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Between 2004-2010, the journal is headed by Professor Ph.D. Constantin Mecu, as editor-in-chief, and associate professor Ph.D. Aurelian A. Bondrea, as deputy editor, both vice-rectors of the university.

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# FOREWORD

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Russia's war of aggression against Ukraine continues to weigh on the EU economy, moving it towards lower growth and higher inflation compared to the European Commission's spring 2022 forecast.

According to the (intermediate) summer 2022 economic forecasts of the European Commission, the EU economy will grow by 2.7% in 2022 and by 1.5% in 2023. In the euro area, growth of 2.6% in 2022 is anticipated, with a more moderate pace of 1.4% in 2023. Average annual inflation is forecast to reach historic highs in 2022, namely 7.6% in the euro area and 8.3% in the EU, before declining in 2023 to 4.0% and 4.6% respectively.

War shocks have a negative impact on economic growth. Many of the downside risks associated with the spring 2022 forecasts have materialized. Russia's invasion of Ukraine has put additional upward pressure on energy and food staples. These factors are fueling global inflationary pressures, eroding household purchasing power and prompting a faster than previously anticipated monetary policy response. The continued slowdown in US growth adds to the negative economic impact of China's strict "zero-COVID" policy.

The EU economy remains particularly vulnerable to developments in energy markets, due to its high dependence on Russian fossil fuels, and slowing global growth has the effect of reducing external demand. The momentum gained from last year's recovery and a slightly stronger-than-expected first quarter should support the annual growth rate for 2022. However, economic activity for the rest of the year is expected to be modest, despite a summer promising. According to estimates, in 2023, quarterly economic growth will accelerate on the back of the resilience of the labor market, the moderation of inflation, support from the Recovery and Resilience Mechanism and the still high volume of savings.

Overall, the EU economy will continue to expand, but at a much slower pace than predicted in the spring 2022 forecast.

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Record inflation is forecast to decline in 2023. By June 2022 headline inflation had reached record levels as energy and food prices continued to rise and price pressures fed into other goods. In the euro area, inflation increased strongly in the second quarter of 2022, from 7.4% in March 2022 (compared to the same period of the previous year), to a new record level of 8.6% in June 2022. In the EU, the increase was even more pronounced, with inflation rising sharply by a full percentage point from 7.8% in March to 8.8% in May.

Inflation forecasts have been revised up considerably compared to the spring forecasts. In addition to the strong price increase in the second quarter, a further increase in natural gas prices in Europe is expected to be passed on to consumers through electricity prices as well. Inflation is expected to peak at 8.4% in the third quarter of 2022 in the euro area, after which it will decline steadily, reaching below 3% in the last quarter of the year 2023 in both the euro area and the EU as commodity price pressures and supply constraints ease.

The risks remain high and depend on the evolution of the war. Risks to the outlook for economic activity and inflation depend heavily on the evolution of the war and, in particular, its implications for Europe's gas supply. Further increases in gas prices could lead to further increases in inflation and drag on economic growth. The knock-on effects could, in turn, amplify inflationary forces and lead to further tightening of financial conditions, which would not only hurt growth, but also entail increased risks to newly established stability. It cannot be ruled out that the re-emergence of the pandemic in the EU will cause new disruptions to the economy.

At the same time, recent downward trends in oil and other commodity prices could intensify, causing inflation to fall faster than currently expected. Furthermore, with a strong labor market, private consumption could prove more resilient to rising prices if households drew more on accumulated savings.

The IMF will "significantly" revise its estimates regarding the evolution of the world economy. Even the International Monetary Fund (IMF) will "significantly" revise its estimates of the pace of growth of the world economy in its next report, at a time when those in charge of the financial sector are faced with a narrow list of options to responds to the worsening of risks, reports Bloomberg, according to Agerpres at the beginning of July 2022.

Rising food and energy prices, slowing capital flows to emerging markets, the continuation of the pandemic and the slowdown of the Chinese economy create "many more challenges" for policymakers, IMF strategy director Ceyla

Pazarbasioglu told a panel on the occasion of the meeting of finance ministers and central bank governors of the G20, which takes place in Bali (Indonesia) in July 2022."It is about shocks after shocks that seriously affect the world economy," said Ceyla Pazarbasioglu.

The remarks come after a meeting of G20 finance ministers and central bank governors ended without a joint statement, highlighting the difficulties of coordinating a global response to rising inflation and fears of a recession.

On the occasion of the latest "World Economic Outlook" report, published in April 2022, the IMF has already revised downwards its estimates regarding the evolution of the world economy in 2022, up to 3.6%, compared to an advance of 4 .4% forecast before the start of the war in Ukraine.

Central bank officials around the world are struggling to find the right response to price increases that are being fueled by supply-side problems.

"The path to a soft landing is narrowing; we continue to believe that this is a feasible trajectory but certainly not a very easy one. Where central banks change monetary policy quickly and decisively and have a response to inflation, this is more conducive to a smooth landing", said the director of research from the Bank for International Settlements, Hyun Song Shin, present at the same panel in Bali.

In the case of Romania, in April 2022, the IMF significantly revised its estimates regarding the growth of the Romanian economy this year, from 4.8% as it estimated in the fall to 2.2%.

In the current context, the authors found forums for discussions and debates and have written articles for the current issue trying, as far as possible, to look at some solutions for the problems facing the new world state of economy. Whether or not they succeeded in responding to the challenges, we leave it to you to determine.

The first scientific paper published in our present issue, named ***Innovative Solutions For The Production Of Bricks From Wastewater Treatment Sludge*** and written by authors **Gabriel POPESCU, Nicoleta-Raluca JIANU, Ioana-Corina MOGA, Mădălina-Teodora ANDREI, Aneta CHIVOIU, Laurențiu CIORNEI, and Mirela SIMION** is based on the need to recover various wastes such as waste from wastewater treatment plants. The article research proposed to use of sludge in the manufacture of various building materials, such as bricks. So far, bricks made of different materials and combinations of classical materials as burnt clay, cement, sand, but also of other unconventional materials, most of them coming from different wastes, are used in construction. To use the sludge for bricks fabrication, it is necessary to inert it and to obtain a moisture content below 80%.

Also, the physico-chemical and ecological parameters must be suitable for sludge utilization and their values must be situated within the limits imposed by legislation. So, the sludge is centrifuged in order to reduce the moisture content from (90-95) % to a maximum of 80%, treated, then the sludge batches are characterized and finally the sludge is recovered by inert cement.

The purpose of **Milan MARKOVIĆ'** paper, named ***Ranking of EU Countries According to Innovation Potential*** is to rank all 27 countries of the European Union (EU) according to selected indicators of innovation potential. In a high-tech society, the main factor of economic development are activities related to research and development (R&D). The author singled out five relevant indicators from the Eurostat database in the assessment of the conditions for innovation development in the EU using the MOORA (Multi-Objective Optimization on the basis of Ratio Analysis) method. Based on the conducted multi-criteria analysis, the author concludes that Germany, Sweden, France and the Netherlands have the best innovation performance, so that these countries are the closest to achieving the goals of a highly competitive economy and sustainable economic development. On the other hand, Romania, Cyprus, Slovakia and Croatia show the weakest innovation potential, followed by other newer EU members.

**Wilfred Isioma UKPERE**, in his paper called: ***Techno-Globalisation and Labour Sustainability in an Era of The 4th Industrial Revolution*** is talking about capitalism, as it is based on the concepts of competition, profit motive, private enterprises (self-interest) and scientific management. These key catalysts set the motion for capitalist expansion, exploration and exploitation. One notable area where capitalism has naturally done exceptionally well based on its characteristics, is within the domain of scientific management, which has spurred technological innovations as well as triggered techno-globalization. In spite of several warning signs of the impact of techno-globalization on the sustainability of labor, the world advanced into the 4th Industrial Revolutions, which is also driven by highly sophisticated technological advancements. The 4th IR has unique features, namely, smartphone takeover almost every aspect of business activity; knowledge generation is made possible through big data; robotics may likely replace many human routine activities in the workplace. The new trend will certainly lead to massive job losses as well as create new ones within the industry, which could have detriment effects for labor sustainability. However, some mechanisms have been postulated in this treatise to improve the status quo.

Author **Daniela PAŞNICU**, in her interesting paper called ***The Importance of Using Smart Data to Analyze Skills in The Labor Market*** is talking about the needs of the workforce who is constantly changing as a result of global concerns about digitization, production automation, the introduction of new technologies and industry 4.0. Therefore, the labor market needs a continuous reassessment of labor skills in the context of digitalization and the industrial revolution. The paper will study the change in perspective of the structure of the employed population by occupational groups and in high-tech economy of Romania compared to UE27 and the most requested skills currently in online job postings in various fields, based on traditional and intelligent data from Cedefop. It is also intended to understand how the use of BigData can facilitate labor market decision-making. The analysis of the skills required in the jobs posted online from various fields in Romania, in 2020, suggests importance of digital and contextual skills having in view that in the top is „accessing and analyzing digital data", followed by „working with others" and „using digital tools for collaboration, content creation and problem solving".

In his paper entitled ***Aspects of Career Management and Success in Educational Organisations***, the author **Sebastian Cristian CHIRIMBU** is talking about a modern educational institution who should create the necessary conditions for the integration and development of the personal and professional competences of the teachers in order to obtain a successful career. In the current context of the educational system in the Republic of Moldova and Romania, the capitalization of human resources is a priority objective of the managers of educational institutions. The difficulties they face, the constantly changing educational reforms, the unpredictable and challenging situations are known partially or impartially theoretically and practically by teachers who are beginning to integrate into the institution, and the process of insertion from educational institutions is often not effective. The author analysed the characteristics of a successful career but also the motivation for achievement as an important component of the professionalization process, teachers thus tending to pursue challenging careers, complex enough, but not so difficult as to end in failure. Therefore, if professional motivation is an important endeavor, because it starts from the idea that a large part of everyone's life spends at work, performance denotes the achievement and ability of the teacher to respond to tasks and to be a model for those in the organization when it comes to involvement and responsibility.

The authors **Tinashe R MUSHONGA** and **Wilfred Isioma UKPERE**, in their paper entitled *The Effects of Downsizing on Employee Commitment in the Freight*

*Management Services in Zimbabwe* are telling us that the 21st century introduced several technological advancements, including artificial intelligence, and these technologies affected almost every industry in every country. Freight management services in Zimbabwe had also adapted to these technologies to keep abreast with global pressures. Hence, embarking on massive workforce re-engineering strategies and downsizing had been the most popular strategy. However, organizations have to deal with consequences of downsizing, and **employee commitment as one of these consequences**.

**Irena TODOROVA**, in her paper entitled ***The Effect of Motivation for The Prevention of Corruption Acts in The Ministry of Internal Affairs*** presents the objective need for motivation as an element of managerial impact in the Ministry of Internal Affairs. The activity of the state administration should correspond to the high public expectations for professional competence, legality, integrity, correctness, and responsibility. That is why motivation is the key element that leads to the formation of specific behavior aimed at the observance of value orientations in the performance of official duties and is an important prerequisite for the prevention of corrupt behavior among the employees of the Ministry of Internal Affairs.

**Zanele L. MPABANGA**, **Wilfred Isioma UKPERE and Xavier KNIGHT** in their paper entitled *Effects of Globalisation on Employment Relations Within The Film Industry in South Africa* are talking about globalization that has been perceived as the integration and spread of information, processes and technology across organizations and nations. It has accelerated transformation and change in organizations, with the effect of strengthening or, as the case may be, weakening employment relations within organizations. Globalization has been characterized by a rise in the use of casual employees, decentralization and continuous advancement in technology, which ultimately affects employment relations. Therefore, this paper sets to explore the effects of globalization on employment relations in South Africa's film industry. The current investigation adopted a qualitative research approach, which was carried out in an organization within the film industry in the city of Johannesburg, South Africa. Purposive sampling was used to collect data from ten employees at various levels in the organization. Data was obtained by means of semi-structured face-to-face interviews with the research participants. The findings revealed that the effects of globalization are twofold, as it has both positive and negative effects on organizations. From a positive perspective, it was found that globalization has helped to promote inclusive

workplaces, effectively manage tensions and conflict in the workplace, and improve communication between parties in the employment relationship. Furthermore, it was discovered that interactions between management and employees have increased since globalization. Conversely, the current findings uncovered that there are increasing tensions in the employment relationship. There is also evidence of less training to workers in the film industry. The findings further revealed that using casual employees in the film industry has increased, and many of them are confronted with several challenges, as they do not get the same benefits that their counterparts in permanent employment receive. Hence, generally, this paper's outcome could be used in organizations to address some of the negative effects of globalization in respect of relationships in the workplace, particularly in the film industry.

**Georgiana Zoe IACOB MIHAILA and Elena GURGU**, in their paper entitled ***Investigating How Managerial Communication Influences Employee Motivation. Study Case to a Romanian Crude Oil Products Transport Company*** are researching the motivation of human resources, with a case study at CONEREPET SA PLOIEȘTI[1], a Romanian crude oil products transport company.

In the first part of the work, the authors dealt with the theoretical aspect of environmental pollution with petroleum products: polluting factors and methods of depollution. Then they presented theoretical aspects of human resource management, so that they can approach a research study in the second part of the paper. Also, the authors analyzed the CONEREPET SA company, and, like the research study, they dealt with the motivation of human resources within the company. The authors chose this topic due to the experience in the field. In the final part of the paper, the authors concluded that human resources are primary among those needs and resources available to the organization in carrying out the activity to achieve its objectives and, consequently, it is logical to pay special attention to their management. At the center of all business are the people. All other resources, land, buildings, machinery, equipment, vehicles, or money are only of secondary importance. Business cannot be done without people. Businesses have no other purpose than to serve people's needs.

[1] We will not divulge the name of the company where we conducted the case study for security reasons of the data and information provided. Thank you for understanding the situation.

The next paper written by **Sahil MAMMADOV** is talking about: ***Critical Evaluation Of EU Migration Policy in Crisis Agenda Within Framework of Border Management***. If we try to define the concept of migration, which is one of the critical issues faced by all countries today, we will see that it is more a search for innovation stemming from a "problem", and this process has tried to preserve this feature from the very beginning of history until today. When we open the concept of "problem" here, it can be seen that sometimes there can be a direct threat to human existence, such as natural disaster, war, oppression and persecution, and sometimes this process can occur for personal reasons, such as unemployment, the desire for a better life. At the same time, the issue of migration can be considered optional as well as mandatory within the framework of interstate agreements and various difficulties experienced. It is known that the migration crisis observed in 2015 as a result of the fragmentation trend among the member states turned into an integration crisis in the EU migration policy. In this regard, this study aims to reveal the validity of independent national policy requirements by analyzing them. The secondary data methods have applied for this study by using different official sources from EU and other statistical sources. With this aim, the evaluation of the EU's migration policy goals, financial, legal and institutional tools in the context of inter-national and intergovernmental tension in the example of border management is considered as the main final goal of the study.

**Olufemi Adebowale ABASS** and **Temidayo Jerry OLUBUSADE** wrote their paper entitled ***The Risk Aversion and Self Insurance Utilization : Evidence From Small and Medium Scale Business Owners in Lagos State.*** This study is to examine the influence of risk aversion on the adoption and utilization of self-insurance among Small Medium Enterprises (SME) owners in Lagos State. The study employed cross sectional class of survey research design. Three hundred and fifty SME owners were selected using Taro Yamane formula and the data obtained was analyzed using correlation and t-test inferential statistics. Questionnaires were administered through convenience sampling method. The result of the study revealed a significant relationship between risk aversion and self-insurance utilization among SME owners in Lagos State. Additionally, the result of this study also revealed that there is no significant difference between preference for conventional insurance and self-insurance among Lagos State SME owners. Based on the findings of this study, it is recommended that conventional insurers should endeavor to develop products that address the actual needs of SMEs. It is also recommended that SME owners should be highly disposed to risk improvement

measures as this would help to reduce the cost of market insurance and self-insurance even if both are taken up contemporaneously.

Authors **Oluwaleke Ebenezer AKINDIPE** and **Ogorchukwu *Augustine ISIMOYA*** wrote their paper entitled *Gross Premium Income and Claims Settlement for Fire Insurance Policy in Nigeria: A Panel Approach* . Claims, being the heartbeat of the workability of insurance, are the most critical contact influencer between the insuring public and the insurer. It serves as a critical path to truth that shapes the policyholders' ultimate perceptions of their insurers. This study evaluated the relationship between gross premium income and claims settlement with specific focus on fire insurance business in the Nigerian insurance industry from 2010 to 2021. Data on gross premiums income and gross claims paid over the period were extracted from Nigerian Insurers Association (NIA) annual reports and digest. Stationarity test carried out on the data revealed that data is stationary at the 1%, 5% and 10% levels of significance. Using the ordinary least squares regression, the calculated probability value of 0.0000 is lower than the 0.05 significant value, which shows that there is a significant significance of the data. The computed linear co-efficient of determination ($R^2$= 0.928731) shows that 92.87% of the total return on asset is accounted for by the independent variables which are expense ratio and net claims. It was therefore concluded that there is a significant relationship between gross premium income and gross claims payment of fire insurance in careful consideration must be given to other administrative costs, such as underwriting, which have the potential to reduce the revenues and profits of the company.

The authors **Augustine Ejededawe OSHO** and **David Olufemi IBIFUNMILOLA** are approaching an interesting subject, talking about *Foreign Currency Transaction, Translation and Performance of Supernational Companies in Nigeria, West Africa.* The study examined foreign currency transaction, translation, and performance of supernational companies in Nigeria. Specifically, the study examined effect of exchange rate, transaction rate and interest rate on return on asset of supernational companies in Nigeria. In a bid to accomplish this, panel regression analysis of fixed and random effect on five (5) selected supranational companies in Nigeria were employed. The study employed secondary data; the data for the study cover the period 2012 to 2021. The Hausman test carried out showed that fixed effect model is more realistic and produced a better result which was therefore employed in drawing inferences in the study. From the result, exchange rate exhibited significant negative relationship with

supernational company's performance in Nigeria. The finding further revealed that Interest rate has insignificant positive relationship with performance of the supernational companies in Nigeria while the translation rate indicated insignificant negative relationship. Hence, the study concluded that unfavorable movement or adjustment in foreign currency transaction and translation rate affect the performance of supernational companies in Nigeria, especially, when measured performance in term of return on asset. It was recommended that supernational companies should develop a mechanism to hedge against foreign exchange rate exposure caused by unanticipated movement in the exchange rate. More so, this should be supported by sound risk management strategies that can withstand macroeconomic instability especially inflation rate in the host economy.

**Mihaela BEBEȘELEA** and **Adina TRANDAFIR** are debating a very interesting paper, also, called: ***Empirical Study About the Relation Between Family Ownership and Firm Performance: Evidence for Romanian Family Firms***. The objective of the article is to produce and validate a statistical model for quantifying the performance of family firms. Such aim will be achieved through the analysis of a sample of 27 entities from the "family firms from Romania" group. The statistical hypothesis underlying the specification of the model is one according to which selected variables will distinguish the performing family firms from the non-performing ones, regardless of ownership. The article addresses an alternative possibility for assessing the financial performance of family businesses, namely a model created by Carton, R. The complex indicator created by Carton, R, is composed of performance factors such as asset growth, debt change and degree change survival rate (Z-score change), calculated using the Statev coefficient, Z-score. The indicators that were used are extracted from both the Entities' Balance Sheet and their Profit and Loss Account (on-line), while the modelling is carried out through the Excel statistical modelling.

The authors specialists in mathematics, **Jannatul FERDOUS** and **Haradhan Kumar MOHAJAN**, are trying to approach a new topic through their work entitled: ***Maximum Profit Ensured for Industry Sustainability.*** This article tries to calculate a maximum profit from sale items of an industry. The study has considered three inputs, such as capital, labor, and raw materials and other inputs for the mathematical analysis of the production procedures of the industry. In the present competitive global economy policy, to survive strongly, there is no alternate of sustainable economy. For the survival of an industry, profit maximization policy is vital. To acquire maximum profit, the production unit of the

industry must be run in an efficient way. In this study an attempt has been taken to maximize the profit of an industry using Lagrange multiplier technique by applying necessary and sufficient conditions.

The authors **Betty Oluwayemisi ALI-MOMOH, Lateef Ayodeji ADISA, David Olufemi IBIFUNMILOLA, Bosede Oluwaseun DEJI OYELEYE, Gabriel Kehinde AGBEDE** and **Samuel Samson OJEME** wrote their scientific paper talking about: ***Standard Cost Effect on Performance of Selected Listed Food and Beverage Companies in Nigeria, West Africa***. The aim of this research was to determine whether or not a change in standard cost will improve the financial standing of a sample of Nigerian food and beverage manufacturers. This goal was reached by analyzing the relationship between the price of raw materials, the price of labor, and the price of manufacturing overhead on the bottom line of Nigerian food and beverage firms. Five manufacturing firms were chosen at random for the research. Nestle Plc, Cadbury Nig Plc, P.Z. Cussons Nig. Plc, and Presco Nig. Plc are the food and beverage companies that were included in the survey. In this case, we used secondary data that we had gathered over the previous decade (2010-2020). Panel estimation methods (pooled OLS, fixed effect estimation, and random effect) and a post estimation test were used to examine the compiled data. The results showed that a firm's performance in the manufacturing sector in Nigeria was significantly correlated with its manufacturing overhead costs, but negatively correlated with its raw material costs, and positively correlated with its labor costs. The research indicated that careful consideration of raw material costs and the maintenance of effective standard costing across all labor costs were necessary to obtain the desired results. Because of the significant savings in time and money that may be achieved via the use of standard costing principles and procedures, the research concludes that all food and beverage businesses in Nigeria should do so.

**Augustine Ejededawe OSHO** and **Ibukun Felix ADEWOLE** wrote their scientific paper entitled: ***International Transfer Pricing and Performance of Supranational Companies in Nigeria West Africa***. The study examined the relationship between international transfer pricing and the performance of supranational companies in Nigeria. The study used secondary data from the Central Bank of Nigeria (CBN) Statistical Bulletin, the Federal Inland Revenue Service (FIRS), the World Bank Statistical Bulletin, and annual reports and accounts of the sampled multinational companies. The study used panel regression analysis. The results of the study showed that interest rates and import duties have

a significant and positive effect on the performance of supranational corporations in Nigeria. The study further found that corporate income tax and exchange rate have a significant and negative impact on the performance of supranational corporations in Nigeria. Based on the results, the study concluded that international transfer pricing has a significant impact on the performance of supranational companies in Nigeria, particularly when international transfer pricing is measured using interest rates, exchange rates, corporate income taxes and import duties; while performance is measured by profit after tax. The study therefore recommended that supranational companies should develop a system to defend themselves against exchange rate and corporate taxes caused by unforeseen exchange rate movements and double taxation.

The author **Haradhan Kumar MOHAJAN** wrote an interesting paper called: ***Cost Minimization Analysis of a Running Firm with Economic Policy***. In this paper the Cobb-Douglas production function is operated in a firm for the analysis of the cost minimization policies. In an economic world, gain of profit depends on the efficient use of raw materials and use of various techniques of the cost minimization. A firm's main target is to make maximum profit. Scientific based and efficient but minimum cost procedures will favor in this regard. To increase local and global demands, a firm of course develop production sector. An attempt has been taken in this study to minimize cost by considering four inputs, such as capital, labor, raw material, and other inputs to form the economic model subject to a production constraint within the budget.

**Godwin Emmanuel OYEDOKUN** wrote an interesting paper, too, who is talking about the ***Determinants of Forensic Accounting Techniques and Theories: An Empirical Investigation***. This study sought and investigated the determinants of forensic accounting techniques. The data analysed in this study were gathered from both primary and secondary sources. The 120 respondents were purposively selected, which includes forensic accountants, fraud auditors, bankers, forensic investigators, finance enthusiasts, fraud investigators, and those in academia. The data for this study were gathered electronically using an online questionnaire through Google Form. The Google Form analysis was adopted. Secondary data were the existing data, established by seasoned professionals and academics. The data were presented through pie charts, bar chats, and descriptions. The study shows that the nature of fraud under investigation which includes the level of crime perpetrated, how much involved, stages, complexity, and who is involved are the determinant of techniques to be applied to fraud examination.

