the attractiveness of strategic alliances.

A survey on insurance companies conducted by Deloitte highlighted the sudden digitalisation of the world during the pandemic and the unpreparedness of most companies "79% of respondents believe the pandemic uncovered shortcomings in their company's digital capabilities and transformation plans" (Deloitte, 2019). On the same note, the financial services sector faced a surge in digital adoption throughout products and demographic segments. Even with the return to normality and the end of the pandemic, the use of digital products is only increasing. "In a context of rapid digitisation, including the increasing importance of marketplaces, platforms and ecosystems in the distribution of products, strategic alliances can offer a fast and sometimes less risky access to assets and intellectual property compared to 'build' or 'buy' strategies". (Deloitte 2019)

In addition to fostering innovation in how current markets operate, technology is also opening up new markets for previously undiscovered asset classes.

The growing significance of marketplace, platform, and ecosystem models in the financial services industry, which offer more scalable and affordable client care as well as an improved client experience, is one example of this trend.

Strategic alliances are naturally suited to achieving the size needed to establish a sustainable market, provide clients with innovative, value-adding services, and improve their overall experience.Deloitte shares a similar view on the strategic alliance life cycle as professor Kanter

Figure 1: The life cycle of strategic alliances

Source: Deloitte, Strategic Alliances (2019)

This article published by Kimberly A. Withler on the Forbes website, gives us some real life examples and statistics as to why most strategic alliances fail before being able to create that co-operative advantage. The article starts by stating disparity in the percentage of people who view alliances as a crucial part in the development of their business (85%) and the percentage of failed alliances (60% or more) (Withler 2014).

The main issue in maintaining alliances lies in the lack of governance. The author shares a similar opinion with professor Kanter as she also states that a formal approach is insufficient in managing an alliance. However, the author sees the solution in a leader giving the "orders" (Withler 2014) for the creation of the strategic plan, not mentioning the steps for a good alliance that professor Kanter highlighted (Kanter 1994, 97).

The advertising of a partnership does not mean it will be successful, giving the example of the Apple and IBM partnership. Press releases at the beginning and then a long period of time without anything happening. The author gives 3 means to leverage strategic partnerships:

1.The resources allocated should march the importance of the partnership

Continuing with the Apple-IMB example, if they considered the alliance of importance, then both firm should have allocated a budget, trained managers and providing clear oversight

2.Treat your partner as you would your customer

It is rare for partners to receive the same treatment, consideration, or care as customers. And yet, in many circumstances, partners lead the door to more clients. Furthermore, a lot of businesses lack foresight and fail to consider the consequences in the event that a partner loses patience. It might not be worthwhile to pursue the relationship in the first place if you lack the resources to manage it properly. As a result, it would be beneficial to assess partner satisfaction even though most businesses only measure customer satisfaction. In order to guarantee that everyone is happy, the governing leader must effectively manage this function.

3.Formalize a strategic plan

Managers are skilled in creating strategic plans. Creating one for a strategic alliance can be beneficial in a number of ways. Initially, it might assist you in promoting alignment both within your company and between the two businesses. Formalising expectations and laying the groundwork for attaining them are two benefits of formalising objectives, goals, strategies, milestones, and metrics. There's a good chance that someone in the partnership will feel let down if it's not formalised.

5. Conclusions

In conclusion, while companies can grow and develop on their own, there is a clear advantage in collaborating with other businesses to facilitate an increase in their market share, developing new technologies and adapting to the constant change in trends. The process of developing a strategy for a viable alliance is a hard and resource consuming task, however, with a clear goal and carefully chosen approach, companies can develop long lasting relations that are generators of value and innovation, as demonstrated in the works authored by Rosabeth M. Kanter, Deloitte and Kimberly A. Wither.

The influence of the research conducted by professor Kanter created the template for future businesses to improve their approach and to shift from searching just for an exchange and to look for partnerships with high value creation potential.

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