Also, other factors such as criminal evidence, the expertise and experience of the examiner, organisational policies, and the risks involved determine what techniques to be applied to forensic investigations. Data mining emerged as the most appropriate technique for fraud investigation, however, the combination of two or more techniques is advised for forensic accountants, forensic legal practitioners, and all other similar parties. This study recommends the need for stakeholders to engage, recruit, and employ the services of a forensic accountant to review, strengthen, reappraise records and internal control systems on a routine basis. Organizations should train employees on the dynamics and scope of financial crimes, the legal environment, fraud prevention, and ethical issues.

The authors **Clement Olatunji OLAOYE** and **Temitope Ayodele EKUNDAYO** are writting their paper talking about: ***Annual Accounting Information and Stock Price Reactions: Evidence from Nigeria Deposit Money Banks in West Africa***. *This paper examined the value relevance of accounting information and stock prices in Deposit Money Banks in Nigeria. Specifically, it assessed the behaviour of share prices in relation to accounting information in terms of earnings per share, book value per share, dividends per share and return on assets. The study adopted the expo-facto research design and the study elements covered all the 18 listed Deposit Money Banks; out of which, 10 Banks were selected as the study participants and this was achieved through a random sampling technique. The study covered 10 years, spanning from 2010-2019 and data were sourced from the fact book of the Nigeria Stock Exchange (NSE) and audited annual financial reports of the sampled banks. The estimation technique adopted in this study was panel data analysis technique. This was carried out after descriptive statistics and Pearson correlation. It was discovered that earnings per share, book value per share and dividends per share exert a positive and significant effect on stock prices and that return on assets exerts a positive and insignificant effect on stock prices. Based on the findings, it was established that accounting information has a positive effect on stock prices. Thus, it was recommended that timely and adequate accounting information should be made available by the management of Deposit Money Banks in Nigeria to induce the interest of investors and that investors are urged to pay more attention to earnings per share, book value per share and dividend per share in their investment decisions.*

The authors **Andrei Alexandru BREBEANU** and **Elena GURGU** are approaching an interested subject, talking about: **The *Analysis of Sales Management Strategies Within a Distribution Company of Building Materials and Interior Furnishing Elements Headed in Romania***. This paper aims to study the sales in the field of construction materials and interior design, presenting in a

case study, managerial aspects of the DedeRman SRL Company[2], as well as the factors that can influence the purchase decision. All these characteristics are closely related to management strategies, so its societal branch is vital to better anticipate buyers' wishes. Thus, the company DedeRman SRL has adopted as values: seriousness, honesty, diligence, and values, that have guaranteed this company the road to success. The theme of this project was chosen because of the importance of management strategies aimed at construction materials, a vast field, which is in continuous development, being at the same time a good field to exploit.

This work aims to achieve the following objectives:

• Knowing the distribution of projects monitored in 2021

• Identifying the evolution of the construction materials market both internally and externally

• Knowing the types of customers

• Identifying the strengths and weaknesses of the DedeRman SRL company

• Recognition of some communication parameters that influence the company's management.

The novelty of this topic is represented by the management analysis of the DedeRman SRL company and the construction materials market in a pandemic context.

The last paper of the present issue is written by **Bianca CALOTA TOMA** and **Elena GURGU**, taking about: ***Quality Management in The Romanian Pharmaceutical Field During the Covid-19 Pandemic.*** Health services are very important, as in any economy, because the life of all mankind depends on them. Bearing in mind that the pharmacist is the first and last filter in the medical system, we believe that they have a decisive role in the COVID-19 pandemic. Pharmacists must take extra measures to protect themselves, their families, and the community. All patients can be considered as COVID-positive, but pharmacists will offer them the same services and care as before. In the last 15 years, Romania has faced a complex socio-demographic process.The decrease in the birth rate, the general mortality rate and the emigration of the young population led both to the aging of the working age population and to the decrease of the total population of the country. All this aspect led to the reduction of the population size and required a rethinking of the health services system of social protection, in view of prolonging

[2] For data and information security reasons, the real name of the company will not be disclosed. Thank you for understanding.

the active life of the population both from the point of view of the quality of the services offered and of the infrastructural facilities. The consumption of services represents an indicator of the quality of life, which we want to discuss in this article.

We hope that our journal issue caught your attention and made you read it. Also, we strongly believe that all the articles are interesting and deserve to be appropriated by those who are interested in understanding the specific issues of the global economy.

If you've liked our articles, please visit our website at **http://anale-economie.spiruharet.ro/**. If you want to write an article in our journal, we invite you to expose your ideas in new studies published by us.

Finally, hoping that you found interesting Issue no. 3/2022, I strongly invite you to address your comments and suggestions at *ashues@spiruharet.ro* and, of course, to submit your own paper via online submission system, using the following link: **http://anale.spiruharet.ro/index.php/economics/login**.

*Research is the breath of the future. Let's shape the world together!*

***Associate Professor Elena GURGU, Ph.D. in Economics***
***ASHUES Deputy Chief Editor***

# ACADEMIA PAPERS

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# INNOVATIVE SOLUTIONS FOR THE PRODUCTION OF BRICKS FROM WASTEWATER TREATMENT SLUDGE

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**Abstract**

*Based on the need to recover various wastes such as waste from wastewater treatment plants, it is proposed to use sludge in the manufacture of various building materials as bricks. So far, bricks made of different materials and combinations of classical materials as burnt clay, cement, sand, but also of other unconventional materials, most of them coming from different wastes, are used in construction. To use the sludge for bricks fabrication, it is necessary to inert it and to obtain a moisture content below 80%. Also, the physico-chemical and ecological parameters must be suitable for sludge utilization and their values must be situated within the limits imposed by legislation. So, the sludge is centrifuged in order to reduce the moisture content from (90-95)% to a maximum of 80%, treated, then the sludge batches are characterized and finally the sludge is recovered by inert cement.*

**Key words:** *bricks, sludge, construction, waste, wastewater treatment*

**JEL Classification**: Q25

## Introduction

The wastewater treatment process produces sludge with a variable physico-chemical composition, depending on the composition of the treated wastewater and the nature of the chemicals used for treatment. This treated sludge can be used in the manufacture of bricks together with other component materials. Sludge must be classified according to its physico-chemical characteristics and according to the environmental legislation in force (in Romania: Law 211/2011, Regulation

1272/2008, HG 856/2002) in hazardous, non-hazardous or inert waste classes. According to this classification, the waste is transported, inertised and deposited in specialised landfills per waste class. The costs of transport, inerting and storage are high and have a final effect on the total wastewater treatment costs. By using sludge in the construction materials, wastewater treatment plants considerably reduce their operating costs.

The idea of the authors resulted from an existing need on the Romanian market (and not only), where there is an urgent need for sludge treatment solutions, storage or/and reuse and due to the restrictions imposed by the environmental legislation regarding the way of construction, operation and waste management. [Korhonen et al., 2018]

The current worldwide trend is to move in the direction of addressing the problem of waste from wastewater treatment plants towards reuse or recovery in agriculture (as N, P, K, Mg, Ca supplement) or use as a holding material for oil products, after composting, followed by briquetting (determination of heat capacity). Based on the need to recover the sludge from the industrial wastewater treatment plant, the authors aim to transform it into an inert waste (by including it in a matrix that does not allow the leaching of chemical elements) and use it in the production of building materials: bricks and mortar for plaster. The process has been patented, and the novelty is the sludge from industrial wastewater treatment utilization in combination with cement to produce construction materials.

According to Eurostat data, the sludge generated by the WWTPs has increased in Romania, both in volume and in kg per capita, so that the sludge per inhabitant evolved from 3.84 kg of sludge / capita in 2008 to 12.69 kg / capita in 2018, Romania registered the highest growth of 19 of the EU28 states in 2018 (only these have reported statistical data). The treatment processes of wastewater generate the sludge which negatively impacts the health and the economy.

Referring to the quantities of sludge generated by the wastewater treatment plants in Romania (Fig. 1), but also those at European or world level, they have an increasing tendency, mainly caused by the population growth.

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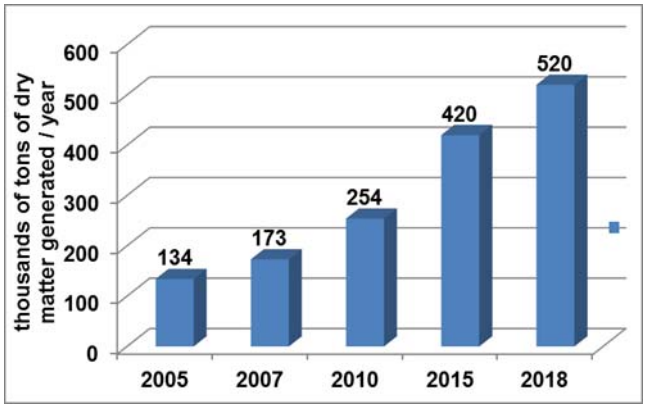


**Figure no. 1. Evolution of the amount of the sludge generated by the wastewater treatment plants in Romania**

In respect of the waste management, there are known, numerous processes of use / storage / disposal of the sludge from wastewater treatment plants, presented in Table 1. As can be seen each process has both advantages and disadvantages. The process of obtaining bricks from sludge does not present any disadvantage and makes this a viable solution both from economic point of view and from environmental protection point of view.

**Table no. 1. Options available for the use and disposal of sludge, and their practical benefits and constraints**

| Options | Benefits | Constraints |
|---|---|---|
| **Sludge use options – land based** | | |
| • Agriculture<br>• Reclamation<br>• Silviculture<br>• Forestry<br>• Amenity<br>• Horticulture | • Policy<br>• Nutrients<br>• Organic matter<br>• Low cost/low technology | • Voluntary<br>• Vulnerable<br>• Variable demand<br>• Quality<br>• Impacts<br>• Competition |
| **Sludge use options – fuel based** | | |
| • Incineration<br>• Supplementary fuel for power and processes<br>• Gasification | • "Green" energy<br>• Transport costs (if on site)<br>• Continuous process | • Public perception<br>• Planning controls<br>• Costs<br>• Emissions<br>• Ash disposal |

| Options | Benefits | Constraints |
|---|---|---|
| **Sludge disposal options – land based** | | |
| • Landfill<br>- Mono<br>- Co-disposal | • Low cost<br>• Low technology<br>• Fill and forget<br>• Enhanced CH4 recovery | • Gas emissions<br>• Leachate<br>• Legacy<br>• Resource loss<br>• Void loss |
| **Sludge disposal options – water based** | | |
| • Surface waters | • Low cost<br>• Low technology<br>• Biological productivity<br>• CO2 fixation | • Contaminants<br>• Nutrients<br>• Perception |

Although sludges represent only 2% of the total wastewater, the costs related to sludge management vary between (20-60)% from the total operating costs of the treatment plant (Foladori et al., 2010). Considering these figures, even though there are many recipes for making bricks from the market, research in the field must continue to reduce pollution and reduce resource depletion, problems that contribute to the intensification of climate change.

## Literature Review

One of the most important problems facing society today is the large amount of waste generated by agriculture, industry and constructions in the context of accelerated consumption, until depletion of natural resources. Thus, at a worldwide level, there are intense concerns for managing waste in an environmentally sound manner and making use of the secondary materials they contain. In the scientific literature are mentioned studies regarding the utilization of agricultural waste such as coconut shell [Sujatha & Balakrishnan, 2021; Hamada *et al*., 2020], rice bark [Ketov *et al*., 2021; Jittin *et al*., 2020], peanut husk [Zúñiga-Torres *et al*., 2021; Maraveas, 2020], spent coffee ground [Saberian *et al*., 2021; Lachheb *et al*., 2019], olives pomace [Lopez-Garcia *et al*., 2021; El Boukili *et al*., 2021; José & Castro, 2018], grain straw [Calatan *et al*., 2020; Olacia *et al*., 2020; Xing *et al*., 2018], hemp [Nováková., 2018], foam from vines [Taurino *et al*., 2019], berries sugar cane [Ricciardi *et al*., 2020; Daheriya & Singh, 2018], waste from industrial sludge [Gomez *et al*., 2019; Daheriya & Singh, 2018], fiber waste glass [Munir *et al*., 2021; Xin *et al*., 2021] and even the reuse of waste to make a similar product (expensive clay mites) [Huarachi *et al*., 2020] in different combinations and

proportions. Attempts have also been made to obtain bricks products from plant fibers (chopped stems, seed husks, sawdust) clay, construction waste, industrial waste [Priyadarshini *et al*., 2021; Ganesh *et al*., 2020; Daheriya & Singh, 2018].

**Theoretical Background**

The preparation of the sludge sample from the characteristics of the treated wastewater to the dewatering process, has a dual purpose: relevance and success of the experiment, i.e. access to a positive result with respect to the initial objective. [Gomes et al., 2019]

Each step of the process will be influenced by the previous ones, the links between initial conditions and results are affected by a complexity of factors.

Stages of the sludge recovery and inerting process:

a) obtaining sludge by wastewater treatment;
b) dewatering of sludge by filtration on bag filters and/or centrifugation on a laboratory centrifuge;
c) sludge recovery by cement inerting.

**Structure of the production process of sludge bricks from wastewater treatment plants**

a) Obtaining sludge from wastewater treatment.

- Sampling Plan elaboration which takes into account the sampling objectives. The objective of sludge sampling is to provide representative samples for the sludge batch for which the experimental tests are being carried out. The aim is to obtain representative and valid (real) samples for the full characterisation of the constituent/constituents of the environmental component under examination. This means that the samples must be collected and preserved (kept under specific preservation conditions - by refrigeration or chemical treatment) so that the quality indicators measured in the sample itself have the same value as the entire composition of the generated sludge.
- Analyses required for the sampled samples. Physico-chemical analyses (pH, total organic carbon, dissolved organic carbon, moisture, organic substances, inorganic substances, chlorides, sulphates, fluorides, phenol index, total dissolved substances, metals - arsenic, cadmium, copper, total chromium, molybdenum, nickel, lead, zinc, mercury) will be carried out. Characteristics of the technological process from which the sludge to be tested originates: the technological process from which the sludge to be tested originates is a

physico-chemical process for the treatment of technological wastewater. The physico-chemical characteristics of these waters may vary. These characteristics will be mentioned for each experimental test performed. Depending on these characteristics, the dose of coagulant added (10% aluminium sulphate solution) will also vary.

- Sampling methodology. Sampling involves the collection of samples from different points of the charge under investigation. According to the working procedure of these standards, for a maximum quantity of 2 tons of sludge, 10 samples of 200 grams are taken, constituting a homogeneous sample of 2 kg. Ten such 2 kg samples were taken. These were then homogenised and the sample was formed for the experiments to be carried out. Samples are taken in plastic or borosilicate glass containers of 2000 ml volume, washed and kept in 5% (v/v) nitric acid solution for 24 hours and rinsed 2-3 times with distilled water, then filled and acid added for preservation); finally, they are sealed. Transport and preservation of the sample is carried out at (2 – 5)ºC and under safe conditions to avoid damage or destruction of the container and contamination or loss of the sample.
- Sampling Frequency. Sampling is done at each sludge discharge from the treatment plant, generally weekly, in order to test each charge of sludge generated by the wastewater treatment process.
- Location and sampling points. The sampling location is at the discharge from the secondary clarifier.
- Sample coding. Sample coding must be clear, representative of the sample taken.

b) Sludge dewatering. Sludge dewatering is carried out by filtration on bag filters and/or centrifugation on a laboratory centrifuge. This aims to obtain a sludge with a moisture content of less than 80%, according to the requirements of the proposed patent technology.

c) Sludge recovery by cement inerting in order to obtain bricks. The centrifuged sludge is mixed in the ratio of: 45% cement + 55% sludge. The mixture is homogenised for 15 minutes until a homogeneous paste is obtained and poured into metal or wooden moulds. Leave to dry for 24 hours, then removed from the moulds and leave in the open air for 3-4 days to allow the lime in the sludge to come into contact with the $CO_2$ in the air, which helps increase strength.

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**Experimental tests of the process of obtaining bricks**

Centrifuged sludge is mixed in the ratio of: 45% cement + 55% sludge. The mixture is homogenised for 15 minutes until a homogeneous paste is obtained and poured into metal or wooden moulds. Leave to dry for 24 hours, then remove from the moulds and leave in the open air for 3-4 days to allow the lime in the sludge to come into contact with the CO2 in the air, which helps increase strength.

Only 3 of the experimental results are shown in Table 2.

**Table no. 2. Experimental tests**

| Experiment | Sludge sample code | Final product code | Sludge sampling date | Experiment date |
|---|---|---|---|---|
| 2. 08. | N8 | 2.08 | 04.05.2020 | 04.05.2020 |
| 2. 09. | N8 | 2.09 | 04.05.2020 | 04.05.2020 |
| 2. 10. | N8 | 2.10 | 04.05.2020 | 04.05.2020 |

During the test period, wastewater with varying physico-chemical characteristics was treated in the treatment plant (Table 3).

**Table no. 3. Physico-chemical characteristics of waste water from which raw sludge for experiments is obtained**

| Parameter | MU | Values |
|---|---|---|
| pH | Unit. pH | 8,75-8,89 |
| Suspended solids | mg/L | 510,8- 625,0 |
| Biochemical Oxygen Consumption | mg $O_2$/L | 342,91-36,22 |
| Chemical Oxygen Consumption | mg $O_2$/L | 672,18-685,04 |
| Detergents | mg/L | 3,01-3,32 |
| Total Phosphorus | mg/L | 2,61-2,87 |
| Sulphates | mg/L | 376,78-396,37 |
| Ammonium | mg/L | 2,62-2,86 |
| Extractable substances | mg/L | 30-30,9 |

I. Aluminium sulphate: 0.5 g/l wastewater.

*Sludge sampling from treatment plant.* According to the working procedure for a maximum quantity of 2 tons of sludge, 10 samples of 200 grams each were taken

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to form a homogeneous sample of 2 kg, then all the indications mentioned in the Methodology chapter were followed. The constituted sludge sample was coded and sampled into 3 subsamples for the experimental tests that were carried out. The part of the sludge sample separated for physico-chemical determinations was preserved in jar glass (Fig. 2) and taken from the raw sludge (Fig. 3). The final product is shown in Fig. 4.

**Figure no. 2. Preserved sludge sample for physico-chemical analysis sample code N8**

**Figure no. 3. Raw sludge used in experiments**

**Figure no. 4. Final brick product sample code 2.08**

Description of the sludge sample, after wastewater treatment:
- Semi-liquid, dark blue appearance with grey iridescence.
- Sludge moisture before filtration and centrifugation: 97.05%.
- Sludge moisture after filtering on bag filter and centrifugation: 64.99%.
- Quantity of sludge used to obtain final product, brick: 2.75 kg.
- Quantity of cement used to obtain final product, brick: 2,25 kg.

Working method for the preparation of the final brick product:

The raw water sample is treated with aluminium sulphate, dose 0,5 gr/L, for precipitation and coagulation of organic and inorganic substances. The resulting sludge after settling for 24 h is filtered on filter bags and centrifuged on laboratory centrifuge. The dewatered sludge is mixed in the ratio of: 45% cement + 55% sludge. The mixture is homogenised for 15 minutes until a homogeneous paste is obtained and poured into metal or wooden moulds. Leave to dry for 24 hours, then remove from the moulds and leave in the open air for 3-4 days to allow the sludge cousin to come into contact with the $CO_2$ in the air, which helps increase strength.

**Conclusion**

Efficient and quality wastewater management ensures that sludge of appropriate quality is obtained for management and recovery according to the proposed technology (inertness and end product: bricks and plaster). The new technology for obtaining bricks, dealt with in this article, is a technology for depollution and recovery of waste, eliminating the potential impact on environmental factors (water, air, soil). Wastewater treatment plants that implement such sludge recovery technologies can minimise their operating costs (transport, storage and waste disposal), and even more so, they can obtain additional income from the sale of the bricks.

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# RANKING OF EU COUNTRIES ACCORDING TO INNOVATION POTENTIAL

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**Abstract**

*The purpose of the paper is to rank all 27 countries of the European Union (EU) according to selected indicators of innovation potential. In a high-tech society, the main factor of economic development are activities related to research and development (R&D). The author singled out five relevant indicators from the Eurostat database in the assessment of the conditions for innovation development in the EU using the MOORA (Multi-Objective Optimization on the basis of Ratio Analysis) method. Based on the conducted multi-criteria analysis, the author concludes that Germany, Sweden, France and the Netherlands have the best innovation performance, so that these countries are the closest to achieving the goals of a highly competitive economy and sustainable economic development. On the other hand, Romania, Cyprus, Slovakia and Croatia show the weakest innovation potential, followed by other newer EU members.*

**Key words:** *innovation, research and development (R&D), MOORA (Multi-Objective Optimization on the basis of Ratio Analysis) method, composite index, European Union (EU) countries.*

**JEL Classification:** C44, O30

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## Introduction

Sustainable development is a multidisciplinary concept. It includes 17 goals, among which is Goal 9 - *Industry, innovation and infrastructure* [United Nations Development Programme, 2022]. The importance of this goal is also recognized by the European Union (EU), so the 2030 Agenda especially emphasizes innovations with the aim of reaching a high level of sustainable development within this integration of countries [Denoncourt, 2020]. Encouraging innovation and competitiveness in the area of the EU are listed as important goals within the framework of the Lisbon Strategy.

Innovative activities that are primarily aimed at researching long-term solutions for sustainable socio-economic development are particularly in the focus of policy makers. In order to achieve the principles of the concept of clean economy and sustainable development, environmental protection is extremely important. Greening the economy is at the top of the EU's priorities, so innovation and research and development (R&D) activities are often moderated towards environmental sustainability. This will enable industrialization in a sustainable way.

R&D are activities that improve knowledge and enable the use of that knowledge to create new products and services. Without scientific research, it is not possible to realize development based on knowledge and innovation. Countries that are leaders in innovation were the first to recognize the importance of innovative activities for economic development.

The paper aims to measure the innovation potential of EU countries according to the level of innovation performance. The Eurostat database and selected indicators were used as a data source: 1) *Gross domestic expenditure on R&D*, 2) *R&D personnel*, 3) *Tertiary educational attainment*, 4) *High-speed internet coverage*, and 5) *Patent applications to the European Patent Office*. The values of these indicators are from the last available year in the Eurostat database. The MOORA (Multi-Objective Optimization on the basis of Ratio Analysis) method was applied as a multi-criteria analysis method, while the equal weighting approach was used to determine the weighting coefficients that reflect the relative importance of the indicators.

The study is important for two reasons. First, based on the calculated innovation potential, a comparison will be made of the success of EU countries in achieving sustainable and smart development. On the other hand, poorly positioned countries can, from the experience of high-ranking countries, implement similar programs to

promote education, the importance of innovation and R&D. As a rule, European economies that invest insufficiently in infrastructure and the scientific research sector lag behind economic development.

The paper consists of several sections. The first section is dedicated to the importance of selected indicators for building innovation potential and sustainable development. Then, the applied methodology is described in detail. The final section summarizes and discusses the results. The concluding remarks provide an overview of the most important research results, their implications and suggestions for future research.

**Literature Review and Theoretical Background**

Innovations are the basis of competitiveness of every economy and a factor of economic development [Kaynak *et al.*, 2017]. Herman [2018] points out that a strong connection between innovation, competitiveness and entrepreneurship is needed in order to achieve sustainable and inclusive development. Innovations play a significant role in changing the economic structure and dynamics of investments. In this way, they can solve the problem of high import dependence and insufficient exports. That is why economic policy makers implement support measures to increase the interest of individuals in innovation, as well as increase the number of scientists in scientific institutions. The globalization process and the development of information and communication technology have contributed to the development of innovations.

Higher allocations for R&D enable sustainable growth and development through increased productivity, efficiency and new employment. If innovation is directed towards the development of environmentally clean technologies and increased safety and security at work, R&D can play a decisive role in environmental protection and the achievement of social sustainability and sustainable industrialization.

Many studies deal with the role and importance of innovation in the economy. The authors study the innovation potential of the economy, especially at the EU level, and use mostly similar indicators. Thus Baescu *et al.* [2015], in addition to indicators related to R&D activities and education of the population, also use the level of economic development and exports of countries. However, they argue that R&D expenditures do not have a positive effect on increasing the number of patent applications, unlike the number of employees in the R&D sector.

According to the global composite index - European innovation scoreboard [European innovation scoreboard, 2021], Sweden, Finland, Denmark and Belgium have the best innovation performance in the EU. In addition, the EU as an economic integration has a lower innovation performance compared to South Korea, Canada, Australia, the United States and Japan. That is why the EU must encourage innovation through various strategies and programs, primarily in lower-ranked countries.

The aim of this paper is to quantify such a complex problem with an appropriate multi-criteria decision-making method. It is an aggregate method that transforms various variables into a unique composite index on the basis of which the achieved level of development is assessed. Recently, the role of composite indicators in the evaluation of innovation potential and performance has increased [Paas & Poltimäe, 2010]. They are significant not only for understanding the position of an individual economy, but also for international comparisons. There is also a wide range of innovation indicators that can be included when aggregating data, as well as many methods of multi-criteria analysis.

As human capital is the main factor in the creation of innovations [Hollanders & Arundel, 2007], the following indicators were used in the research: R&D personnel and Tertiary educational attainment. Human capital creates and uses innovation. Consequently, it is important that as many people as possible successfully complete tertiary education, and that some of them carry out R&D activities. Creative and smart industry is based mainly on quality human resources. That is why the EU aims to reach the target of 45% of the population aged 25 to 34 with a tertiary degree by 2030 [SDG 9 - Industry, innovation and infrastructure, 2022]. This goal has been achieved by 11 EU countries so far. According to Eurostat data, Luxembourg is the most successful in this, while Romania is at the back.

Another significant indicator of the innovation potential of the economy is the number of patent applications. The most common representation of a country's innovation potential is the number of patents and investments in R&D [Paas & Poltimäe, 2010]. Their realization is of key importance for smart and sustainable development at the EU level in the future [Roszko-Wójtowicz & Białek, 2016], and especially for generating knowledge and creating patents [Janjić *et al.*, 2021].

All EU countries aim to increase the speed of communication, because it affects the speed of transactions, greater availability of services and faster business in all sectors: agriculture, industry, service sector. Digitization of the economy and information and communication technologies enables its accelerated economic

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development, and provides the population sector with better access to health care and educational services Malta is the only country with 100% high-speed internet coverage in the EU [Eurostat, 2022].

Based on the researched literature and the availability of data in the Eurostat database, the author chose five key indicators that best represent the conditions for innovation development. They refer to financial allocations for R&D, human capital, adequate infrastructure and the number of registered patents. Table 1 highlights the analyzed indicators and provides a brief explanation for each of them.

**Table no. 1. Description of innovation indicators**

| Indicator | Interpretation |
|---|---|
| Gross domestic expenditure on R&D (in %; 2020) | This indicator describes the share of gross domestic product that is directed to R&D. |
| R&D personnel (in %; 2020) | This indicator represents the share of R&D personnel in the total labour force in the country. |
| Tertiary educational attainment (in %; 2021) | The indicator shows the share of the population who completed tertiary studies in the age group of 25 to 34 years. |
| High-speed internet coverage (in %; 2021) | The indicator aims to show how many households (in %) have the possibility to use a fixed network of very high capacity. |
| Patent applications to the European Patent Office (2021) | This absolute indicator measures the number of applications for patent protection by applicants'/inventors' country of residence. |

Source: *Eurostat*, 2022.

**Methodology**

The MOORA method is a newer, widely used multi-criteria decision-making method [Marjanović *et al.*, 2019]. The goal is to obtain composite index values that will reduce multidimensional issues such as this to a single measure. The value obtained by applying this method will indicate the degree of innovation potential, with higher values indicating higher success in creating conditions for the development of innovation and high-tech industry. On the other hand, an equal weighting approach was used as a method for determining the weight coefficients, where each criterion/indicator will have equal relative importance in the

construction of the composite index. In this way, subjectivity is avoided in determining the importance of indicators.

Application of the MOORA method requires compliance with the following steps [Brauers & Zavadskas, 2006; Gadakh *et al.*, 2013; Madić *et al.*, 2015; Marjanović *et al.*, 2019]:

Step 1. Formation of a normalized decision matrix:

$$x_{ij}^{*} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^{2}}}$$

where:

$i$ = 1, 2, …, $m$ (number of indicators); and $j$ = 1, 2, …, $n$ (number of alternatives).

Step 2. In this step, the sum of the values for the cost indicators is subtracted from the sum of the values for the revenue indicators:

$$y_{ij} = \sum_{j=1}^{g} w_j x_{ij}^{*} - \sum_{j=g+1}^{n} w_j x_{ij}^{*}$$

where:

$i$ = 1, 2, …, $g$ (the indicators to be maximized); and $i = g+1, g+2, \ldots, n$ (the indicators to be minimized), $w_j$ - the weight coefficients.

Step 3. Ranking of the alternatives according to the decreasing values of the composite index.

**Results and Discussion**

The practical part of the research begins with descriptive statistics. Table 2 summarizes the minimum, maximum and mean values of the indicator for the 27 EU countries, as well as the size of the standard deviation. EU countries show the biggest differences in performance related to *Patent applications to the European Patent Office*.

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**Table no. 2. Descriptive statistics of indicators**

| | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| Gross domestic expenditure on R&D | 0,47 (Romania) | 3,53 (Sweden) | 1,78 | 0,92 |
| R&D personnel | 0,41 (Romania) | 2,12 (Denmark) | 1,32 | 0,50 |
| Tertiary educational attainment | 24,90 (Romania) | 60,60 (Luxembourg) | 43,38 | 9,18 |
| High-speed internet coverage | 10,20 (Greece) | 100,00 (Malta) | 65,14 | 23,50 |
| Patent applications to the European Patent Office | 22 (Latvia) | 25.969 (Germany) | 2.507,89 | 5.320,66 |

Source: Author's calculation.

Sweden is the leader in R&D expenditures with 3.53% of the gross domestic product. The EU has predicted that allocations for these purposes will be over 3% by 2030 [Maier, 2018]. Looking at individual countries, in addition to Sweden, only three other EU countries reached that target: Belgium, Germany and Denmark. [Eurostat, 2022]. Romania shows the lowest values of indicators related to *Gross domestic expenditure on R&D*, *R&D personnel* and *Tertiary educational attainment*.

Table 3 shows the calculated weight coefficients that participate in determining the final value of the composite index. The author chose the approach of equal weighting, since each of the criteria has equal relative importance for assessing the position of countries according to the conditions for the development of innovations.

**Table no. 3. Weighting coefficients obtained by the equal weighting method**

| Indicator | Weights |
|---|---|
| Gross domestic expenditure on R&D | 0,20 |
| R&D personnel | 0,20 |
| Tertiary educational attainment | 0,20 |
| High-speed internet coverage | 0,20 |
| Patent applications to the European Patent Office | 0,20 |

Source: Author's calculation.

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Table 4 provides an overview of the ranking of European countries according to the value of the obtained composite index. The most successful countries in creating the conditions for innovation development are Germany, Sweden, France, the Netherlands and Denmark. These are countries that are at the very top in terms of the intensity of R&D at the EU level. In addition, Germany and France have the highest number of patent applications. On the other hand, at the bottom of the list are Romania, Cyprus, Slovakia and Croatia. These are newer EU member states. All countries below Slovenia in the table have a composite index value below the EU average of 0.1611. Romania is in the worst position, so it must be in the focus of EU economic policy makers in the area of innovation in the coming period.

**Table no. 4. Composite index of innovation performance of EU countries (MOORA method)**

| Country | Score | Rank | Country | Score | Rank |
|---|---|---|---|---|---|
| Germany | 0,3436 | 1 | Lithuania | 0,1367 | 15 |
| Sweden | 0,2381 | 2 | Estonia | 0,1359 | 16 |
| France | 0,2316 | 3 | Poland | 0,1321 | 17 |
| Netherlands | 0,2308 | 4 | Czechia | 0,1293 | 18 |
| Denmark | 0,2272 | 5 | Malta | 0,1223 | 19 |
| Belgium | 0,2195 | 6 | Latvia | 0,1206 | 20 |
| Finland | 0,2016 | 7 | Hungary | 0,1201 | 21 |
| Austria | 0,1851 | 8 | Bulgaria | 0,1096 | 22 |
| Luxembourg | 0,1802 | 9 | Greece | 0,1094 | 23 |
| Ireland | 0,1658 | 10 | Croatia | 0,1060 | 24 |
| Slovenia | 0,1612 | 11 | Slovakia | 0,1019 | 25 |
| Spain | 0,1606 | 12 | Cyprus | 0,0946 | 26 |
| Portugal | 0,1548 | 13 | Romania | 0,0844 | 27 |
| Italia | 0,1459 | 14 | | | |

Source: Author's calculation.

## Conclusion

Germany is by far the most successful country when it comes to innovation performance. Sweden is in second place in terms of innovation potential in the EU. The key factors of the high position are high investments in the R&D sector (Sweden), as well as a large number of patent applications to the European Office (Germany). The experience and practice of Germany and Sweden can be of

importance to other countries that want to improve their innovation potential. However, the author believes that highly developed countries have significantly greater opportunities for convergence due to significant investments in education and R&D. Therefore, in addition to structural reforms, additional funds must often be provided for the development of innovations in less developed countries. The author concludes that the countries of Western and Northern Europe have the best innovation potential. On the other hand, Romania and Cyprus record the lowest values of the composite index of innovation according to the results of the applied method.

The EU members who joined the EU at the latest must implement structural reforms in order to improve innovation capacity because they have shown the worst results. In doing so, science and technology must play a major role. Despite the many socio-economic challenges they face, adopting strategies to support innovation can help achieve economic growth in the long term. The benchmark can be high-ranking European countries, whose practice can serve them for convergence in the future. The results of this paper show a similar ranking as shown by previous studies that measured the innovation potential and performance of EU countries.

Future research can include more variables in the evaluation of the innovation potential of EU countries. Also, the analysis may include candidate countries for EU membership after the data are available in the Eurostat database. In addition, authors can use other methods of multi-criteria decision-making such as TOPSIS, PROMETHEE, Gray Relational Analysis, etc.

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# TECHNO-GLOBALISATION AND LABOUR SUSTAINABILITY IN AN ERA OF THE 4TH INDUSTRIAL REVOLUTION

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**Abstract**

*Capitalism, as it is known is based on the concepts of competition, profit motive, private enterprises (self-interest) and scientific management. These key catalysts set the motion for capitalist expansion, exploration and exploitation. One notable area where capitalism has naturally done exceptionally well based on its characteristics, is within the domain of scientific management, which has spurred technological innovations as well as triggered techno-globalisation. In spite of several warning signs of the impact of techno-globalisation on the sustainability of labour, the world advanced into the 4th Industrial Revolutions, which is also driven by highly sophisticated technological advancements. The 4th IR has unique features, namely, smartphone takeover almost every aspect of business activity; knowledge generation is made possible through big data; robotics may likely replace many human routine activities in the workplace. The new trend will certainly lead to massive job losses as well as create new ones within the industry, which could have detriment effects for labour sustainability. However, some mechanisms have been postulated in this treatise to improve the status quo.*

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**Keywords:** *Capitalism, Fourth Industrial Revolution, Techno-globalisation, Technological Innovation; Unemployment, Re-engineering, Downsizing.*

**JEL Classification:** F02; F66; O31 & O33

## Introduction

Capitalism as it is known is based on the concepts of competition, profit motive, private enterprises (self-interest) and scientific management. These key catalysts set the motion for capitalist expansion, exploration and exploitation. One notable area where capitalism has naturally done exceptionally well based on its characteristics, is within the domain of scientific management, namely technological innovation, which finally resulted in the triumph of capitalism as the reigning orthodoxy over other economic patterns, namely socialism and communism, which culminated in what is commonly known today as global capitalism or capitalist globalisation. Thus, experts seem to have universally agreed that capitalist globalisation is an inescapable product of innovations in technology (Went, 2000). In order words, it would have been difficult for globalisation to materialise without great technological innovations within the domains of communication, data processing as well as transportation (Scholte, 2000). Certainly, innovation in technology has boosted communication and at the same time, reduced transportation cost (Gomory and Baumol, 2004). For instance, Legrain (2002) noted that the cost of sea freight drastically came down from 1920 onward, and that of air flight came down from 1930 onward and a major part of the importation and exportation in and out of the USA is through aeroplane, in recent times. In that regard, Scholte (2000, also cited in Ukpere, 2010) noted that technology has, indeed spurred globalisation and vice versa.

Indeed, innovations in technology has boosted communication, finance, production and marketing across the globe. New technological innovations in the putative globalist era encompasses e-mails, voice mail, videophones, video conferencing, and etcetera. The advent of broadband technologies, in the form of Integrated Service Digital Network (ISDN) as well as the exceptionally high-velocity Asynchronous Transfer Mode (ATM) invented in 1980s, have enabled fibre-optic cables to carry sound recordings, graphic material, motion pictures, text and massive bulk of digitised data with voice (Scholte, 2000). Processing of data

through digital machine is indeed an additional key domain where innovation in technology has supported global organisations in their day-to-day activities. Global financial organisations for instance, have greatly depended on far-reaching automated management information systems. Advancement in technological innovations has boosted banking operations across the globe as funds can easily be transferred from any branch or bank to the other by simply pressing a computer keyboard. Hence, a key aspect of globalisation, is technological advancements and innovations, which has boosted major economic activities.

Indeed, innovations in technology have played a key role in advancing modern organisation in the era of globalisation. For instance, the velocity of digital processing has rapidly increased, while the internet has significantly impacted the world as never before imagined (Petersen, et al., 2001). Therefore, technological innovations appear to have put everyone and everything on a fast gear (Went (2000). Indeed, technological changes have great impact on companies' demand for labour. As a matter of fact, new technologies have accelerated the pace of globalisation, while at the same time global competition arising from globalisation has stimulated advancement in technological innovations, which has spread across nations through foreign direct investment (FDI) (Intriligator, 2003; Gomory and Baumol, 2004). A majority of organisations utilise modern technologies for cost effectiveness in the domain of production and service delivery.

In recent times spoken words, faxes and computerised data can now reach the nook and cranny of the globe in a twinkle of an eye. Globalisation can therefore be synonymous with techno-globalisation. Schuch (2007) perceives techno-globalisation as a world-wide pervasion in the creation of technological knowledge and the use of innovations that has technological contents. In fact, techno-globalisation has supported social interaction as well as organisational meeting and transactions across the globe. However, rapid innovations in technology may as well come in the way of labour sustainability as constant plant retooling could result in short-term downsizings, and changes in the kind of skills required by workers in the workplace, render them redundant, thereby pushing them in most cases into long-term joblessness.

**Problem Statement**

There is a growing concern that in few years to come, human labour as it is known may vanish from the production chain due to the incursion of high-powered technological innovations in the age of the 4th IR.

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**Research Objectives**

The paper explores techno-globalization and labour sustainability in an era 4th Industrial Revolution by giving a deep context to both historical and current pertinent literatures and issues on the subject matter.

**Research approach**

The times constraints with which the paper was developed made it a conceptual paper that relied majorly on secondary data. It considers techno-globalization from an emic perspective. The paper also entails thick theory building, reviewing of pertinent literature from a historical context and the utilisation of natural scientific approach in analysing divergent perspectives related to the subject matter.

**Theory building and thick review of pertinent literatures**

The key doctrines of global capitalism, include private enterprise (self-interest), competition, profit motive and Scientific Management. The above doctrines of global capitalism will be illuminated one after another to reinforce discourse on the research focus.

**The doctrine of private enterprise (self-interest)**

Global capitalism, similar to original capitalism strongly belief in ***private enterprises (self-interest)***, with regards to the ownership production and service outlets. In other words, every living soul is responsible to take good care of him/herself, particularly in making rational or irrational financial decisions. Hence, it is the responsibility of every individual to put in hard efforts as well as utilise all available resources towards an economic end, namely profitability (Leatt, et al, 1986; Ukpere, 2010). As a matter of fact, people are born different, as such, society should comprise of different individuals chasing their own respective self-interest based on economic freedom without being constrained by anybody (Hooker, 2004). This doctrine presupposes that self-interest is the oil of good relationships (Hilfiker, 1998). Thus, it was argued that the wealth of a nation depends on all individuals chasing their self-interested goals (Donaldson and Pollin, 1978). That is, individual in an effort to better themselves end up bettering the nation at large. Adam smith was of the view that individually, people do not plan to advance the interest of the public or understand the level to which they are advancing it. He believed that individual interest is also in the interest of the nation. In his view, an individual is naturally prompted by an invisible hand to advance a

course, which was not part of the individual's original plan. Thus, by chasing his personal goals he/she in many instances advance societal goals more effectively than when he deliberately plans to do so (Smith (Wealth of Nation), 1776, Heilbroner, 2002).

In similar vein, Klein (2003) was of the view that the invisible hand works in tandem with the natural law nature, which directs people with self-interest in a way that brings benefit to society. In that sense, the profit an individual receives from an economic endeavour is in most cases proportional to the productivity of his resources, in terms of skill and technology with which he/she can turn raw materials into finished goods. In that vein, Smith (Wealth of Nation), 1776, mentioned in Klein, 2003) noted that, it is not from the kindness of the brewer, the butcher, or the baker that people hope to get their dinner, but through the interest in their personal ventures. Put differently, the 'invisible hand' explains the fact that producers manufacture products to earn surplus income also known as profit motive.

**The doctrine of profit motive**

The capitalist global economy is totally based on profit motive. On the basis of this notion, profit is considered supreme and, how the earning of such profit affect goods and services as well as human beings as employees in the process of earning such abnormal profit, matters little to the executives of organisations. In other words, the key perimeter for gaging efficiency since the dawn of globalisation, is the total profit that an organisation can earn after deducting expenditures. Under the current dispensation, profit is pursued with reckless abandon (Martin and Schumann, 1997) and, most often than not, the welfare of human beings is forfeited for the sake of profit. For instance, the massive job destruction and poor working conditions of workers in recent times both in the rich and poor countries, could be linked to most organisations' tendency toward making extraordinary profits (Bloch, 1998). According to Martin & Schumann (1997), while corporate profits are increasing in recent times in double digit jumps, salaries and wages of employees continue to go down. Indeed, the chase for profit maximisation could be responsible for the myriad of inferior products and services in the market nowadays (Hooker, 2004). The craze for profit could even prompt some corporations to sacrifice human health simply to earn profit within the global economic setting. For instance, the pollution and effluent by some of the big global corporations have not been addressed till today owing to the supremacy of profit motive (Scholte, 2000). Other instances where the health of humans seem to have been ignored for the sake

of profit, was the contention and rancour that unfolded between pharmaceutical corporations for the supply of drug that could save lives, such as ARVs for people living with HIV/AIDS. Indeed, it was palpable that power struggle involved in the tussle boils down to their craze for profit maximisation (Sklair, 2002). Hence, capitalist globalisation seems to have triggered a global economy where anything can be put aside to earn profit to remain competitive.

**The doctrine of competition**

The next doctrine of global capitalism is free competition. Free competition simply means that manufacturers and employees have to compete amongst themselves in an open market. In that way, an individual who can offer quality and quantity of product or services at a cheaper rate than others, have a comparative edge in the market (Leatt, et al., 1986). Hence, tough competition results in determined efforts to outperform other competitors. (Manicas, 2000). Such outlook will encourage people to thinks innovatively in order to perform effectively, which encourage the use of better techniques in the field of product development and service delivery (Leatt, et al., 1986). This is the only sure way to survive in an open market. The same applies to workers, as highly skilled and efficient workers are remunerated highly because they contribute towards higher performance and productivity (Leatt, et al., 1986). Competition is also based on the idea of natural selection, which infers that in nature, only the fit survives, while the unfit dies a natural death. This idea seems to resonate well with the dictum 'survival of the fittest' or 'struggle for survival', which forms part of the views of social Darwinism, which believes that in nature, the strong habitants survive, whilst the weak ones die off. As such, there is no need to assist the weak to survive under the law of natural selection (Klein, 2003, also see Ukpere, 2007). Therefore, in similar way, with which an entrepreneur acts in order to make profits, an employees may also endeavour to change job that gives him/her a higher income. An individual who gets a wage might out of his free volition, seek a more lucrative job in another organisation. From that perspective, a farm-employee who has meaningful job of food production from the viewpoint of others, might latter consider getting an employment in the factory by producing what people may consider as worthless plastic junks, which in most cases ends up rapidly in the garbage can. In this scenario, the farm worker has acted in similar way in his quest to get additional income like the capitalist, whose interest is to make a supernormal profit. Hence, in of their bid to earn higher income or supernormal profit, they are similarly imbued with acquisitive tendencies in their craving for higher income and profit under a

competitive atmosphere, which is very peculiar with the capitalist mode of operation (Donaldson and Pollin, 1978). From the perspectives of Schumpeter (1976, cited in Stokvis, 2001), capitalism is ever-changing, and this change comes as a result of the rivalry amongst the capitalists and the organisation created by them. The result of their competitive drive is a continuous hurricane of creative destruction according to Stokvis, (2001). From Schumpeterian (2017) perspective, there are five domains of possible competitive advantages, namely process of production, products, resources, markets, and organisation. He posited that any domain that brings a competitive advantage to a firm over its rivals, is germane to the competitive race. Therefore, for people and organisations to grow, there is a need for them to compete with others. In fact, competition within the global village has been likened to a flood tide that has engulfed everyone (Reuter 1993, cited in Martin and Schumann, 1997). The capitalist global system has prompted organisations not just to compete locally but globally. For organisations to survive within the global economic setting, they must not only focus on domestic competition but should be able to compete globally. Competition within the global village is not merely in terms of product quality, prices or services, but in all areas that brings competitive advantage to the firm (Stokvis, 2001).

Knowledge as well as information has a powerful role to play when it comes to competition, because it helps firms to become well-versed in the competitive tussle taking place within the global village. Awareness is obtained through information required for innovation that could improve the competitive drives of a particular organisation above others. Hence, information that results in a better wealth creation, is utilised for innovative activities in the rivalry between firms (Stokvis, 2001). Global competition, for instance, has made some corporations to utilise innovation, based on information and knowledge, in developing some array of technologies to increase their competitiveness. Hence, a comparatively small business enterprise with few workers, assets or sales volume, could indeed hold a leading position as a distributor of vital goods and services owing to its superiority in the use technology more than its rivals (Sklair, 2002). As aforementioned, global competition seems similar to the process of natural selection (Dennett, 1995) where the not so strong fizzles away and the very strong remains. In that case, any corporation that is unprepared and unaware to respond to the current global competition, will end up losing its market share and profit within a global economic platform. Hence, in order for a company to subsist, it is crucial for it to be more flexible in adapting to the dynamics of the current competitive environment (Kirkbride, 2001).

The current global competition has triggered new corporate ways of achieving efficiency such as merger and acquisition, re-engineering, downsizing, lean manufacturing, and outsourcing, all of which are directed towards job destruction. Unemployment has worsened in many regions as many corporations are downsizing in response to stiff competitions within the global economy (Slabbert, 1996; Scholte, 2000). More than that, the ever-increasing company mergers and acquisitions (M&A) have in most case resulted in huge job losses. The activities of M & A have significantly flourished in response to global competition. In the pharmaceutical industry for instance, the merger of Glaxo and Wellcome caused about 11% contraction of the workforce. Another example was the merger of Pharmacia and Upjohn, which led to the closure of 40% of their plants (FT, 7 March 1996:1 cited in Scholte, 2000). The merger of Chase and Chemical Bank in response to global competition resulted to the termination of 12000 workers job, due to redundancy (FT, 1 April 1996:23, Scholte, 2000). The current outlook seems to make some section to conclude that global competition has made most organisations to become leaner and meaner (Harrison, 1994; Scholte, 2000). Now it is time to progress to the doctrine of scientific management.

**The doctrine of Scientific Management**

The capitalists' quest for new techniques of production, their interest in resources accumulation and overambitious tendencies, activated a powerful interest in science and technology. From that perspective, Leatt, et al. (1986) noted that the developments made people to think that the progress confronting humanity was endless. In similar vein, Queen Victoria of England during an excursion in 1851 to have a look at some of the new scientific discoveries, described what she saw in her diary as follows: *"June 7. To the exhibition: went to the machinery part, where we remained 2 hours, and which is excessively interesting and instructive, and fills one with admiration for the greatness of man's mind, which can carry out and devise such wonderful inventions, contributing to welfare and comfort of the whole world…we are capable of doing anything. Here indeed was the concrete evidence of what capitalism could do. Here were displayed the means by which economic growth was being achieved, how production was expanding to increase the nation's wealth"* (cited in Donaldson and Pollin, 1978:28). These renewed enthusiasm towards science and technology, triggered what was considered as 'Industrial Revolution'.

The Industrial Revolution, which commenced around the late 18th and early 19th century in England triggered a major shift on how labour is managed and utilised in the field of production. What actually transpired was that the steam engine irreversibly transformed the workplace, and turned both horse, buggy and man, into less sought-after commodities, in spite of the warning of then eminent industrialist, Robert Owen (1771-1858), who laid emphasis about the pre-eminence of human beings in the field of production. According to him, the return on investments in human beings are far greater and better than investments in machineries and equipment. As such, managers must put workers first in all they do and provide them with information because an enlightened employee is a productive employee (Prasad, 2004).

Opposed to the position of Owen, other authorities such as Charles Babbage (1792-1871), who was the inventor of the earliest computer, were focussed on developing ideas relating to the efficient use of human resources in the workplace. In his treatise, 'The Economy of Machinery and Manufacturing', he emphasised the need to measure work activities, considers efficient use of tools and machines, specialisation, proper ways of remunerating workers and a need to discover new methods of minimising cost (Bedi, 1998). In fact, Babbage was of the view that technological advancement in production can be gauge by the level at which the task of each employee is simplified and harmonised with the task of other employees, in order to reduce the price companies, pay for employing workers as well as the necessary time to learn each job, so as to weaken workers' bargaining power in order to reduce the wage bills of organisation (Giddens, 1995).

Max Weber (1864-1920) considered the ways various profit ventures and non-trading businesses work and postulated that *'bureaucracy'* is the best way to manage them (Kumar, 2000:40). Following that, the world withnessed the dawn of the '2$^{nd}$ Industrial Revolution' around the middle of the 19$^{th}$ century and some periods within twentieth century. In fact, while steam engines triggered the '*First Industrial Revolution*', the second one was activated when electricity and oil were both discovered (Slabbert, 1996), which brought about major new inventions and developments. The introduction of machinery in production ushered in the factory system of organising industrial activities and ownership of big businesses moved from a single entrepreneur to joint stock companies, which brought about some new breed of capitalists and factory workers. This period also witnessed the

replacement of the rule-of-thumb with more scientific approaches to management (Kumar, 2000).

Although others might have contributed but the most famous contributor to scientific management was Frederick Taylor (1911), a mechanical engineer. Taylor believed that company's aim at high productivity at a reduce cost of production, as well as employees' hopes for higher remuneration, could be harmonised by examining every single parts of a given job in order to establish the most effective ways of doing that job by chosen the best employee for a given job, and training him/her on one best approach to execute task by providing additional incentives for higher performance (Bergh and Theron, 2005). In fact, Taylor's scientific approach of managing workers was greatly accepted under the factory system and popularly referred to as Taylorism. Scientific Taylorism was propounded with a view that human beings are economically rationale. The concept of Taylorism was also based on the precept that human beings are innately lazy, unpredictable, and incompetent, and as such, only monetary rewards can induce them to perform, while their weaknesses should be addressed through standardised training (Bergh and Theron, 2005). In a nutshell, Taylorism believed that scientific methods can be effectively applied in the management of people in the workplace (Bedi, 1998)

Taylor initially believed that his scientific management approach would lead to 'mental revolution' for both the managers and workers. Nonetheless, his prediction of mental revolution failed woefully, in spite of the contribution of his ideas to management thinking. Apart from Taylor, other noteworthy contributors to management in scientific ways, include authorities, such as Henry Fayol, who conceived the idea of a universality of the management principles, Henry Gantt, who examined the behaviour of people within the workplace, Frank & Lillian Gilbreth whose work contributed significantly within the domain of time and motion study, and Harrington Emerson whose treatise advocated for efficacy and proper standard in the workplace (Kumar, 2000). As aforementioned, Taylorism was latter objected by the industrialists, trade unionist, and the general public. The anger towards Taylorism was so terrible to the extent that Taylor was summoned by a special US congressional committee in 1912 to defend his scientific management (Worsfold, 2004).

Reflecting on the opposition against Scientific Taylorism, Bergh and Theron (2005), noted that the opposition was that it was perceived as another form of

workers' exploitation, which failed to take the individual psychological needs of employees into consideration. Taylorism was also perceived to be promoting job destruction as workers became narrowly focussed on a particular job, which gave them no room to change to alternative job. This outlook impacted negatively on their own initiatives and growth. In concordance with the above, Kumar (2000) noted that workers were demoted to become an appendage of the machines in the factories of production. Their work became strictly narrowed to their specific areas of specialisation. It negatively affected their pride and involvement at work. Hence, Taylorism's approach dehumanised the workers as they were demoted to humans without emotion and a mere production factor similar to the machine. As a matter of fact, Scientific Taylorism terrorised the working man and turned him into a simple impersonal cog in the machine of production, merely trained to undertake only what he or she is good at, and forced to focus on that throughout his/her work life, while managerial function is at different location in the organisation (Worsfold, 2004). For the fact that employees were not allowed to initiate ideas as well as show skills, but expected to work exactingly according to supervisor's specifications, their initiative became marred, resulting in boredom and monotony, which finally triggered an industrial action by unions (Kumar, 1993:48). With regards to the flaws of Taylorism, Beundex (cited in Kumar, 2000) noted that as the activities of capitalists expands, the craftsmen regressed; as the common people are brought low, the masters are highly elevated, and, as such, there exists no human connexion between the capitalists and their workers. As a matter of fact, Taylor himself was sincere to put forward three reasons for the outburst towards scientific management, namely 1) workers perceived that a rise in productivity led to increase unemployment; 2) the system led to employees' restriction of their contribution and outputs, also known as systematic soldiering; 3) the routine work activities adversely affects initiative and innovation. The displeasure and anger towards Scientific Management led some experts such as Eton Mayor to start rationalising other better way to manage people in the workplace, which birthed the "Human Relation Approach" of management. However, for the fact that this section is focussed on the scientific management as a doctrine of global capitalism, one will be guided not to dabble into entirely a different topic but focus on scientific management within the context of techno-globalisation, which prompted some experts to paint a gloomy picture of a world without work.

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**The soothsayers of the 4th Industrial Revolution and projection of a grim future for labour**

As far back as 1995 Jeremy Rifkin painted a gloomy picture of the future of labour in his famous treatise, "The end of work". Rifkin (1995) forewarned that before the next century mass labour in the marketplace may disappear in almost every advanced country across the globe. He further warned that the coming revolution would not only affect blue collar workers but white-collar worker as well. While buttressing his point, Rifkin used the USA as an illustration, where 33% of the general employees worked in the production sector within the 1950s. That number declined to 30% around 1960s and came down to 20% around the 1980s and diminished further to about 17% in 1995 (Rifkin, 1995). Compared with Canada, which recorded 23.5% of the labour force in manufacturing in 1966, which declined to about 17.2% around 1986, and came down further to 14.7% around 1991 before finally coming down to 14.2% in 1996 (Statistic Canada, cited in www.ucs.mun.ca/~alatus/2801/FutureofWork.html). Rifkin further drew the world attention to the Moravec's Universal Robots, which is a new technological invention, predicted to replace the human mind altogether (Rifkin 1995). From that vintage point, Leontief Wassily (as seen in Rifkin, 1995) postulated that the special role of human beings as a key factor of production, will certainly shrink in the manner the role of horses in farming initially declined before it was discarded when tractors were introduced into the farms. Rifkin (1995) posited that for certain individuals, notably engineers, scientists, and owners of industry, a world without work will usher in a new epoch in the history of mankind where humans are finally freed from a life of laborious work and monotonous boring activities. However, for other individuals, a society without work invokes a perception of a gloomy future of high-level global joblessness and mass destitution.

As a matter of fact, global job losses is burgeoning since the dawn of globalisation (Ukpere & Slabbert, 2009). The population of those who have lost their jobs have sharply increased as multitude of employees who enter into the labour force suddenly realised that they have been displaced by the introduction recent technological innovations, in the form robotics, super computers, telecommunications, and leading-edge technologies, which has encroached into government, production, finance, retail, agriculture, as well as transportation (Rifkin, 1995). More than that, Rifkin (1995) was of the view that our world has speedily been divided into two conflicting forces, namely an info elite who are in charge of and dominating the high-tech worldwide economy; and on the other pole,

a growing population of perpetually sacked workers, who with little hope or prospects of getting reasonable job in an aggressively computerised work space. He pointed out that, from the origin of civilisation, humans' daily subsistence had been organised, to a great extent, around what is known as work. Nevertheless, in recent times in the history of mankind, human labour is steadily being removed from major economic activities. Hence, work, as people know it, may likely be a thing off the past in a majority of the advanced nations of the world (Rifkin, 1995 cited in The Job Letter, 2003).

The origin of the current trend was initiated when big multinational organisations decided to spend over a trillion dollars around 1980s and at the beginning of 1990s on telecommunication satellites, computers, robotics and other automated devices (Shah and Mehta, 1998). Those massive investments are beginning to materialise in recent times, which has brought about huge cost reduction, higher productivity and profitability. Nevertheless, the new trend seems to be producing some calamitous effects on labour. A notable case was when the first interstate Bankcorp reorganised its business operations to accommodate the current logics, which led to the destruction of about 9,000 jobs. Another example was when Motorola took the decision to re-engineer its manufacturing, as well as admin and distribution structures to become leaner and slimmer, over 10,000 workers lost their jobs in 1998. Other organisations such as GTE, Scott Paper, IBM, NYNEX Corp and Arvin Industries have also pursued similar aggressive labour elimination policies within those periods (Rigdon, 1994).

The growing amount of job destruction linked to corporate downsizing and recent work patterns such as working from home, part-time, flexi-work and self-employment, has multiplied the profitability of corporations from one perspective, but at the same time led to a global economy that destroys jobs (Shah and Mehta, 1998). Some big companies that have adopted modern technological innovation are suddenly beginning to loss their talented employees. The current automation, corporations and managerial approach are set to force a majority of blue-and white-collar employee into impermanent jobs as well as unemployment positions (The Job Letter, 2003). Computer aided technologies have diminished the desire for human labour in all production activities. For instance, as far back 1991 and 1995, IBM eliminated 85,000 jobs due to the introduction of some high-powered technology. In the same period AT&T destroyed 83,000 jobs, Nynex eliminated about 22,000, while Kodak removed about 14,000 jobs (Head, 1996, cited in Matthews, 1998). There seems to be no end in sight in the introduction of new cohorts of high-level automated technologies into an extensive range of job

circumstances. It was predicted then that within a decade not more than 12% of the labour force in USA will be working in the factory, and that by the year 2020, a majority of the global labour force may not be utilised in factory work any longer. It was then predicted that within a quarter of a century, blue-collar as well as mass assembly-workers would almost disappear from the manufacturing lines (The Job Letter, 2003).

Based on huge data, Robert Lawrence of Harvard and Paul Krugman of Stanford, have forewarned that the apprehensions generally express around the 1950s and 1960s that worker in industry would be out of job due to automation is beginning to come into reality (The Job Letter, 2003). In concordance, Peter Drucker, (cited in The Job Letter, 2003) averred that the fading of human labour, as a major production function, will emerge as the final onslaught of capitalism. For instance, US steel, which is the biggest integrated steel company with 120,000 employees in 1980, had manufacture approximately the same quantity of steel utilising merely 20,000 employees after adopting automation in the company in the 1990s (Kenney and Florida, 1993). The current increasing rate of corporate re-engineering, job destruction through the introduction of technology and falling income, is reflected in the current stagnant goods that lie in warehouses and slow pace of growth, which successively triggers renewed calls for re-engineering and downsizing.

## Re-engineering

With regards to reengineering, previous work titles and organisational structures such as divisions, departments, unit, groups, etc., becomes irrelevant and outdated. What is crucial for managers when taking a decision to reengineer their workplace, is the current market demands and the influence of modern technological innovations.

Currently, technology such as telecommunication and computer systems, play a major role in organising business operations. Re-engineering places emphasis on the necessity to streamline work methods in other for organisations to achieve their goals in an effective and cost-efficient manner. As a matter of fact, re-engineering was originally considered as an approach of restructuring the organisation, with the aim of doing more things with less resources by discarding the old-fashioned ways of achieving organisational efficiency, which merely placed emphasis on work simplification and division of labour or replacing employees with machines (automation). Different from previous ways of achieving efficiency, re-engineering is focussed on using high powered electronic data processing and communication

technological innovations with an intension to cut down the number of employees by simplifying the organisational chain of command through the creation of elastic labour forces that is capable of responding to fast-changing organisational requirements.

As Meiksin (1996) observed, re-engineers forbid engineering as long as it linked with work simplification and welcome it as long as it linked with sophisticated technology and computerisation. However, it is pertinent to mention that the main reason for corporate re-engineering is for the purpose of achieving efficiency by reorganising tasks in order to provide better services, and increased productivity at a reduced cost. For instance, previously middle managers were responsible for co-ordinating the top and lower level of the organisational pyramid. Nevertheless, due to the incursion of new technologies, those works have become redundant and eliminated (Turban et al., 1996, cited in Shah and Mehta, 1998). Hammer and Champy (1993) were of the view that any organisation considering re-engineering must execute it in a big scale and not in a small and cautious manner because re-engineering enables an organisation to overcome inefficiency as well as outdated ways of operation that does not guarantee survival (Rosenberg, 1993).

Indeed, one remarkable example of organisational re-engineering was IBM's Credit Corporation that used to offer credit facilities to IBM clients. Previously, specialists were in charge of each phase of the operation of the business. For instance, a particular division of competent office worker and supervisors register the credit applications, and another division organises a special condition for specific clients; and another division takes decision on the rate of interest; the fourth unit capture all the data needed for the quote letter, etcetera. From this outlook, IBM Credit Corporation can be considered as massive assembly line, which takes many weeks to transmute a given set of forms into another. Nevertheless, currently, one single worker, known as a deal structurer, can carry out the whole operation within a twinkle of an eye, and only in unusual circumstances, should an expert be approached for an advice. In that case, the deep-rooted assembly line turned to a software package in a computer on each stage of the transaction, and most of the knowledge and experiences of the previous system clerks and supervisors have been digitalised. In fact, the most shocking aspect was that outputs at IBM's Credit Corporation increase by not merely 100% but skyrocketed by 10,000%. In other words, one single deal structurer has replaced every hundred workers and supervisors that were previously employed at

IBM's Credit Corporation (Davis, 1996). Certainly, re-engineering amounts to an effort to restructure corporations for the Information Age.

Of course, re-engineering can be regarded as a powerful management apparatus. Slabbert (1996) observed that the revolution taking place in traditional organisational structure as well as rising productivity levels and supernormal profit margins could be attributed to re-engineering activities in most corporations. According to the Wall Street Journal (1993b, cited in Slabbert, 1996), the 2.8% increase in output in 1992 in the USA could be linked re-engineering. The focal point of re-engineering according to some experts was to restructure the corporate designs in such a way for the organisation to willingly embrace supercomputer. Consequently, the previous managerial hierarchies in organisations are compressed and certain jobs are eliminated. As worker are prompted to become multi-skilled and administrative structures destroyed, productivity increases become inevitable. Regrettably many corporations seem to have abused the concept of reengineering, by deliberately destroying jobs in order to make supernormal profit for their shareholder (Reh, 2007).

It is germane to clarify that re-engineering represent a business term such as 'trimming the excess fat'. This explains reason why any pronouncement that an organisation will embark on re-engineer signals the termination many jobs. A very good illustration was when IBM terminated the employment 63,000 workers when the management decided to re-engineer the corporation in 1993. Another good example was Sears Corporation's destruction of 50,000 jobs when they reengineered. Also, Boeing eliminated 28,000 employees during their reengineering; Digital Equipment destroyed about 20,000 jobs during their 1994 re-engineering. Lockheed Martin retrench about 15,000 job holders in 1995 as a result of their reengineering. More than that, AT&T discarded 40,000 employees in the course of their re-engineering around January 1996. In other words, approximately 216,000 jobs were destroyed in merely six corporations within a period of three years in the USA due to reengineering. It is pertinent to mention that these job eliminations taking place are not simply discharges of regular production line employees as a result of short-term falls in demand, as both demand and production have increase astronomically. In addition, these are not works that have been moved to China or India in search of cheaper labour, but these jobs that have disappeared overnight, include white-collar and highly paid jobs with many at managerial level (Davis, 1996).

As a matter of fact, even managers in charge re-engineering are in many instances wary of their own jobs since those in middle managerial hierarchy are in

most cases the targets when an organisation decides to embark on corporate re-engineer (Meiksin, 1996). In similar vein, Davis (1996) observed that the fear of a majority of board members in most organisations, including senior managers and previous CEOs of production organisations, suggested that re-engineering has not merely destroyed the jobs of younger employee, which have no rank in the organisation and have better prospect elsewhere, but has as well destroyed jobs at senior managerial level. Most of those managers have invested all their lives in the corporation with the hope of a fulfilled retirement at the ripe age. All these like one are pushed back into the labour market as a result of reengineering in their respective organisations. In this regards, Meiksin (1996) noted that as the craze for re-engineering continues to grow, many corporations have come to realise that in their desire to destroy jobs in order to become more competitive and flexible, they have ended up losing key experienced professionals that are difficult to substitute as well as costly to hire on contract basis.

In spite of the fact that a majority of the reengineering lead to a rise in corporate shares/stock (Martin and Schumann, 1997), it is destroying a key component of enterprise existence, that is, employment creation. The scenario prompted Rifkin (1995, cited in Slabbert, 1996) to predict that corporate re-engineering is capable of destroying about one million to two million five hundred thousand jobs annually. According to Attali (1991, cited in Slabbert, 1996), the impact of re-engineering was mostly felt in the production industry, where machines have now been recognised as the new working class. Undeniably, the decrease in production jobs have come a long way, particularly from the times managers started replacing humans with machines in the workplace. For instance, around 1950s, about 33% of the total employees in the USA were working in production companies. However, currently below 17% of the workforce is employed in production companies (Drucker, 1993; Job Letter, 2003). In addition, in spite of the fact that production jobs have dropped, productivity seems to have grown. For instance, yearly production, which was increasing at approximately 1% per annually at the start of 1980s, has skyrocketed to over 3% as a result of re-engineering (Shah and Mehta, 1998). As noted by Flint (1993), beginning from the year 1979 to the year 1993, production has accelerated by 35% in the productive industry, at a time the labour force has declined by 15% in the same industries. More than that, it has been projected that 25% of the USA workforce will be on impermanent employment, and that the figure will rise to more than 35% in few years to come (Vogl, 1995). Some expects contended that in some nations impermanent jobs will exceed the

USA figure (Shah and Mehta, 1998). Considering the current trend, Slabbert (1996:44) succinctly posited:

*"If retrenchment and re-engineering are viewed as processes with parallel results, the logical conclusion is that unemployment will dramatically increase during the next decades. The concept of the workerless world is receiving increased attention in diverse application fields- indeed, a world without work is often considered to be the logical end result of the forces, which have been set in motion, and which are, for all purposes, not reversible in nature. Protesting voices have been raised, but conclusive evidence mounts that the trickle-down effect is, indeed, a trickle and not the required flood, which is necessary to balance the forces at play in the equation".*

Indeed, it seems as if re-engineering has simply become another ploy by executives to manipulate and control engineering (Meiksin, 1996). As a matter of fact, engineers have over the years made efforts to improve efficiency in organisation. Taylor's studies on 'time and motion' are notable examples where engineering made earnest efforts to alter production lines so as to become more efficient. Conversely, re-engineering has prompted a new area of engineering. However, what seems to separate it from the previous engineering fields, are the massive increases in efficiency at the expense of discharged worker (Davis, 1996). At present, re-engineering seems to have become an ever-present term, and has infiltrated into other field, such as customer care and marketing, and what is noticeable is that it is as well killing jobs within those domains. From that above stance, Harmer and Champy (1993) have cautioned:

*"It would be nice to say that re-engineering is a win-win program that leaves everybody better off; it would be nice but it would be a lie; re-engineering isn't to everyone's advantage…some people will lose their jobs and some workers may be unhappy with their jobs".*

In concordance with the above Slabbert (1996) opined:

*"The concept of the lean-production method of management, first introduced by the Japanese, in conjunction with the just-in-time principle, is making an impact in every industry. These phenomena are actively altering the traditional methods of business management and, in the process, millions of jobs and hundreds of jobs categories are eliminated".*

**Downsizing**

Around 1996, the concept of downsizing, which emerged from reengineering concept, became very popular, and led to big companies declaring huge cut down

of their labour force. Most of the downsized workers do not, in most cases, get new jobs with the previous salaries they are paid before downsizing. As a matter of, older workers are worse affected as they may have to wait for a longer time before getting any other job after being downsized. A majority of the organisation that have embarked on downsizing, in most cases, substitute senior employee in most of those job positions with poorer paid employees. In that case, they have substituted more experienced older worker with less experience and younger workers who are favourably dispose to lower pay packages. Under such circumstances, only executives receive very fabulous pays (Crotty, 2006). This trend has tendency to expand inequity in most societies. More than that, there is a strong possibility that many of the employees that have been downsized, may never recover again from financial and emotional trauma. In actual fact, research have revealed that even retained worker who survives the axing, also endure emotional and health challenges, as a majority of them perceive members of their workplace as family members and feel a sense of lost without them. This has a de-motivating effect on the surviving employees, leading to low morale and disloyalty. As a matter of fact, the distrust between management and employees have accelerated in recent times, as worker who survive have tendency to defraud or sabotage the organisation. More than that, a majority of the workers who survive the downsizing are in most case engaged in very long hours with heavy workloads, to the extent that some regret their retention at all by the company (Tripod, 9 January 1999). In recent times, with a growth the high-tech industries, notably in the telecommunications and computer companies, downsizing or rightsizing (as some may choose to call it) have, undeniably, accelerated the pace of job destruction, which has not abated since the dawn of the Fourth Industrial Revolution.

**The dawn of the Fourth Industrial Revolution and the future of labour**

The dawn of fourth industrial revolution (4th IR), which is also sometimes known industry 4.0, is marked by an accelerated deployment of digitalised technology and cyber-physical systems (CPS) by corporations (Liu & Xu, 2016). The concept of 4th IR was first initiated in 2016 during the World Economic Forum (Peters, 2017), by Professor Klaus Schwab. While giving context to the phenomenon, he stated:

*"We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the*

*response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society"*, (Schwab, 2016).

For more than two hundred years, since the advent of the Industrial Revolution, the world economy has been progressing very fast as a direct result of new technological inventions. For each new technological advancement, there is a positive effect on productivity, economic growth and opportunities for different types of new businesses. In fact, the 4th IR entails the alteration of all production processes within an organisation. Such alteration is made possible through the fusion of numeric as well as the internet in the field of production (Stăncioiu, 2017). In other words, the current 4th IR is a product of a blend of diverse technological innovations, such as cloud computing, machine learning, nanotechnology, biotechnology, big data and so on in production activities (Frederick, 2016). In the words of Schäfer (2018), the 4IR, also referred to as the digital revolution is a distinctive blend of human capabilities and technological innovations through algorithms, which are self-learning, robotics, self-driving cars, big data, just to mention a few. Kessler (2020) was of the view that the 4th IR is a phenomenon of progressive scientific sagacity, which promises a change from outdated methods and approaches to a seamless data-supported outcomes. In other words, businesses and workers from the analogue-age. In order words, businesses and workers must not be restricted under the current dispensation in following the lanes toward their own progress.

Mokyr (1997) observed that a true Industrial revolution is not merely in the area of technological advancements but entails innovations that is capable of making a profound difference in organisations. It is pertinent to note that the 4$^{th}$ IR and industry 4.0 are in most cases used interchangeably to mean the same thing. In spite of the fact that the two ideas are closely associated, they do represent two different concepts. While Industry 4.0 originated from Germanyin-between 2011-2015, with a focus on digitalisation in production, the 4$^{th}$ IR, conversely, is emblematic of major shifts and changes in political, social, and economic spheres (Nicholas, 2019), and has been triggered by technological innovations.

The 4$^{th}$ IR has unique features, namely, smartphone takeover almost every aspect of business activities; Knowledge generation will be made possible through big data; robotics may likely replace many human routine activities in the workplace; and mass consumers spread across the globe will be attracted (Hyun

Park, Seon Shin, Hyun Park, & Lee, 2017). Hyun Park, et al. (2017) further observed that the 4th IR took the globe by surprise. In similar vein, Davis, (2019) noted that the current revolution is momentous and posited that it will create new prospects for corporations and their workers alike, through the use of artificial intelligence, the internet of things and high-level computing as well as effective optimisation of systems within the organisation (Davis, 2019). The current 4th IR is definitely going to affect how people carry out their daily routine in organisations. The key new trends, include digitisation and automation, which are bound to affect the ways people relate with machines, while engaging with their works. This will as well influence how managers manage employees in organisations. The new trend will certainly lead to the loss of many jobs as well as create new ones within industries (Hirschi, 2018). The 4$^{th}$ IR is bound to trigger a major shift in the future of jobs roles within organisations. As a matter of fact, the advent of new jobs will displace old ones (Park et al., 2017). Moreover, the requisite skills-set for jobs will certainly change and affects current and prospective employees. The current development will certainly affect labour relations and human resources management due to the new relationship and interaction between humans and machine. This has certainly triggered a new uncertainty in organisations as far as job security is concerned (Pereira & Romero, 2017; Nam, 2019). Now the big question is whether technological innovation in the current 4$^{th}$ IR leads to job destruction or mass unemployment.

The answer to the above question is quite diverse. For instance, the research by Kristina, Matuzeviciute, and Karaluite (2017) found no link between technological innovation and joblessness in countries in Europe. The above view was supported by Liso and Leoncini (2011) who observed that technological innovation creates new avenues for higher earning for skilled employees owing to a rise in demand for goods and services. Hence, as Vivarelli (2014) claims, technological innovations lead to numerous market compensation mechanisms, such as new ventures, new machineries, lower prices and poorer wages. The foregoing is not far from other theories (Piva and Vivarelli, 2005) that spoke about compensation mechanisms, which stems from prices and new demands that ultimately absorb unemployment. The above is not very far from the position of Say (2009) and Schumpeter (2017) that advancement in technology brings about product and process innovation, which, ultimately result in employment creation. Also, the findings of Marcolin et al. (2016) that, technological advancement has a positive effect on job creation seems to reinforce the above views that technological progress leads to job creation

instead of destruction. In between the protagonists and antagonist are experts who chose to seat at the middle point. For example, the research of Harrison et al. (2008) as well as Vivarelli (2014) distinguishes between two main aspects of innovation, namely product and process innovations. In their view, while product innovation offers new products to the marketplace, which motivates new demands and brings about positive connection between technological innovations and job creation (Vivarelli 2014; Marcolin et al. 2016), process innovation triggers an adverse effect on the workforce owing to the substitution of labour with new machineries and tools that increases production and efficiency in organisations (Peters 2004; Pianta 2004; Vivarelli 2014)

Also seating on the fence, Alonso-Borrego and Collado (2002) were of the view that technological advancement is a major source of job creation as well as destruction. There are also perceptions that technological advancement favours the developed as opposed to the developing nations.

On the other side of the pole are those who are adamant that technological innovations in the era of 4$^{th}$ IR is destroying jobs, and as such causing mass unemployment. For instance, as Feldmann (2013) study showed, technological innovations increase joblessness in the short-run. In fact, Wood (2004) and Feldmann (2013) argued further that technological innovation has the capability of increasing unemployment. In the same vein, Piva et al. (2006) posited that technological innovations have negative impact on skilled as well as unskilled labour. According to the Marxist thinking, it is implausible to conceive that newly created labour-saving technologies would create enough jobs to absorb the number of workers who have been displaced by machine (Wood 2004). Hence, it is simply a fact that labour-saving technological innovations does trigger technological unemployment. Certainly, since technological innovations enables organisations to manufacture at lower costs, the immediate effect of innovation is technological joblessness. This position seems to contradict Schumpeterian argument that technological advancement leads to product and process innovation that logically results in the creation of jobs (Ziemnowicz, 2013).

Hence, politicians, economists, and technology gurus have unanimously accepted that the world is facing an era of technological unemployment. The sudden change in opinion is mainly owing to automation that is capable of removing human beings as a factor of production. This new position diminishes the compensation effects, which enabled traditional technologies to become sources of job creations. The Classical schools of thought that technology accelerates unemployment, was also of the view that technology will not cause long term

joblessness in a society (Khan, 2016). However, there are now constraints to the classical mind-set that technology cannot cause long term unemployment. The initial perception was that technological innovations cannot cause long term unemployment (The Economist, 2018) based on the 'Lump of Labour' theory. Nevertheless, the recent outlook of rising productivities in manufacturing, accompanied by declining employment in some sectors challenge this theory (Waters, 2014). For instance, a professor of economics at Stanford University, Nick Bloom, noted the above as the reason for a major change in opinion on technology as a major source of unemployment. Former American President Barak Obama has added his voice to the current growing debate and argued that technological innovation is a primary threat to job creation. In his view: *"The next wave of economic dislocations won't come from overseas. It will come from the relentless pace of automation that makes a lot of good middle-class jobs obsolete"* (cited in Rotman, 2017). Based on the above, there is a need for society to consider new mechanisms to sustain labour in the 4th IR in the face of technological job destructions.

**The way forward towards labour sustainability and conclusion**

Right from the beginning of capitalist expansion it is very obvious that the owners of capital intend to achieve maximum profit at minimum production cost. From the first Industrial revolution till the current, the capitalist mode of operation remains the same with the exception that the Fourth industrial revolution may witness a total replacement of human labour with machines, culminating in the end of work, which amounts to unsustainable labour. In order for labour to be sustainable, it may be worthwhile to proffer the following recommendations:

1. **There is an urgent need to regulate technologies that eliminates job faster**

In order for the government to guarantee lasting employment, there will be a need to regulate some of the technologies that eliminate jobs faster and cause havoc for the working class. Technology should enhance the well-being of the working class and not eliminate them entirely from the production chain. In other words, technologies, which dehumanise the working man and render him obsolete should be controlled. Hence, technological innovations should be created to serve and support the working man and not the other way round, because it is very unjustified for what is created to dominate the creators. Higher taxation on technologies that destroy jobs faster could be one way of regulating such

technologies so that their prices can skyrocket. When that is done, human labour would become more valuable, and expensive technologies and automation would become less profitable. Moreover, before initiating new technology into the organisation, management must endeavour to makes sure that there is an alternative in the organisation to deploy workers that have been displaced by technology. More than that, the capitalists and philanthropists sponsoring the development of technologies should also endeavour to give back to society in the form of social responsibility of business to workers.

2. **A policy and commitment towards the creation and sustainability of decent work for economic growth by public and private organisation across the globe**

There is an urgent need for a policy and commitment towards the creation of more decent jobs through public and private partnership across the globe for economic development and growth. In that case, instead of flexibilization of employment relationship, efforts should be made towards the creation of and sustenance of permanent employment. Therefore, the public sector must work in harmony with the private sector to ensure that more jobs are not destroyed but rather created. Hence, government and private organisations' interests should be directed more towards job security and creation. No longer should the working class bear the brunt of organisations' craze for abnormal profits. Hence, any policy that is opposed to the above ideals should be critically evaluated as well as curtailed. Instead of pushing workers back into the labour market through job destruction, many of them can be trained to become entrepreneurs and small business owners to start their own businesses and become employers of labour. This will certainly address the issue of rising unemployment in many nations across the globe as well as help to spur new phase of sustainable economic development and growth.

3. **A need for more ethical and emotionally intelligent leaders and captains of industry**

Finally, there should be a need for more ethical and emotionally intelligent leaders and captains of industry. An ethical leader should be someone who strives towards the general public goods. An ethical leader should be a moral leader and not someone who will resort to job destruction at a time when the organisation is still making super-normal profit. An ethical leader and captain of industry will

always work towards the benefit of the wider stakeholders, such as the employees, communities, suppliers, the government, etc., rather than working only in the interest of shareholders. An ethical leader is as well an emotionally intelligent leader, who will consider the plight of employees before taking a decision that affects them. More of such leaders are needed in organisations in the current era of globalisation and the 4th IR. Such leaders are level five leaders who take the interest of employees into consideration above their own selfish interests, and considers the emotions, feelings, and moods of the people in the organisation in everything they do. Such leaders rely more on participative approach and consult widely before introducing any new course of action into the organisation. In fact, leaders with empathy, compassion, patience, understanding and love for humanity will be the best authentic leaders to stir the ship of industries and nations in the current 21st century and should be desired and headhunted to lead in the current dispensation. Such leaders will see to it that the sustainability of labour is guaranteed.

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# THE IMPORTANCE OF USING SMART DATA TO ANALYZE SKILLS IN THE LABOR MARKET

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**Abstract**

*The needs of the workforce are constantly changing as a result of global concerns about digitization, production automation, the introduction of new technologies and industry 4.0. Therefore, the labor market needs a continuous reassessment of labor skills in the context of digitalization and the industrial revolution. The paper will study the change in perspective of the structure of the employed population by occupational groups and in high-tech economy of Romania compared to UE27 and the most requested skills currently in online job postings in various fields, based on traditional and intelligent data from Cedefop. It is also intended to understand how the use of BigData can facilitate labor market decision-making. The analysis of the skills required in the jobs posted online from various fields in Romania, in 2020, suggests importance of digital and contextual skills having in view that in the top is „accessing and analyzing digital data", followed by „working with others" and „using digital tools for collaboration, content creation and problem solving".*

**Key words:** *labor market, skills, skills matching, smart data, online job vacancies*

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**JEL Classification:** J2, J23, J24

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## Introduction

The growing importance of the global economy, competitiveness and dynamism in the business environment, as well as the demographic aspects that indicate a shortage of labor in the future have led the state to start digital transformation agendas. The digitalisation of the economy has led to an increase in the number of sources of information on job vacancies published online.

A major challenge facing the labor market in the coming years is the digital transformation. Two major initiatives that will have a key impact in the coming years on the digital transformation in the EU are the Recovery and Resilience Mechanism and the Compass for the Digital Decade. Five of the seven digital policy areas identified in the Regulation on the Recovery and Resilience Mechanism are the subject of measures included in the National Recovery and Resilience Plan (PNRR) proposed by Romania: connectivity, human capital, e-government; digital public services and local digital ecosystems; digitalization of enterprises; investments in digital capabilities and the implementation of advanced technologies. The measures in the PNRR also address the four flagship digital initiatives outlined in the 2021 Annual Strategy for Sustainable Growth: Connecting; modernization; development; retraining and improvement. It can be deduced that in the context of the digital transformation, the development of human capital, the retraining and improvement of the workforce are the focus of both European and national documents. The four cardinal points of the "compass for the digital dimension" are skills, the digital transformation of companies, secure and sustainable digital infrastructure and the digitization of public services. The analysis of the DESI digital economy and society index, which measures the progress made towards achieving the 2030 digitalisation targets, shows that Romania is still at the beginning of the road, ranking last in the EU hierarchy (European Commission, DESI 2021). In terms of human capital, Romania ranks 26th out of 27 Member States, scoring below average for most indicators, with the exception of “ICT graduates” (4th place) and “specialists”. in the field of ICT ”(3rd place). Although Romania has a large number of graduates in the field of ICT (6.3% of graduates), there is still a shortage of ICT specialists that limits the country's ability to innovate and take advantage of digital transformation.

Another major challenge facing the labor market is industry 4.0, namely the introduction of advanced processing technologies whose main determinants are: customers and their needs, competitors, suppliers, potential companies entering the market. In fact, the fourth industrial revolution is different from the previous ones

precisely because it integrates the physical, digital and biological universe with the help of technology (Schwab, 2017). One of the main aspects of the Industry 4.0 concept is the digitally networked systems to create a world where everything from cars to people is connected. These connected smart devices can also be called Cyber Physical Systems or CPS (Cyber Physical System) because they consist of information technology / software and mechanical and electrical physical parts. These CPSs are able to communicate with each other, for example, over the Internet. Two of the main factors leading to the development of Industry 4.0 are: shorter product life cycles, especially in the case of electronic products, and the growing demand for individual products (mass customization). Increased flexibility with fast technology leads to better results for employees, customers and the business at large.

Digitization leads to a reconfiguration of skills in the labor market, the emergence of new information about the labor market and the development of new tools that people and organizations will use to find an employee or a job. The analyzes undertaken in the article provide a characterization of the Romanian labor market through the prism of qualifications, an anticipation and a better understanding of the importance of using smart data alongside traditional data for the analysis of changes in the occupational structure according to skills.

People who feel confident that they have the necessary level of digital skills for everyday life or work have a positive perception of the effects of technology on the economy, society, quality of life and robots. In terms of socio-economic characteristics, they are highly qualified (education), employed or self-employed (occupation), young adults (age) and have frequent access to the Internet (Vasilescu et al., 2020).

**Literature review on the implications of Big Data and Blockchain applications on the labor market**

The main technologies transforming the business environment today are: artificial intelligence, machine learning, robotic process automation, 5G technology, blockchain and cryptocurrencies, big data and Cloud, Virtual Reality, Internet of Things (IoT) (World Economic Forum). These technologies, although they currently have low applications, will play an important role in human resource management in the future. For example, blockchain applications that are widespread in financial management are beginning to be applied in human resources in activities such as payroll. The report "Trending Tools and Technologies in HR" (APQC, 2019) mentions that in 2019, 82% of organizations

were already at least familiar with blockchain technology, but only 11.7% were implementing blockchain technology in HR. However, interest was growing, with 74% of firms in the sample considering experimenting with or piloting blockchain. Blockchain is being applied in key human resource management activities such as payroll, recruiting, employee vetting and contract management. The main benefits of using this technology are trust, privacy, security, data integrity and transparency. The top three drivers of blockchain adoption in the UK are the need to increase transactional transparency, increase the speed of transactions by reducing clearing and settlement time, and automate or simplify the business process. A blockchain is a network made up of individual entities called nodes that each have the role of storing data and processing transactions by consensus with the majority of the network (Puchiu, Stoian, Foca, 2018). Blockchain is therefore a distributed, shared digital ledger technology where transactions are verified and recorded in a way that makes it virtually impossible for anyone to alter the information. That means people who don't already know each other can share data and make transactions, including financial transactions, without an intermediary.

The digitization of the economy has led to an increase in the number of different information sources where job vacancies are posted, such as online portals, but also websites of companies and recruitment agencies, professional networks (such as Linkedin), online job search platforms (Upwork, Uber), educational platforms, social networks (Facebook, Twitter), newspaper and notice board websites, university graduate employment promotion centers, etc. In Cedefop 2019, the online job landscape was mapped and analyzed in the 28 EU member states (including the UK) and it was observed that the share of job vacancies published online varies from under 50% in Denmark, Greece and Romania to almost 100% in Estonia, Finland and Sweden. Countries differ in the structure of the online job market: for example, in Denmark, Finland and Malta the market is dominated by a few leading portals and public services tend to be influential players, while in Greece, Ireland, Italy and the United Kingdom United are several job portals with similar power, and public employment services are less influential compared to private actors.

The increasing use of the Internet for job postings provides a rich source of real-time and detailed data about the requirements of job postings called Big Data. We can define Big Data as high-volume, high-velocity and/or high-variety information assets that require innovative and cost-effective forms of information processing and that enable improved insight, decision-making and process automation. They contain a lot of additional information about the labor market that cannot be

obtained from statistical or administrative sources (Horton&Tambe, 2015; ETF, 2019). Recorded information typically includes specific stipulated skill needs and skill-related indicators included in advertisements, such as job titles, along with requirements for qualifications, certifications and experience, as well as other information about each vacancy, such as employer, sector economic, occupational category and geographical location of the promoted position (ILO, 2020).

Vankevich & Kalinouskaya, 2021, consider that it is very important to use new sources of information and analyze the data generated by them; to combine this data with traditional data (statistical and administrative data) to increase information about the labor market and develop tools that people and organizations will use to find an employee or a job. Statistical and administrative data are not sufficient for the analysis of qualifications and skills and Big Data analysis is needed (Vankevich & Kalinouskaya, 2021) and online job portals can serve as a source for Big Data on the labor market (CEDEFOP, 2019a; ILO, 2020; Mezzanzanica & Mercorio, 2019).

The analysis of job vacancies posted online has both advantages and disadvantages compared to the traditional methods of anticipating skills needs and matching them on the labor market, based on quantitative and qualitative analysis. Quantitative approaches usually use proxies to measure skills, such as occupations, qualifications and levels or types of education, and therefore the information obtained is useful but not sufficiently detailed about the specific skills and competences needed in the labor market. Qualitative approaches enable the identification of specific skills and competences, but are time-consuming, require significant resources and risk providing outdated information in the context of increased labor market dynamics. Among the disadvantages of analyzing jobs posted online are: lack of structure, duplication; the need for advanced data analysis skills (e.g. software, programming, coding) and the lack of representativeness that necessitates their cleaning and quality checking and other potential issues, including data privacy issues that stand in the way of their effective use. Among the advantages of analyzing jobs posted online we mention: the analysis is done almost instantly, large volume of information, in-depth information about skills and skills needs between and within establishments, low time and cost-effectiveness, and the veracity of data, since online information declared by individuals can had a higher degree of truth (ILO, 2020).

The nature and content of work has changed a lot in recent decades, and therefore new methods of job analysis are needed to see how employees adapt in this context. Job analysis focuses on understanding what employees do and can be

defined as "the process by which one gains an understanding of the activity, purpose, and requirements of a job task" (Sanchez & Levine, 2012). Context analysis (text mining) can be a viable, current job analysis method that can illustrate what employees are doing in the broad context of work change (Berkers, Mol, Kobayashi, Kismihók, Hartog, 2019). This method makes it possible to automatically extract and analyze tasks from job vacancies posted online that have a relatively high correspondence with tasks collected using a task inventory. Content analysis does not replace current job analysis methods but rather complements them.

**Methodology**

The analyzes undertaken in this study are based on Cedefop data: Cedefop Skills Forecast and Skills in online job advertisement. The estimation and forecasting engine made by the Cedefop center of the European Commission within the project on "Medium-term forecast of the demand and supply of qualifications at the level of 2030" represents the most comprehensive and robust tool of the demand and supply of qualifications both at the EU level and and at the level of each member state, including Romania. This forecast engine allows both the analysis of the period 2015-2020 in Romania, from the perspective of qualifications, as well as the detailed forecast of developments up to the horizon of the 2030s. Also, the use of the engine allows carrying out comparative analyzes at the same level of detail between Romania and the EU as a whole and between Romania and any EU member state at the same level of detail. The projection methodology has a modular approach, with the following main elements: a) demand (need for skills and qualifications), with attention to employment (jobs); b) supply, focuses on available skills and competences, the number of economically active people and the qualifications they possess; c) imbalances, obtained by comparing the modules analyzed within the two components, supply and demand. Based on CEDEFOP data, the article will analyze the change in the structure of the employed population by occupational groups and the demand for replacement and the increase in employment in the high-tech economy at the horizon of the 2030s, as well as the most requested skills in online job ads in Romania in Skills in 2020.

**Results**

In this section, the skills required in the labor market resulting from traditional methods of analysis and the analysis of jobs posted online will be presented.

The largest percentage increase in total job demand between 2018-2030 is for the occupational groups: Specialists (76%), Service and Sales Workers (67%) and Machine and Plant Operators (57%) and the lowest for skilled agricultural workers. Total demand is determined by the sum of the net change (jobs abolished/newly created) and the replacement demand resulting from the replacement of people who leave a job for various reasons, especially as a result of retirement. Most jobs will appear as a result of the replacement demand, namely 3403 thousand jobs. The number of jobs resulting from the difference between newly created and terminated jobs is only 800 thousand, which illustrates that the potential for new job creation remains low in the analyzed interval. An important increase of 52% is also forecast in the case of the occupational group of public workers, which illustrates the increased need for digitization of public services, in order to increase their access and transparency, which has achieved marginal progress so far, with systemic problems related to quality being reported and accessing public services. Moreover, Romania is behind the member states in terms of acquiring digital skills. In the case of skilled workers in agriculture and fishing, the largest share of the replacement request is recorded, at 58%, due to the significant share of this occupational group in total employment. The share of net change is forecast to be negative in three occupational groups, Skilled Agricultural and Fisheries Workers, Armed Forces and Craftsmen and Related Trades which means that the number of jobs lost increases compared to those created, the share of the sum of jobs created/lost decreasing in these occupational groups by 31%, 10% and 4% respectively. In past industrial revolutions, as new skill needs arose, traditional crafts and trades either became obsolete or their nature changed radically. The emergence of the fourth industrial revolution (industry 4.0), with the ubiquitous penetration of digital technologies in business and social activities, will have a similar impact.

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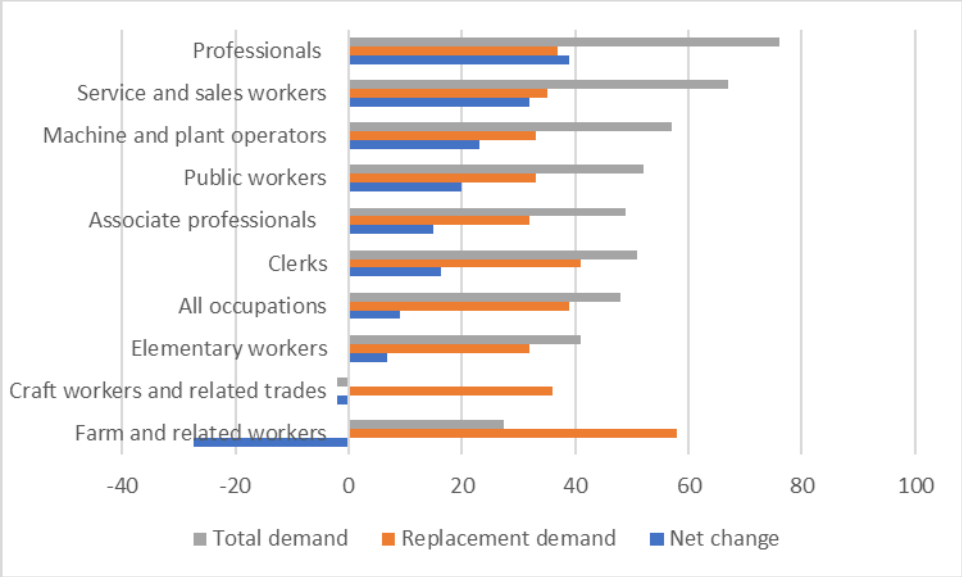


**Figure no. 1 Change in the structure of jobs by occupational groups and replacement demand 2018-2030 (%)**
Source: author processing, Cedefop data, Cedefop Skills Forecast

The analysis of the skills required in the jobs posted online in various fields in Romania, in 2020, suggests that the skills of accessing and analyzing digital data (36.7%), working with others (31.7%), are at the top in while resource allocation and control and promotion, selling and buying have the lowest values of 6.3% and 7.7%. It is also observed that digital skills and contextual skills are at the top of the hierarchy, those skills that compete in solving the problem, respectively the skills to deduce, frame and apply.

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**Figure no. 2: Most requested skills in online job ads in Romania in Skills in 2020 (ESCO level 2) (%)**
Source: author processing, Cedefop data, Skills in online job advertisements

The comparison of employment growth in the high-tech economy in Romania and the EU27, period 2020-2030, highlights a maximum for Romania in high-tech production and a minimum for the EU27 for the same indicator. Employment growth in high-tech occupations will be 4.5% in Romania, while in the EU27 it will be 9.3%. The increase in employment in the high tech economy indicates the increase in the share of "high technology occupations", the increase in the technological intensity of the entire country and the share of people employed in science, engineering and information and communication technology professions.

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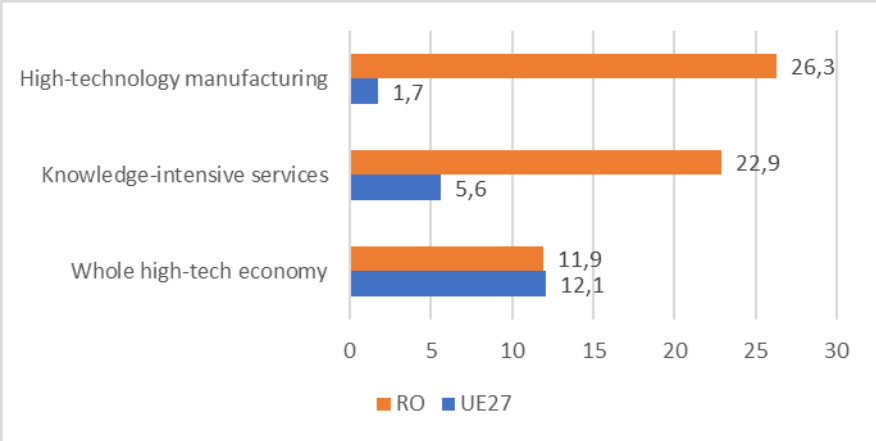


**Figure no. 3 Employment growth of high-tech economy in Romania compared to EU27 in 2020-2030**
Source: author processing, Cedefop data, Cedefop Skills Forecast

## Conclusion

Romania has experienced a decline in the number of employees since the turn of the century as a result of high inactivity rates among the working-age population (15-64 years old), the large number of people working in subsistence agriculture, and significant out-migration of the labor force. On the other hand, the extent of early school leaving has also affected the competitiveness of the labor force in Romania. Therefore, it is necessary to make the use of human capital more efficient, and in this sense, researchers and political decision-makers are looking for new sources of information to help achieve a better correspondence between the demand and supply of qualifications on the labor market. The nature and content of work has changed a lot in recent decades, and therefore, in addition to traditional methods, new job analysis methods are needed to see how employees adapt in this context. The use of Big Data and Blockchain applications leads to transparency, increasing the speed of transactions and automating or simplifying the business process. Online job portals can serve as a source of Big Data on the labor market. Looking ahead to the 2030s, the highest total job growth is projected for specialist sectors and service and sales workers, and the lowest for skilled workers in agriculture and fisheries, who also have the lowest new employment opportunities. From the analysis of the skills required in jobs posted online from various fields in

Romania, in 2020, it follows that the skills to access and analyze digital data are at the top, imposing the need to intensify the process of acquiring them by the workforce. In the period 2020-2030, the growth of employment in high-tech production, in percentage terms, will be 16 times higher compared to that recorded at EU27 level, highlighting the importance of training on topics related to advanced processing technologies and new models of business. There is a need to improve the digitization of businesses by raising awareness of the relevance and benefits of adopting digital technologies, promoting digital interactions and stimulating businesses to engage in transnational innovative value chains.

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# ASPECTS OF CAREER MANAGEMENT AND SUCCESS IN EDUCATIONAL ORGANISATIONS

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**Abstract**

*A modern educational institution should create the necessary conditions for the integration and development of the personal and professional competences of the teachers in order to obtain a successful career. In the current context of the educational system in the Republic of Moldova and Romania, the capitalization of human resources is a priority objective of the managers of educational institutions. The difficulties they face, the constantly changing educational reforms, the unpredictable and challenging situations are known partially or impartially theoretically and practically by teachers who are beginning to integrate into the institution, and the process of insertion from educational institutions is often not effective. We will analyse the characteristics of a successful career but also the motivation for achievement as an important component of the professionalization process, teachers thus tending to pursue challenging careers, complex enough, but not so difficult as to end in failure. Therefore, if professional motivation is an important endeavor, because it starts from the idea that a large part of everyone's life spends at work, performance denotes the achievement and ability of the teacher to respond to tasks and to be a model for those in the organization when it comes to involvement and responsibility.*

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**Key words:** *teaching career, personal development, professionalization, success, performance*

**JEL Classification:** I21, L2

## Introduction

Education is the main sector in which a civilized country should continuously invest in order to ensure the sustainable development of the society, and the technical-scientific progress in all socio-economic spheres is directly determined by the educational policies promoted and implemented by the state, but also by the human resource involved in the complex process of "delivery" of instructive-educational activities. (Andritchi, V., 2012). The teaching career is often considered flat or one-dimensional, with little or zero chance of progress – of expansion, growth or advancement, despite the consensus regarding the need for continuous personal and professional development. This perspective can have a negative impact on teachers' long-term motivation and desire for professional development. It poses problems for both schools, in terms of the workplace, and education systems, who not only want to retain teachers in this profession, but also for them to carry out their work with passion and show motivation to promote change where it is needed. (Pânişoară. I.O., 2015)

All countries have a certain type of competence framework or a set of expectations that contribute to the definition of pedagogical studies, the establishment of criteria for the recruitment and selection of teachers and the identification of teachers' professional development needs. Also, advanced countries and preoccupied with their own education systems focus on policies for pupils, students, researchers in one manner or another, following with great seriousness the career of a teacher from the first steps in the educational organization through trainers, mentors, information and online counseling, programs for the development of leadership qualities. (Sultana, R. G. , 2012). However, we know that there are differences in the countries' offer and that at European level, these differences in approach to the teaching staff's status persist. ( de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022)

Most (inter)national surveys and studies give us a lot of information about the difficulties that some teachers face when trying to find time and get permission to attend courses and take part in projects that could help them in their pedagogical work in the classroom or classroom and beyond. They also signal competences for

whose development some teachers feel they would need more support. (Pânişoară. I.O. , 2015)

Career development is decisive by the personal development that occurs over time, depending on the experience gained, but also on the specific legislation – the obligation to support / confirm the teaching degree, or the need to follow continuous training courses for the accumulation of professional development credits. (de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022)

Efficiency, applicability, sustainability, involvement, outstanding results that are oriented towards the development of skills and personality of the pupils / students / trainees for which they are directly responsible. (Hooley, T., Watts, A. G., Sultana, R. G., & Neary, S., 2013)

A teacher is a key figure for every educational system, including the national education system. The mission of teachers is to improve the educational system, to implement student-centered learning based on learning outcomes, to train competences, attitudes, skills, etc. (Lemeni, G., Miclea. M., 2010), The teacher has the responsibility to ensure the best training and education for young children, to educate active citizens for society and valuable specialists for the needs of the labour market [Chirimbu&Sadovei, 2021].

The educational sector can fulfill its mission only if the human resource is a quality one. The role of the career in the human life has increased in the last 50 years, when the role of personal and professional activity in the process of social integration was emphasized. Through professional activity, a person manifests his abilities, communicates and interacts with other people, finds a certain place in society, has the satisfaction of doing something for himself and for others. (Andritchi, V., 2012).

In the current context of the educational system in most balkan countries (Romania, Bulgaria, the Republic of Moldova and Greece) the capitalization of human resources is a priority objective of the managers of educational institutions. (Andritchi, V., 2012). The difficulties they face, the constantly changing educational reforms, the unpredictable and challenging situations are known partially or impartially theoretically and practically by teachers who are beginning to integrate into the institution, and the process of insertion from educational institutions is often not effective. It is found that the initial and continuous training programs are not focused on the needs of the teachers, and the professional competences of the beginner teachers are not connected to the changes in the current educational system or to the performance as an indicator of the success of a

teaching career. ( de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022) All these factors demonstrate the opportunity to apply strategic and operational actions in the field of management of the professional insertion of beginner teachers. (Nica, P., & Iftimescu, A., 2004). A modern educational institution should create the necessary conditions for the integration and development of the personal and professional competences of the teachers in order to obtain a successful career. (Iucu, R. , 2007).

Unfortunately, today, in the countries mentioned above, there are not only problems related to the quality of human resources, but also with a shortage of staff that directly affects the quality and relevance of education. (Andritchi, V., 2012). The teaching profession has ceased to be an attractive career alternative for young people, including because of the image and social status inadequate to its importance, as demonstrated by several researches.(Popescu. M, Băltăreţu. A., 2012)

Career covers and identifies different roles in which the individual is involved: student, employee, member of the community, parent, how he acts in the family, school and society and the suite of stages he can go through in life: marriage, retirement, etc.; all these considered as a unitary, indivisible whole. In this sense, everyone has a career and not just those who successfully exercise a certain profession.

The professionalization of the teaching career is one of the objectives aimed at the quality of education, and the policies proposed at European Union level converge towards a common vision of this goal. ( de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022)The current socio-economic dynamics and complexity require continuous adaptability on the part of teachers. They are put in the situation to develop, periodically, their professional competences, in order to meet both the educational needs, updated, of the students, as well as the scientific innovations arising from research in various fields. (Pânişoară. I.O. , 2015)

In the theory and practice of teachers' careers, a situation has been created, when, on the one hand, their professionalization appears as a priority of the educational policies, and on the other hand, there is an insufficiency of the theoretical concepts and of the methodological mechanisms of continuous teacher training in relation to the institutional and personal needs and of achieving the inverse connection, as a factor of professionalization of teachers. In this context, the teaching career is forcibly going through a period of multiple transformations, the vast majority of them being determined by the globalization and

Europeanization to which Romania is a party, by the need to harmonize the education system with the requirements of the European labour market, but also by the changes in the educational, political, social, economic and axiological paradigms. All these imply the continuous increase of the quality of the educational system, aiming further at the professionalization of the teaching career, by implementing professional standards in the process of training future educators. ( de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022)

**Literature Review. Aspects of the teaching career**

Numerous investigations in various countries have targeted various interests in the development of the teaching career in pre-university education. Internationally, the issues of the teaching career were concerned: Cole G.A., Cossette Pierre, Sonnentag S.

- In Romania, the most important approaches regarding the formation of a successful career in education are recorded by S.Cristea (the paradigmatic dimension of lifelong learning), I.Al.Dumitru (the specificity of adult learning), D.Terzi (the comparative approach of pedagogy and andragogy), R.Iucu (teacher training), S.Sava (adult education – identity, problematic), A.Niculau (adult education: Romanian experiences), M.Craşovan (design of in-service training activities), E.Păun (professionalization of the teaching career).

- The problem of the teaching career has found its reflection in the works of researchers from the Republic of Moldova: V.Gh.Cojocaru (continuous training of teachers with leading positions), Vl.Gutu (design of standards for in-service teacher education), A.Gremalschi, A.Cara (design of coninue training standards), V.Olaru (continuous training of teachers from the perspective of personal needs), D.Patrascu (managerial dimension of continuous teacher training didactic). V.Andriţchi (continuous teacher training in the context of human resources policies), L.Pogolşa (continuous teacher training from the perspective of pre-university curriculum management), T.Callo (conceptualization of in-service teacher education).

The notion of career has multiple definitions, there being no unanimously accepted official definition so far, which would meet the consensus of specialists, in the specialized literature being known different formulations or numerous opinions.

The current meaning of the notion of career has close connections with the idea of advancement or evolution of the individual in an activity / occupation / profession, aiming as an objective the individual evolution, within the broader

evolution of the community to which it belongs, by acquiring greater responsibilities, obtaining a status with a higher prestige added, obtaining power, etc.

Thus, the career becomes a succession of evolutionary moments related to activities and professional stages crossed by a certain person in relation to the skills, capacities and educational levels that he goes through and that he develops over time. (Hooley, T., Watts, A. G., Sultana, R. G., & Neary, S., 2013)

In career analysis, as a concept, there is an obvious distinction between two dimensions: one determined by internal – individual factors (capacities, needs, interests, values, objectives) and another by external factors (level of education, family framework, society, policies and organizational strategies), dimensions whose role is representative in career development. (Zhao, Q., Cai, Z., Zhou, W., & Zang, L. , 2022)

In the specialized literature we attest several definitions of the notion of professional career. The differences between them lie in the author's intention to highlight certain aspects of the concept or to highlight certain connotations:

a) Career – the path of development of a person through learning and work;

b) Career – promotion, climbing the hierarchy of an occupation or organization, respectively, achieving success [Lemeni&Miclea, 2010].

In any field of professional activity you can make a career. We identify the internal and external aspect of it. Moreover, we attest to attempts to promote the terms: internal career (recognition and personal satisfaction determined by the position / professional activity) and external career (appreciation and social recognition). We therefore infer an understanding of the phenomenon by which we capitalize on the correlation between the personal and the social factor:

c) Career – personal self-realization through profession and through social recognition of professional competence.

If we refer to the teaching career, career development is necessarily decisive by the personal development that occurs over time, depending on the experience gained at the department and in the educational organization, but also on the specific legislation – the obligation to support / confirm the teaching degree, or the need to follow continuous training courses for the accumulation of professional development credits. (de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022)

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**Human resources development in education: from motivation for achievement to performance**

The development of human resources in education aims at diversifying the offers of initial and continuing education and career opportunities for teachers and other categories of human resources in the initial education and training system. (Andritchi, V., 2012).

The competences provided for in these education and training programmes will ensure, first and foremost, the acquisition and development of the competences rewritten in the European qualifications framework for teachers.(Iucu, R. , 2007). The actions foreseen under this measure concern human resources in education from a dual perspective, participants in lifelong learning and knowledge spreaders. (Popescu. M, Băltăreţu. A. , 2012) This area of intervention contributes to the development of the stock of human capital in education able to provide quality education focused on the individual personal and professional development needs of students, to reduce the phenomenon of early school leaving and to increase the attractiveness of learning. Also, given that the services for guiding and advising human resources in education are insufficiently developed (Magee, M., Kuijpers, M., & Runhaar, P. , 2022), not being operational or specific tools for defining professional and career paths for this category of human resources, the actions in this field will be correlated with specific measures to increase career development opportunities for human resources in education. (Klanienė, I., Šmitienė, G., & Vainorė, R. (2022).

We can note here that the motivation for achievement is an important component of the professionalization process, teachers thus tending to pursue challenging careers, complex enough, but not so difficult as to end in failure. (Klanienė, I., Šmitienė, G., & Vainorė, R. , 2022). Therefore, professional motivation is an important endeavor, since it starts from the idea that a large part of everyone's life spends at work.

Unfortunately, also in educational organizations, the wishes of employees (teachers) are not enough for the development of a successful career, even if they take the form of a well-thought-out plan. (Hooley, T., Watts, A. G., Sultana, R. G., & Neary, S., 2013) To bring all these components together, the teacher often needs help from the outside. (Pânişoară. I.O. , 2015)

In the modern world, the organization in which they work becomes the most important source of support for an employee in career development. (Zhao, Q., Cai, Z., Zhou, W., & Zang, L. , 2022)

This state of affairs is easy to explain - modern organizations see in the development of their employees one of the fundamental factors of their own success, and therefore are sincerely interested in developing their careers. Not by chance, planning and managing career development have become one of the most important areas of human resource management in the last 20 years.(Nica, P., & Iftimescu, A. , 2004).

In the educational institution, the emphasis should be placed on the management of the professional insertion, which constitutes a complex, systemic, planned, individualized approach focused on learning, monitoring, evaluation, progress, career and performance, which ensures the quality of the instructive process, and its effectiveness depends on the degree of collaboration of the managers, insertion mentors and beginner teachers.(Nica, P., & Iftimescu, A. , 2004). It is vital to establish strategies for the development of human resources, especially for academic staff. . (Popescu. M, Băltăreţu. A. , 2012) These strategies should involve self-study, induction, on-the-job training, research and involvement in projects, e-learning and other formal and informal methods of lifelong learning, etc. The development of human potential and career development in educational institutions are essentially based on the process of development of teaching staff. (de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022) Regardless of the method or approach adopted for career development, it must consider educational actors as providers of the educational service.

Modern paradigms, which assimilate the status of the teacher with that of a member of a defined organizational structure (school) and, of course, of a community, also require a different acceptance of roles and, in particular, of professional identities, with an emphasis from the pragmatic side, personal and creative part of the process of formation. (Pânişoară. I.O. , 2015)

The entry into the teaching profession, the permanent professional development and the evolution of the individual in his career are points of a continuous professional subject to the laws of resource management. The needs for mobility, flexibility and perspective in the professional development of teachers required the introduction of the career term as a support to encourage motivation and involvement for a successful career in education [Iucu, 2006].

**What does success mean in your teaching career and what is a successful teacher?**

In the UNESCO study, entitled *Teacher Motivation, Compensation and Working Conditions, International Institute for Educational Planning*, (Paris,

2006), the following indicators are mentioned for success and performance in career:

1. Dedication to the profession and to the activity with children;
2. Management of success achieved in the classroom – the professional rewards that the teacher receives by observing the students' achievements;
3. The status obtained in the community, in that they exercise a respected profession;
4. The training obtained by the initial and continuous training in the field. (Iucu, R. , 2007).

A good teacher leaves his definitive mark on the harmonious development of his students, through a sum of essential qualities that help him honor the embraced vocation. Every parent wants a perfect if for their child, but do we know how to really recognize a high-performing teacher? (Rostini, D., Syam, R. Z. A., & Achmad, W. , 2022).

Over time, specialists in psycho-pedagogy have built and reconstructed the portrait of a successful teacher, recognized by the community. Is it preferable to be severe and authoritative or tolerant and flexible? (Zhou, J. , 2022). Should they focus on memorizing or applying knowledge? The theories are numerous, but they highlight some essential, desirable, native and learned qualities that make a teacher good. (Pânişoară. I.O. , 2015)

The most successful teachers have some common characteristics. In the following lines are mentioned some of them. Every teacher can benefit from focusing on these important qualities. Success in teaching, as in most areas of life, depends almost entirely on attitude and approach from the department but also outside the educational institution, why not on image?! (Pânişoară. I.O. , 2015)

One of the researchers of the aspects of the career management of success in the educational institution (Professor Ion Ovidiu Pânișoară from University of Bucharest) considers that successful teachers are "builders" of destinies, not just people who come to school to transmit information to students (similar to the role of the one who delivers you a product you ordered). Successful teachers are those who make students leave school with a smile on their faces and come back happy the next day. Successful teachers are those who know that they have chosen this career for the huge role of the teaching profession in society (whether society recognizes this or not!).

Beyond the subject he teaches – a true teacher makes students have self-confidence, love school and have deep values that will channel their destiny from here on out. Similarly, any teacher should make all his students feel important.

Each student should consider that the teacher values him, that he is involved in his life, that he cares about him and that he trusts his future. Successful teachers trust their students, know them and cherish them all. But more than that, it also gives them a vision, it gives them support in their trials, it gives them all their support. (Pânişoară. I.O. , 2015)

Here are other features that the online environment cites:

- Successful teachers are driven and have a sense of humor. A sense of humor can help you become a successful teacher. Your sense of humor can relieve tense situations in the classroom before they become disturbances. A sense of humor will also make the class more enjoyable for your students and possibly make students look forward to attending and paying attention. Most importantly, a sense of humor will allow you to see the joy of life and make yourself a happier person as you progress through this sometimes stressful career. (Inandi, Y., Yaman, Ş., & Mustafa, A. T. A. Ş. , 2022)

- An effective teacher must have high expectations. Striving to raise the standard of your students is a merit and a challenge! If you expect less effort, you will receive less effort. You should work on an attitude that says you know that students can reach the level of your expectations, thus also giving them a sense of confidence. This does not mean that you should create unrealistic expectations. However, your expectations will not be up to the better.

- To create a positive learning environment, your students will be able to do so. They should know what to expect from you, every day. You have to be consistent. This will create a safe learning environment for students and will be more likely to succeed. It's amazing that students can adapt to teachers throughout the day, from strict to easy. However, they will dislike an environment where the rules are constantly changing. Many students confuse fairness and coherence. A consistent teacher is the same person from day to day. A fair teacher treats students equally in the same situation. (Pânişoară. I.O. , 2015)

- A positive attitude is a great advantage in life. You will be throwing many curved balls in life and especially in the teaching profession. ( de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022) A positive attitude will help you cope with them in the best way. A positive attitude should also be professionally extended to others. The desire to work with others and not to close the door to your colleagues. They are important qualities. Finally, a positive attitude must be communicated to the families of students in high-quality communications. The families of your students they can be your best partners in the development of students for academic success.

- One of the principles of teaching should be that everything is in a constant state of change. Interruptions and interruptions are the norm and very few days are "typical". ( de Oliveira Rabelo, L., de Mattos, C. R., & dos Santos Abib, M. L. V. , 2022) Therefore, a flexible attitude is important not only for your level. of stress, but also for the students who are waiting for you to take care of and take control of any situation. (Inandi, Y., Yaman, Ş., & Mustafa, A. T. A. Ş. , 2022)

- Flexibility and responsiveness refers to the teacher's ability to make adjustments in a real-time lesson to meet any changing conditions. Even qualified veteran teachers will find themselves in a situation where a lesson does not go as planned, but they can take advantage of what is happening and respond in what is called a "moment to learn". This quality is because a teacher will persist in attempts to engage students in learning, even when faced with change. Ultimately, this quality is measured by a teacher's response to the student who does not understand or does not understand. (Pânişoară. I.O. , 2015)

Young teachers must be helped to acquire the knowledge and skills they need to conceive, conduct and control learning and teaching situations, to develop competences in modern communication and information techniques, because the complexity of the pedagogical profession makes it necessary to permanently train the teacher [Popescu&Băltăreţu, 20012].

If we refer to school managers, the positive experience gained over the years in their training confirms the need to emphasize the development of skills necessary to increase effectiveness, which involves doing the right things to achieve the organization's objectives and increasing the efficiency that involves doing things right (right). [Nica&Iftimescu, 2003]. These two aspects are defining in the appreciation of the managerial activity and are in an interdependence. . (Iucu, R. , 2007).

## Conclusion

The criteria that signify the dynamics of the pedagogical processes in the educational institution (given that the management activity is not an end in itself) represent the changes produced that have a positive influence on the personality development of each student and are materialized in the performance indicators aimed at: teaching - learning, the support of the student and the school culture and his performances.(Rostini, D., Syam, R. Z. A., & Achmad, W. , 2022).

The educational practices confirm that the (managerial) performance indicators within a school mainly refer to the actual management activity of the management

team by assessing the quality regarding the functioning/development of the educational institution, the application of managerial functions (informational-analytical, motivational-purpose, forecasting-planning, organization, control-diagnosis, regulation-correction) and managerial actions in the fields: curriculum (elaboration, implementation, development), human resources (recruitment, training/development, evaluation), non-human resources (material, financial, informational, time), organizational development/performance of the organization, management skills, in particular, communication, decision-making, pactication of leadership styles. (Hooley, T., Watts, A. G., Sultana, R. G., & Neary, S., 2013)

Since performance represents all the elementary logical stages of the action, from intention to result we cannot separate the result, namely the performance obtained, from the means and activities by which it was achieved, from the objectives set to be achieved because a result represents nothing if it is analyzed by itself. Moreover, if you can't measure, you can't control it. If you can't manage, you can't improve and you can't be performing. The process of controlling individual performance is vital to the overall success of management, contributing to the success of modern school organizations. (Popescu. M, Băltăreţu. A. , 2012)

The key principle of performance management and success in education is that of professional satisfaction of the teacher, a set of positive attitudes of the teacher towards his professional activity "formed as a result of experiencing feelings of pleasure in relation to the fulfillment of needs, desires, professional aspirations, these leading to professional performances, experiencing the feeling of fulfillment, professional achievement." [Andriţchi, 2012].

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# THE EFFECTS OF DOWNSIZING ON EMPLOYEE COMMITMENT IN THE FREIGHT MANAGEMENT SERVICES IN ZIMBABWE

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**Abstract**

*The 21st century introduced several technological advancements, including artificial intelligence, and these technologies affected almost every industry in every country. Freight management services in Zimbabwe had also adapted to these technologies to keep abreast with global pressures. Hence, embarking on massive workforce re-engineering strategies and downsizing had been the most popular strategy. However, organisations have to deal with consequences of downsizing, and employee commitment as one of these consequences.*

**Keywords:** *employee commitment, freight management, technological advancements, artificial intelligence*

**JEL Classification:** J21, J28

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## Introduction

Organisational downsizing is not a new phenomenon, with scholars generating literature, arguments, and models in this regard over the years. Recently, downsizing has become one of the most adopted methods by organizations to stay competitive and save their businesses from total collapse (Sikayena, 2017). There seems to be a consensus on the causes of downsizing amongst both orthodox and contemporary scholars, with most of them pointing out that businesses need to deal with the effects of global economic pressures. The increase in gravity towards better-quality performance to counter fierce global competition clarifies reasons why companies downsize their businesses (Armstrong, 2008). Mapira (2014) contends that when organisations experience this harsh reality, they decrease their labour force to increase competitive advantage, whilst decreasing labour costs to expand production. Freight management service in Zimbabwe is not immune to these global pressures. Faced with harsh economic conditions, characterised by a lack of foreign direct investment (FDI), hyper-inflation, cash shortages, limited access to foreign currency, and a rapid technology change (artificial intelligence), more emphasis had been placed on freight management service's flexibility.

Zimbabwean freight services experienced a myriad of fiscal hardships, ranging from deficiency of foreign currency, hasty technological advancement, corporate reengineering, liquidity crunch, and global competition. Cascio (2010) argues that downsizing is frequently relied upon financial recessions as a reactive strategy, which became a trend across many sectors in Zimbabwe for more than a decade now.

## Problem Statement

Recessions affected almost all units and sectors across the economy, and for the past decade, a wave of economic hardships was a norm for Zimbabwe's business community, which adversely affected the country's working class. This putative hardship for the working class was reinforced by the earlier noted Supreme Court of Zimbabwe verdict in the well-known case of Nyamande and Anor v Zuva Petroleum (Pvt) Ltd. The judgement approved companies to terminate a contract of employment on notice for no-fault. The aftermath of the verdict saw the mass arbitrary sacking of employees based on the set precedent to terminate an employment contract on notice. Consequently, frenzied downsizing of organisations across all sectors in Zimbabwe became the order of the day, including the country's freight service sector.

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The above research problem culminated in subsequent questions, which are presented below.

**Research Questions**

The above research problem culminated in subsequent questions, which are presented below.

- What are the effects of downsizing on employees' commitment to the freight services industry in Zimbabwe?
- What are the implications of using the common law right as a downsizing strategy to terminate employment contracts on notice?
- How do employees perceive downsizing and commitment?

**Research Objectives**

- To determine the effects of downsizing on employee commitment.
- To establish the implications of using the common law right as a downsizing strategy to terminate employment contracts on notice.
- To understand how employees perceive downsizing and commitment.

In line with the research questions and objectives, the following hypotheses were formulated.

**Hypotheses**

$H_1$: Monetary causes of downsizing have a significant effect on employee commitment.

$H_2$: Downsizing, as a change agent, has a significant effect on employee commitment.

**Literature Review**

This is a bid to provide an in-depth understanding of the term downsizing, both orthodox and contemporary scholars have defined downsizing and its related terms. According to McKinley, Zhao and Rust (2000), downsizing means reducing the number of workers to optimal levels. The term downsizing can be used interchangeably with rightsizing. Cameron (1994) hypothesizes that downscaling displays an approach, which executives apply to reduce the size of their personnel. Winfield (2004) states that downsizing is a planned and organised decrease in the workforce to improve performance and flexibility, and to accomplish a strategy to maximise investors' income. However, there is no consensus among scholars on the consequences of downsizing. The Consequences of downsizing include negative

and positive changes in employee commitment, overall organisational performance, physical and psychological changes on both exiting and remaining employees, as well as perceived violations of the psychological contract. Redundancies culminate in a variety of undesirable psychological and physical well-being. However, some of the consequences of downsizing may be reduced with individuals who opt for voluntary exit packages (Casio, 2010). Casio (2010) reiterates that if the process is voluntary, it presents an element of choice and individual control of remedies to uncontainable and unwanted actions that relate to both psychological and physical suffering. Downsizing has been widely used by organisations in Zimbabwe as an immediate response to economic crisis. As a matter of fact, downsizing has a direct impact on employment relations, including employee commitment. Theoretically, the current paper was anchored within Alicia and Ludwig's (1999) theoretical model of downsizing. The model provided the motives for downscaling, the effect of downsizing on workers' commitment, methods of communication, downsizing impacts on the psychological contract, and approaches to improve commitment throughout the downsizing process.

**Theory Underpinning the Study: Downsizing and Commitment Model**

In their model, Alicia and Ludwig (1999) provided an exhaustive and thoughtful understanding of the psychological consequences that the lay-off procedures impact on the entity's welfare. The model demonstrated the consequences of layoffs on variations of worker commitment, variations in physical and emotional job harm (job stressors), and insights into the probability to continue with the job (job security). Alicia and Ludwig (1999) view job commitment as a required trait, opposing intention to quit, work effort, and fear of the unknown. The model also explained perceived fairness as a response of workers concerning how they view the execution of the whole downsizing process.

In their model, Alicia and Ludwig (1999) included job stressors that comprise role ambiguity, conflict, and role overload (Alicia and Ludwig, 1999). Ambiguity imitates uncertainty about opportunities and significances and diminishes the degree to which workers had control over their jobs (Mapira, 2014). Whereas role conflict and role overload emanate from job overlaps and staff shortages caused by downsizing. The above-mentioned variables, coupled with alleged fairness, are connected to fear of the unknown, referred to as the survivor syndrome in the model. Downsizing has increasingly become one the most acceptable practice to cut down costs among organisations, hence the need for researchers to clearly understand downsizing. The next section discussed the research methodology.

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**Research Methodology**

To fully answer the research questions and to meet the research objectives this study adopted a mixed methods research approach. Specifically, an explanatory mixed method approach was adopted in conjunction with a pragmatic research paradigm (what works) in a bid to provide answers to the research problem. Data was sequentially collected in two phases, starting with (phase 1) quantitative data collection using questionnaires from 156 participants from 3 freight services organisations. After the quantitative phase, a follow-up qualitative data collection (phase 2) using semi-structured interviews were employed to solicit in-depth information from a purposive sample of 10 respondents. Numerical data obtained from phase 1 using questionnaires was analysed statistically by the means of descriptive and inferential statistics. A statistical data analysis software package, Statistical Package for Social Sciences (SPSS) version 27, was employed to analyse the numerical data. Data collected in the second phase (qualitative data) was analysed manually through content and thematic analysis. After data was analysed in both phases of the research, data integration was carefully done using a side-by-side colour-coded joint display to get an in-depth understanding of the phenomenon of downsizing and employee commitment.

**Results**

The data presented in this article was collected using an explanatory sequential mixed method approach (QUANT→qual) as alluded to earlier on. Quantitative data was analysed and presented first in the form of descriptive and inferential statistics. The targeted population to participate in the survey was 200 respondents from 3 freight services organisations. In total, 200 questionnaires were distributed, and 156 (n=156) were returned. This constitutes a 78% response rate. Subsequently, qualitative data was analysed using content and thematic analysis.

**Demographic Frequency Distribution**

Illustrated below in Table 1, is the frequency distribution for the biographical questionnaire. The demographic variables of interest are gender, age, position and level of education.

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*Table 1 Demographic Frequency Distribution*

| Characteristics | Category | Frequency | Percent (%) |
|---|---|---|---|
| **Age (Years)** | 18-30 | 11 | 7.1 |
| | 31-40 | 70 | 44.9 |
| | 41-50 | 48 | 30.8 |
| | 51-60 | 21 | 13.5 |
| | Above 61 | 6 | 3.8 |
| | **Total** | **156** | **100.0** |
| **Gender** | Male | 107 | 68.6 |
| | Female | 49 | 31.4 |
| | **Total** | **156** | **100.0** |
| **Job Level** | Management Level | 29 | 18.6 |
| | Shop Floor Level | 127 | 81.4 |
| | **Total** | **156** | **100.0** |
| **Educational Level** | GCEO'Levell | 36 | 23.1 |
| | GCE A'Level | 47 | 30.1 |
| | Diploma | 41 | 26.3 |
| | Degree | 14 | 9.0 |
| | Master's Degree | 13 | 8.3 |
| | PhD | 5 | 3.2 |
| | **Total** | **156** | **100.0** |

**Source:** *Author's fieldwork*

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The frequency distribution shows that out of the total participants, the majority i.e., 70 (44.9%) were between the ages of 31-40, and participants above 60 years of age were 6 (3.8%), and they formed the minority of the total participants. Furthermore, Table 1 above shows that out of the entire participants, 107 were males (68.6%), forming a majority. At the same time, female participants were 49 (31.4%). This depicts that the investigated industry is male dominated. Moreover, the frequency distribution of the job levels or positions of the participants shows that out of the total participants, 29 (18.6%) were managerial employees and the majority (127), which constitutes 81.4% of the total participants, were shop floor level employees. In the same manner, the frequency distribution of the level of education of participants shows that out of the total participants (156), 83 (53.2%) had a General Certificate of Education either at Ordinary Level (GCE O'Level) or at Advanced Level (GCE A'Level) constituting the majority of participants. Participants with undergraduate diplomas, degrees, and postgraduate were 73 (46.7%).

**Relationship between Downsizing and Employee Commitment**

Pearson's Product Moment Correlation Coefficient (r) was used to analyse if there exists a relationship or association between downsizing and employee commitment. Correlation is a measure of relationships and strength between two variables. It takes a value to -1 or 1 for a test to be significant in Pearson's Product Moment Correlation Coefficient (r). If the value of r is close to 1, it indicates a strong positive correlation. Whereas, when r is close to -1, it shows a strong negative correlation. For this article, two dimensions of downsizing were identified from the downsizing scale, and these are monetary causes of downsizing and downsizing as a change agent. The results presented below show the relationship between employee commitment and these two downsizing dimensions.

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*Table 2 Correlations Between Downsizing and Employee Commitment*

| Correlations | | | | |
|---|---|---|---|---|
| | | Monetary causes of downsizing | Downsizing as a Change Agent | Employee Commitment |
| Monetary causes of downsizing | Pearson Correlation | 1 | -.074 | .381** |
| | Sig. (2-tailed) | | .361 | .000 |
| | N | 156 | 156 | 156 |
| Downsizing as a Change Agent | Pearson Correlation | -.074 | 1 | .007 |
| | Sig. (2-tailed) | .361 | | .929 |
| | N | 156 | 156 | 156 |
| Employee Commitment | Pearson Correlation | .381** | .007 | 1 |
| | Sig. (2-tailed) | .000 | .929 | |
| | N | 156 | 156 | 156 |

*Source: Author's fieldwork*

Table 2 above shows a significant and positive correlation between the monetary causes of downsizing and employee commitment ($r = .381$. $p < 0.01$). The assumption that there is a significant relationship between monetary causes of downsizing and employee commitment was supported. Inversely, no correlation was found between downsizing as a change agent and employee commitment ($r=.007$. $p>0.01$).

**Multiple Linear Regression and Hypothesis Testing**

Multiple linear regression analysis was employed to predict the strength of the relationship between the dependent variable (Employee Commitment) and the

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independent variables (Downsizing as a Change Agent & Monetary Causes of Downsizing). The problem under investigation was to see if downsizing has any significant effects on employee commitment in the freight management services in Harare, Zimbabwe. In line with the research questions and objectives, the following hypotheses were formulated.

**Hypothesis**

$H_1$: Monetary causes of downsizing have a significant effect on employee commitment.

$H_2$: Downsizing, as a change agent, has a significant effect on employee commitment.

**Restating the hypotheses into null and alternate hypotheses**

**Hypothesis 1**

$H_0$: Monetary causes of downsizing have no significant effect on employee commitment.

$H_1$: Monetary causes of downsizing have a significant effect on employee commitment.

**Hypothesis 2**

$H_0$: Downsizing, as a change agent, has no significant effect on employee commitment.

$H_1$: Downsizing, as a change agent, has a significant effect on employee commitment.

***Table 3 Multiple Linear Regression Summary and Hypothesis Testing***

| Hypothesis | Regression Weights | Beta Coefficients | $R^2$ | F | t-value | p-value | Assumption supported |
|---|---|---|---|---|---|---|---|
| **$H_1$** | MCD→EC | .383 | .146 | 13.092 | 5.116 | .000 | Yes |
| **$H_2$** | DCA→EC | .035 | .146 | 13.092 | .473 | .637 | No |

*Note. *p < 0.01. MCD: Monetary Causes of Downsizing*
*DCA: Downsizing as a Change Agent*
**Source:** *Author's fieldwork*

Table 3 above shows a summary of the Multiple Linear Regression Analysis.

The hypotheses tested whether monetary causes of downsizing and downsizing as a change agent have significant effects on employee commitment. To test the hypotheses, the dependent variable (Employee Commitment) was regressed to predict the variables monetary causes of downsizing (MCD) and downsizing as a change agent (DCA). Sub Hypothesis 1, Monetary Causes of Downsizing significantly predicted employee commitment, $F$ (2,153) = 13.092, $p < 0.01$. This indicates that monetary causes of downsizing have a significant effect on employee commitment ($\beta$ = .383, $p < 0.01$). These results clearly show the effects of monetary causes of downsizing on employee commitment. Moreover, the $R^2 = .146$ depicts that the model explains approximately 15% change in employee commitment. Therefore, the null hypothesis of hypothesis 1 was rejected, and the alternative hypothesis was accepted. Inversely Downsizing as a Change Agent showed a non-significant effect on Employee Commitment, $F$ (2,153) = 13.092, $p > 0.01$. This indicates that Downsizing as a Change Agent did not play a significant role and has no effect on Employee Commitment ($\beta$ = .035, $p > 0.01$). Therefore, the null hypothesis of hypothesis 2 was accepted, and the alternative hypothesis was rejected.

**Qualitative Analysis**

The results of the quantitative phase informed the interview questions. During the semi-structured interviews, respondents were asked about their perceptions on main causes of downsizing as well as to comment based on their views the effects of downsizing on employee commitment. Furthermore, respondents were also asked to comment regarding the termination of contracts on notice as a downsizing strategy. Pseudonyms were used to protect the identity of the respondents. The majority of the participants singled out economic instability as the main cause of downsizing in Zimbabwe. One managerial participant reiterated how the organisation struggled to pay employees. In a quoted phrase, the participant exclaimed that:

*"...the organisation downsized due to financial upheavals. The organisation was no longer able to sustain its daily expenses including the payment of salaries to the employees due to the unstable rate of the country's currency"* (Tesla, senior management employee).

When asked about the effects of downsizing on employee commitment, the majority of the participants concurred that commitment was negatively affected during and after downsizing. However due to lack of alternative employment and scarcity of employment opportunities survivors had no option but to continue

working for a downsized firm to earn a salary and sustain their families. The following responses were the most popular from a majority of the participants. *"I no longer feel connected to the company. If I could find another job I can leave immediately"* (MacOS).

Interestingly, another participant vowed that he was still with the company only physically to earn a living but his mind was no longer there. This is illustrated in the quote below:

*"Physically I'm there working but my mind is no longer with the company. I'm only there to receive a salary so that I provide for my family"* (Zorin OS, a shopfloor level employee).

Zorin OS's expression above speaks volumes on how employees remained working with a downsized organisation without any sense of affection or attachment to it.

Commenting on the downsizing criteria, the majority of participants were of the view that termination of contracts on notice was a harsh criterion. Participants had the following to say: *"... of course, notices were given but then it was for only one month, not the usual three months that we know"* (MacOS).

**Discussion of Findings**

This quantitative and qualitative results were integrated using a joint display and content narration. Meta-inferences of the integrated results are discussed in relation to the objectives of the study.

**Effects of Downsizing on Employee Commitment**

Even though there seems to exist a disparity in the findings of the quantitative and qualitative strands, it was deduced through meta-inferences that the existence of Continuance Commitment was evident throughout the study. Quantitative findings indicated the existence of commitment after downsizing without clarifying the exact type of commitment. To demystify this ambiguity a follow-up was done through qualitative analysis, which indicated that employees continued to be with the downsized organisations because they had no alternative employment opportunities.

The above notion is consistent with Alicia and Ludwig's (1999) model of downsizing and commitment which posits that during financial crises, organizational downsizing will cause a shift from affective commitment to continuance commitment due to fear of financial loss and survivors' un-employability in other organizations. Simply put, employees were forced to remain

and continue with the downsized organisation owing to a lack of alternative opportunities and fear of losing their income.

Meta-inferences of the results suggest that employees are merely committed to the downsized organisations because they had no alternative employment elsewhere. Hence, they had no other option other than to continue with their organisations after downsizing. Relevant, reviewed literature acknowledges this type of commitment as continuance commitment (Alicia and Ludwig, 1999; Meyer and Allen, 2004; Allen and Meyer, 1997; Meyer and Herscovitch, 2001). Research findings for the study's demographics (Table 1) indicate that a majority of the shop floor employees, comprising 81.4% of the total study population, did not have meaningful qualifications, which explains why they had limited opportunities for alternative employment. These findings are consistent with Allen and Meyer's (1997) argument that employees with fewer skills are the ones who fall into the category of continuance commitment because they fear that if they leave the organization, they are less likely to find employment elsewhere. Allen and Meyer (1997) assert that employees can choose to remain with an organization simply because they fear losing their earnings or savings, which leads to continuance commitment. Building on the work of Allen and Meyer (1997), Meyer and Herscovitch (2001) claim that employees who fall into the category of continuance commitment are regarded as 'perceived cost mindset', as their commitment is driven solely by financial gains. This assertion was undisputedly supported by the research findings of this article.

**Implications of using the common law right as a downsizing strategy to terminate employment contracts on notice**

The second objective was to establish implications of terminating employment contracts by using the strategy of the employer's common law rights. The research findings confirmed the researcher's assumption that using the employer's common law rights to terminate employment contracts as a downsizing strategy, resulted in a frenzied downsizing process in Zimbabwe. This was also consistent with the available literature. In agreement with the findings, several scholars state that the judgement, which led to the use of employers' common law rights to terminate employment contracts on notice opened a new variety of downsizing in Zimbabwe, which left employees at the mercy of the employer through their implementation of a frenzied downsizing strategy (Makings, 2016; Kuwanza, 2017; Mucheche, 2017). Similarly, Kuwanza (2017) declares that the judgement opened a floodgate for job cuts across all sectors in Zimbabwe.

The research findings suggest that the downsizing strategy used by many organisations caused panic in employees who eventually lost trust in their organisations as they were not well informed about the downsizing criteria. This scenario negatively affected survivors' commitment as they feared for a second wave of downsizing. In support of this notion, the downsizing and commitment model by Alicia and Ludwig (1999) argued that survivors' perceptions of becoming victims of future downsizing led to high-stress levels and depression, which eventually leads to poor work performance. In the same vein, Matika et al (2017) were of the view that with a considerable amount of job insecurity, even a fair downsizing process would not convince survivors of continued employment. Intentions to leave were indicated by the participants in the research findings. However, scarcity of alternative opportunities was suggested as the main reason for employees to remain with the same organisations. Hence, the existence of continuance commitment.

**Perceptions of employees with regards to downsizing and commitment**

The third research objective was to understand the perceptions of employees on downsizing and commitment. The research findings suggested that employees were of the view that downsizing was justified due to the economic hardships, which were faced by organisations. Almost every sector in Zimbabwe was hit by serious financial hardships characterised by acute cash shortages and a lack of foreign direct investment (FDI). These findings are consistent with the literature available on the topic under study. According to Matika (2017), hyperinflation coupled with a lack of investor confidence in the then government of Robert Mugabe affected industry and commerce in Zimbabwe, and this led many organisations across all sectors to downsize their workforce.

Conversely, results suggested that Downsizing as a Change Agent through the adoption of technological changes had no significant effects on employee commitment in the freight management services in Zimbabwe. The assumption that Downsizing as a Change Agent and the widespread need for organisations to adapt to new technologies have a contributory effect on downsizing and employee commitment was not supported by the result. This is not in agreement with contemporary views on the 4th Industrial Revolution literature. Johnston (2019) is of the view that organizations are mainly downsizing to cope with the demands of artificial intelligence and automation. However, in the Zimbabwean industrial context, this was not the case, as indicated by the results. Interestingly downsizing was reported to be mainly due to financial crises. This suggests that as the world

progresses into an era of artificial intelligence (AI) and internet of things (IoT), Zimbabwean organisations were faced with acute financial challenges, hence downsizing was not a result of the need to adapt to these technologies.

On the other hand, the research findings suggested that downsizing has remarkable effects on employee commitment. As alluded to earlier, there was little evidence to support the existence of affective and normative commitment in the research findings. The popular perception of employees on commitment indicated that downsizing negatively affected employee commitment. However, due to a lack of alternative opportunities, there were no better options for survivors than to continue with downsized organisations. This proves the existence of employee commitment. This scenario exacerbated some challenges related to the physiological and psychological effects of downsizing.

Both employers and employees reported having encountered challenges during and after the downsizing process. The challenges, which were rampantly reported are related to physiological and psychological effects of downsizing, which include workload, job insecurity/fear of the unknown, stress, and mental breakdown among other challenges. The results are in agreement with Akiyemi's (2018) assertion that survivors' perceptions of becoming victims of downsizing in the near future will lead to high-stress levels and depression, which eventually leads to poor work performance. To make matters worse, employees in Zimbabwe do not have any alternative job opportunities to help them to escape this scenario. The situation has forced employees to quit and stay as described by Cangemi (2000) who posits that employees can remain with an organisation physically but their minds will be elsewhere.

**Limitations of the study**

The generalizability of the findings of this study is subject to certain limitations including lack of adequate responses, use of basic analysis techniques, researcher bias and time constrains. The scope of this study was limited to the freight management service sector in Zimbabwe. These should be thought out when generalizing and interpreting the research findings. The researcher targeted to collect data from more than 200 participants in its quantitative phase. Unfortunately, the present research managed to solicit data from 156 respondents in the quantitative phase due to limited access to data and a lack of response from the targeted participants. It is worth mentioning that data access was limited due to travel restrictions and limited access to company visits due to Covid-19. Therefore, the researcher struggled to gain access to participants as several organisations

declined permission and access citing covid-19 related issues. As alluded earlier on, this study was conducted amidst a global pandemic and a relatively huge amount of time was lost due to lockdowns and international travel restrictions. The researcher failed to timeously access data and this delayed the research progress, data collection at one point came to a complete halt. This might have slightly affected the research outcome. Notwithstanding the limited amount of time, this study offered valuable insights on the existence of continuance commitment and the untold challenges faced by employees of downsized freight management services organisations in Zimbabwe.

**Recommendations**

Based on the research findings, the following recommendations are worth pondering in order to improve sound employment relations within the freight management services in Zimbabwe.

**A need to avoid 'termination on notice' as a downsizing strategy**

Organisations that wish to downsize in the near future in Zimbabwe, especially freight and logistics organisations should endeavour to consider other downsizing strategies and alternatives. More than that, lawmakers and judiciary bodies should consider enacting robust and non-exploitative legislations to regulate downsizing as opposed to the use of employer's common law rights to terminate contracts on notice for no-fault as a downsizing strategy. In a nutshell, downsizing using frenzied downsizing strategies should be avoided at all costs, and organisations in Zimbabwe should consider the use of strategies that are widely acceptable as well as paying out acceptable exit packages to mitigate the effects of downsizing on both exiting and remaining employees.

**Open communication and consultation should be considered**

It was deduced from the study that communication and consultation strategies should support planning and implementation of downsizing as it encourages employee involvement and provides clarity to employees' prior, during, and after the downsizing process. Issues of job security and work changes were indicated in the findings and these were reported to be negatively affecting levels of commitment. It was therefore deduced that communication and consultations help to minimize the effects of downsizing on employee commitment. It is therefore recommended that organisations should consider the use of effective and credible

communication during downsizing as it cultivates trust and enthusiasm among employees.

There is a need to consider social support to both outgoing and remaining employees

The research findings suggest that apart from financial loss, downsizing causes both outgoing and remaining employees to suffer low levels of self-esteem, high levels of stress, and signs of depression as well as negative career attitudes. It was found that remaining employees usually suffer survivor syndrome, which is a combination of emotions triggered by fear of the unknown, anger, feelings of guilt, low morale, and intentions to leave. However, providing employees with social support services was identified as an important way to ameliorate the above-identified negative effects. In a nutshell, in order to avoid absenteeism, sabotage, and employee turnover, downsizing organisations should consider implementing social support as it helps to gain employees' trust and to deal with fears of uncertainty. This improves employee commitment and creates a feeling of organisational citizenship among the remaining employees.

**Retraining of remaining employees should be considered**

The results suggest that while some employees are downsized the same amount of work remains, hence causing potential role overload and role ambiguity for remaining employees. As a result, intentions to leave due to employees' perceptions of role conflict were rampantly reported. However, retraining employees will reduce risks of role conflict and role ambiguity and assist employees with the transition to be able to assume new roles. With that in mind, remaining employees will be equipped with a diversity of knowledge and skills, which will enable them to multitask and use improved methods of production to avoid working overtime. Training will also assist the transition by helping employees to get prepared for challenging roles and eventually accept change.

**Conclusion**

This article significantly concludes that there is a strong existence of continuance commitment among employees in the freight and logistics sector in Zimbabwe. Despite a frenzied downsizing exercise by organisations in Zimbabwe over the past decades, the reason behind the existence of continuance commitment was identified and understood to be exacerbated by a lack of alternative employment and fear of losing income by employees. It was further established that employees in the freight management sector endured untold physiological and

psychological breakdowns due to frenzied downsizing strategies employed by organisations in Zimbabwe. The existence of physiological and psychological breakdowns is an indication that downsizing has a negative effect on affective and normative commitment. Nevertheless, the present article capitalised on the benefits of Mixed Methods which helped to demystify the hidden truths behind the existence of continuous commitment in a downsizing organisation. This study may be relied upon by academics, lawmakers, and policymakers as a departure point in developing robust business and labour sensitive policies.

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# THE EFFECT OF MOTIVATION FOR THE PREVENTION OF CORRUPTION ACTS IN THE MINISTRY OF INTERNAL AFFAIRS

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***Abstract***
*The report presents the objective need for motivation as an element of managerial impact in the Ministry of Internal Affairs. The activity of the state administration should correspond to the high public expectations for professional competence, legality, integrity, correctness, and responsibility. That is why motivation is the key element that leads to the formation of specific behavior aimed at the observance of value orientations in the performance of official duties and is an important prerequisite for the prevention of corrupt behavior among the employees of the Ministry of Internal Affairs.*

***Keywords:*** *motivation, management, Ministry of Internal Affairs, public sector, state administration, corruption*

***JEL Classification***: H56

## Introduction

National security is a state in which subjects, society and the state possess the ability to effectively oppose various threats. The public sector in any country is largely related to its security system, insofar as its main mission is to ensure the protection of the rights and freedoms of citizens, combating crime, protecting

national security and preserving public order. The specificity and variety of activities carried out by the state administration determine a complex organizational structure, which implies the engagement of employees with professional competence in many different areas.

At the same time, higher requirements are set for civil servants regarding their professional competence, skills for working in a tense and dynamic environment, and discipline. The work process is often accompanied by performing multiple tasks and assuming responsibilities, accompanied by high levels of stress and the need for self-discipline. That is why the motivation of employees in the Ministry of Internal Affairs is a key factor in the formation of specific behavior aimed at the observance of certain values: legality, preservation and protection of human life, respect for the dignity and rights of citizens, honesty, correctness, competence and responsibility. Following these value orientations in behavior is an important prerequisite for preventing corrupt behavior.

**Literature Review**

A large volume of literature sources was studied in order to form a methodology for work. The literary review includes literary sources in Bulgarian, Russian and English, by Bulgarian and foreign authors, normative documents and publicly available resources on the Internet, which have attitude to the problems of motivation, training and corruption behavior as a negative social phenomenon. Among them are authors whose scientific works are fundamental in clarifying motivational processes, training and human resource management, as well as publications, made in the last 5 -10 years.

For example, the problems associated with studying the essence of motivation as a process of managerial impact, are described by the following authors: Abraham Maslow, Burrus Skinner, Alexey Leontiev, Pol Lawrence and Knighton Noria, Frederick Herzberg, Maria Andreeva, Elitsa

Petrova, Marin Paunov, Trifon Trifonov, Petar Nikolov, Yosif Iliev, Zakharin Markov, Kamen Kamenov, Anatoly Asenov and others.

Information about the conceptual apparatus in the field of countering corruption and corrupt behavior, as well as the prescribed standards in the activity of the administration are contained in

the normative documents: Penal Code, Code of Administrative Procedure, Law for Counteraction of corruption and confiscation of illegally acquired property, Ethical code of conduct for civil servants in the Ministry of Internal Affairs, Code of behavior of employees in the state administration.

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**Corruption as a negative social phenomenon in the public sector**

Corruption is a negative social phenomenon with its own specific characteristics and forms of manifestation. The legal definition of the concept of corruption is contained in Art. 3, para. 1 of the Law on Combating Corruption and Confiscation of Illegally Acquired Property, published in the State Newspaper No. 7 of January 19, 2018, last amended and supplemented by State Newspaper No. 12 of February 12, 2021: "Corruption under the meaning of this law is present when, as a result of the high public office held, the person abuses power, violates or does not fulfill official duties with the aim of directly or indirectly obtaining an unobservable material or immaterial benefit for himself or for other persons.".

Relative to the functioning of the security sector, the phenomenon of corruption is marked by a particularly high degree of public sensitivity and reprehensibility. Violations of official duties or criminal acts committed by employees of the Ministry of Internal Affairs, who by law should be an example of professionalism, correctness and integrity, reduce public trust in the institutions, undermine the authority of the state administration as a whole and give rise to a feeling of anxiety and uncertainty in statehood in general. Therefore, an effective set of motivational impact measures is needed in order to prevent possible manifestations of corrupt behavior on the part of public sector employees at all stages of development of the personnel process.

The most important factor for any organizational unit is the human resource with its personal qualities and professional skills. The strategic perspective of the organization depends on his competence, willingness to learn and future potential for development. The motivation and behavior of the individual can be effectively changed in the way of supporting the desired reactions and ignoring the unwanted ones, and the conscious impact in the human resources management process favors their effective use and development.

Given this, the motivation of human resources in the security sector has a key influence on the way employees perform their official duties, supports the subjective need for lawful behavior, increases the sense of professional competence and social necessity of the profession and prevents the manifestation of corruption.

**Peculiarities of the motivation of human resources**

Motivation is the force that causes people to act, to treat someone or something in various situations in a way that they themselves choose. In a generalized form, we can present motivation as a process that prompts an individual to behave in a

certain way and largely predetermines his behavior in terms of form, direction, intensity and duration.

Motivation is the force that causes people to act, to treat someone or something in various situations in a way that they themselves choose. In a generalized form, we can present motivation as a process that prompts an individual to behave in a certain way and largely predetermines his behavior in terms of form, direction, intensity and duration. Motivation is a reflection of the relationship between a person and society, and as noted by the English specialist Michael Armstrong: "Motivating people means directing them in a certain direction and taking the necessary steps to get them there."[1]

According to psychological science, the origin of the word motivation comes from the Greek word "*motivun*", which means a reason why something moves. Social sciences, on the other hand, accept the Latin "*movere*" as the origin of the word "motivation", which means "move", "stir", i.e. a reason to do something, an occasion to take some action.

Generally speaking, motivation is a phenomenon related to the essence of a particular person. The role of the manager is to create those conditions that will provoke employees to be actively involved in the work process and to perform their official duties with a conscious desire. Therefore, motivational expression can be defined as "the desire to show a high level of effort towards the achievement of the organization's goals, conditioned by the efforts to satisfy some needs of the individual"[2]. Therefore, the three key elements of motivation include effort, organizational goals, and needs.

The motivational process can be described by the following steps: First, a given initial stimulus appears, which is realized by the individual as a need. Second, the internal tension in the individual increases. Third, the energy hidden in this tension conditions a certain behavior by the person whose goal is to reduce or satisfy this need. Between the choice of behavior and the actual behavior intervenes the ability, because a person may not possess the necessary basis for satisfying his needs. Fourth, with the satisfaction of the need, the tension in the individual decreases. Fifth, a new need arises, after which the cycle repeats itself. [3 4]

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[1] Armstrong, M. Human Resource Management Handbook, Delphin Press, Burgas, 1993.

[2] Markov, Z., Human Resources Management in the Armed Forces of the Republic of Bulgaria, Military Publishing House, 2011.

[3] Petrova, Elitsa, Basics of Management, Veliko Tarnovo, 2013, IC of Vasil Levski National University, Veliko Tarnovo.

Content theories of motivation have a significant scientific contribution to the clarification of motivation and its importance for human resource management. However, they do not take into account the changing characteristics of the situation. Therefore, this gap in science has been filled by process motivational theories, which explain how a person exerts effort, pursues different goals, and chooses a particular type of behavior. It is through procedural theories of motivation that the thesis is justified that motivation is higher when clear and specific goals are set before the individual. People evaluate their performance by comparing, on the one hand, what they have put into the work and what benefits they have received, and on the other hand, comparing the benefits that another person has received. At the same time, financial results are not the only measure of effectiveness of the efforts and work invested. The feeling of being valued, of recognition, of opportunities for career development can prove to be very effective motivating incentives.

**The motivation of human resources as a management function in the Ministry of Internal Affairs.**

Management activity in any organization is a unity of planning and goal-setting, taking into account motivation factors and their impact on employees. These activities are carried out with a relative degree of uncertainty in terms of the potential development of processes, the emergence of the need to manage crises and permanent resource limitations. In order to be able to adequately respond to public needs and expectations, the Ministry of Internal Affairs should have motivated employees whose activities are characterized by professionalism and expertise. In view of this, it is necessary to allocate a priority place to the activity of human resources management, the projection of which is the improvement of efficiency and effectiveness in daily official activity.

A main management function in the public organization is to motivate the human resource for effective work and use of own potential more fruitfully. The existence of diverse concepts and views on this issue is the testimony of the great complexity of the problems of personal motivation. Motivational theories are a complex construct combining elements of need theories, socially acquired knowledge, behaviorism, cognitive, psychoanalytic, and biologized theories.

The subject of the motivation of employees engaged in the security sector is extremely important for managers at all levels of management. Finding, retaining and developing quality personnel, maintaining a high professional level and competitiveness in the modern reality are important not only for the functioning of

each organization, but also for its successful influence on the functioning of the public sector as a whole.

The relationship between the public organization and its employees is a function of the motivational factors combined with the management's ability to organize the activities of human resources and direct them towards the realization of common goals. Every manager in the public sector needs to know the conditions that motivate employees to willingly give maximum effort. Motivation is a prerequisite for the effectiveness of the activity.

Performance standards are an important element of the functioning of the state administration. Society makes increasingly high demands on all aspects of state administration. Public control over the actions or inactions of public officials in their capacity as administrative bodies is an established mechanism for improving the work and the implementation of civil control for compliance with the principles of accessibility, publicity and transparency of the activity.

The ethical rules in the work of the state administration are usually covered in ethical codes with different content and scope, but containing unchanging common values: service in favor of the public interest; respect for laws and regulations; openness, responsibility and accountability to citizens and businesses; independence and impartiality; professional training and competence. Compliance with them is an essential prerequisite for the prevention and non-admission of corrupt behavior.

A kind of mechanism for counteracting corrupt behavior is the legally regulated opportunity to submit proposals and signals concerning the activities of state bodies. Normative regulation of "reports" in the sense of the Administrative Procedure Code (Pub. SN. No. 30 of April 11, 2006, final change and add. SN. No. 15 of February 19, 2021) is contained in chapter eight "Proposals and reports", Art 107, para 4 of the code: "Reports can be submitted for abuse of power and corruption, mismanagement of state or municipal property or for other illegal actions or inactions of administrative bodies and officials in the respective administrations, which affect state or public interests, rights or legitimate interests of other persons", Art 107, para 4.

Taking up a civil service in the Ministry of Internal Affairs is mandatory to a high degree from the point of view of professional responsibilities, ethical rules and the image that is built for the civil servant in public perceptions. It is motivation, continuous training, strict and correct performance of official duties, accurate application of laws and other normative acts that are a way to increase public trust and to minimize potential corruption risk.

The analysis of the motives that push the individual to the corruption show that they can be classified into two groups - basic and accessory. The main motive for committing any act of corruption is the desire for personal enrichment. Additional motivations are: a sense of impunity for wrongdoing; the feeling of power arising from the position held; the notion of solidarity in illegal activity.

Corruption acts, in some cases, represent disciplinary violations and are sanctioned by administrative order, and in more serious ones, they constitute a crime and are a prerequisite for seeking criminal liability.

Studying the reasons and conditions that favor, respectively hinder, the performance of corrupt practices by the employees of the Ministry of Internal Affairs, is an important prerequisite for the implementation of preventive activities in the public sector. Emphasis on ethical values when conducting training and retraining of employees in the course of their career development is an appropriate preventive measure when addressed to units vulnerable to corruption. This could lead to an improvement of the security environment, to a sense of satisfaction in society and to an increase in trust in the state apparatus, as well as confidence that these bodies are able to protect the legitimate rights and interests of citizens.

The system for preventing and countering corruption in public sector organizations includes various forms of influence. These are system input control; disciplinary practice; managerial control; control over management activity, video surveillance, and others.

**Conclusion**

Dynamic socio-economic changes, life in the conditions of crisis situations and the need for timely adaptation of public organizations to the changing environment, impose the need for a new attitude to motivation and its importance for the successful coping of the individual with the changing reality.

Motivation is an ongoing process. People are motivated by what they expect to happen as a result of some action or behavior on their part. Therefore, the most important thing when building the motivational system is to take it into account with the specifics of the specific organizational unit. The effect of motivation is stronger when the individual knows what will be the result of his work and expects this result.

The state administration as a whole can be related to the elements of the security system, insofar as it is a question of structures of important public importance, powers and responsibilities covering all spheres of public life and competences over the entire territory of the country. This places high professional and ethical

demands on the employees who work in the public sector, regardless of their hierarchical position in the institutions. Only the harmony between motivation and official duty could be a guarantor of efficiency and legality in the performance of official duties, as well as serve to increase the trust and support of society.

The prevention of corruption acts in the Ministry of Internal Affairs is a purposeful process of finding, selecting, appointing, training and retaining motivated employees, whose subsequent motivation in the work process is the result of daily efforts on the part of the management team to create a suitable environment and working conditions and to achieve adequate and lawful results in the activity. In the structures of the state administration, sufficient mechanisms are provided and exist to influence both the prevention of corruption and any other negative manifestations that may occur during the performance of daily official activities by the human factor. In order for these mechanisms to be maximally effective and adequate in accordance with the dynamic and changing socio-economic reality, they must be applied by motivated and professionally trained management personnel.

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# EFFECTS OF GLOBALISATION ON EMPLOYMENT RELATIONS WITHIN THE FILM INDUSTRY IN SOUTH AFRICA

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**Abstract**

*Globalisation has been perceived as the integration and spread of information, processes and technology across organisations and nations. It has accelerated transformation and change in organisations, with the effect of strengthening or, as the case may be, weakening employment relations within organisations. Globalisation has been characterised by a rise in the use of casual employees, decentralisation and continuous advancement in technology, which ultimately affects employment relations. Therefore, this paper sets to explore the effects of globalisation on employment relations in South Africa's film industry. The current investigation adopted a qualitative research approach, which was carried out in an organisation within the film industry in the city of Johannesburg, South Africa. Purposive sampling was used to collect data from ten employees at various levels in the organisation. Data was obtained by means of semi-structured face-to-face interviews with the research participants. The findings revealed that the effects of*

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*globalisation are twofold, as it has both positive and negative effects on organisations. From a positive perspective, it was found that globalisation has helped to promote inclusive workplaces, effectively manage tensions and conflict in the workplace, and improve communication between parties in the employment relationship. Furthermore, it was discovered that interactions between management and employees have increased since globalisation. Conversely, the current findings uncovered that there are increasing tensions in the employment relationship. There is also evidence of less training to workers in the film industry. The findings further revealed that using casual employees in the film industry has increased, and many of them are confronted with several challenges, as they do not get the same benefits that their counterparts in permanent employment receive. Hence, generally, this paper's outcome could be used in organisations to address some of the negative effects of globalisation in respect of relationships in the workplace, particularly in the film industryg.*

**Keywords:** *Globalisation, employment relations, casualisation, conflict, decentralisation.*

**JEL Classification:** J01, J53, J81

## Introduction

Human resources divisions in organisations are transforming, as contemporary businesses face complex challenges and prospects. Currently, this transformation occurs owing to factors such as globalisation as a result of rapid changes within businesses (Kapoor, 2011). Due to its emphasis on diversity management, globalisation also has a profound impact on how organisations deal with their employees. Globalisation is vital for employment relations ethics, as it influences how management treats its employees (Cambridge, 2001). Workers in the film industry are more often than not independent contractors rather than permanent employees. Since the dawn of globalisation, organisations in the film industry have increasingly made use of casual employees. Hence, due to globalisation, employment relations to some extent seem to have been strained.

Employees are amongst any organisation's most essential and valuable assets (Sequeira & Dhriti, 2015). Employment relations involves handling remuneration, dealing with employment practices, employment contracts, empowering employees, and communicating with employees (Sequeira & Dhriti, 2015). All these different aspects of employment relations contribute to building a good

employment relationship. However, the film sector has an ongoing history of insecure jobs, which is characterised by unclear contracts and the questionable employment status of its workforce (Myers, Van Liemt, Bibby, & Servoz, 2014). This tends to harm employment relationships, as there are blurred and indefinite employment relationships in the industry. Most workers in the film industry have long and irregular hours, as well as low and variable pay. Several film industry workers have temporary contracts, leading to low job security (Myers et al., 2014).

To effectively equip organisations for a growing global organisational setting, managers need to comprehend the effects of globalisation on employment relations. This helps them to cope with the effects of globalisation, as they are fully aware of its implications such as workplace conflict and diversity. This article explores the effects of globalisation on employment relations in the South African film industry.

## Problem Statement

The dawn of globalisation has witnessed increases in global competition, job reallocation, and outsourcing, as well as new forms of employment such as the use of casual labour in organisations. This has adversely affected employment relations, as the use of more temporary workers prevents employees from enjoying the same benefits as permanent workers. Employment relations have been further strained because employees feel that organisations are not meeting their needs, while the increased use of machinery to replace manual labour as means to remain competitive, has added to employees' job insecurities. There has been extensive research on the impact of globalisation on employment relations in other industries, but none has been conducted on the effects of globalisation on employment relations in South Africa's film industry. The above problem statement prompted the article's research question, which is outlined below:

## Research Question

- What are the effects of globalisation on employment relations within South Africa's film industry?

## Research Objectives

- To explore the effects of globalisation on employment relations in South Africa's film industry.

## Literature Review

### Globalisation in the film industry

Competition in the film business has intensified under globalisation (Rosnan & Aziz, 2012). The film industry, much like other industries in this era of globalisation, is a global industry and is internationally driven (Tuomi, 2006). It is vital for management and employees to understand the concepts and ideologies around globalisation, as they may affect the employment relationship. The film industry rests on complex and informal employer-employee social relations, where the two parties' previous interactions have built trust for future projects together (Lorenzen, 2008). Therefore, some temporary employees may not be re-hired owing to this factor, which may cause conflict as they would consider the re-hiring process to be unfair, and difficult to by-pass. Quite a number of employees in the film industry have shifted from being broadcasters to working as freelancers or independent producers (Liang & Sendanyoye, 2014). According to Gertjan (2017), stagnant pay, overtime, and job insecurity owing to globalisation are a few critical labour issues at stake in the film industry. Employment-related issues have risen in the film industry owing to globalisation.

**Employment relations in the film industry**

The film industry has experienced major changes in the past twenty years, characterised by changes in the labour market, and in work organisations both within employment relationships and through commercial contracts (Liang & Sendanyoye, 2014). Employment relations may differ in different industries owing to different externalities, for example, employment relations, where a "standard employment contract" in the finance industry is likely to be different to that of a "casual employment contract", which is common in the film industry. All employment rights apply to permanent employees, while freelancers only have limited employment rights (Korotayev & Grinin, 2013). Tension in the film industry has risen owing to this fact, as most employees in this industry are freelancers and independent contractors.

Globalisation enhances competitiveness at organisational level, resulting in management adopting strategies to increase effectiveness, productivity, quality, and innovation (Spooner & Haidar, 2005). Globalisation has influenced technology and vice-versa (Ukpere, 2009). The film industry is in a state of flux and subject to ever-changing technology. Moreover, in the globalisation era, the film industry acts as a significant means through which technology is transferred, enhancing the skills base of employees in South Africa (Tuomi, 2006). With innovation being on the rise, and vital for organisations' competitiveness, there is a possibility of the use of robotics replacing human beings in the future, and this has resulted in increased

insecurity. This may make it difficult for management to build trust in the organisation, hence negatively impacting employment relations.

**Globalisation and trade unions**

Globalisation is not only a significant pattern, which develops the integration of markets and the movement of resources, but it also encompasses intense competition between management and trade unions (Lee & Kang, 2012). Labour unions consider job security to be a priority (Lee & Kang, 2012). Involving trade unions in the development of an organisation's human resource management policies helps to create harmonious employment relations (Olungo, 2017). However, organisations now approach employees directly as individuals or in groups rather than via their representatives (Sarkar, 2011). Currently, there has been less use of trade unions in the film industry, because labour law now covers what trade unions did conventionally; hence, there is a possible threat of decline in the use of trade unions (Lee & Kang, 2012). This may increase burdens for employees whom trade unions supported previously (Olungo, 2017). This is because they no longer have trade unions to support them, or to act as a third party in the employer-employee relationship.

**Labour market developments since the dawn of globalisation**

Over the past years, labour market developments have increased owing to globalisation. Ali (2005) mentions that globalisation has also contributed to weaker labour movements, increased casual labour, and unemployment. Consequently, labour markets are susceptible to unfair labour practices, discrimination, and exploitation (Shah, 2005). Today, as an effect of globalisation, and the employer's pursuit for flexibility, non-standard work arrangements have emerged. The continuous shift of employment in labour means that the composition of the workforce is increasingly becoming diverse and dispersed (Pulignano, Kohler, and Stewart, 2016). In the film industry, there is growth of non-standard employment patterns in the form of casualisation, externalisation, and informalisation of work. Casualisation divides employees into permanent and non-permanent employees. Temporary employees are usually poorly remunerated (Hudson, 2014), and have minimal to no training and development opportunities.

**Autonomy in organisations**

Globalisation has enabled autonomy and high-level involvement on the part of employees in organisations. The degree of autonomy granted to the employee is crucial in employment relations (Edwards, 2009). Employers use employment

relations in ways that enable employees to be content with being part of the organisation (Abbott, 2006). Bingham (2016) indicates that employees like to be entrusted to do their work without supervision, although at the same time they do not want to feel abandoned. Organisations, therefore, need to decentralise decision-making to their employees to a certain extent. Linked to employee interests is the extent to which employees have a degree of autonomy in the way in which they work. Abbott (2006) states that employers aim to reduce internal tensions by satisfying employees through involving them in the organisation's activities and decision-making.

**Gender stereotypes**

The differences between men and women have enabled the increase of gender stereotypes among individuals. "Gender stereotypes are beliefs about attributes associated with women and men that reveal gender discrimination" (Castillo-Mayén & Montes-Berges, 2014 p1044). Visser (2014), states that the film industry leads to new forms of marginalisation, thereby increasing existing inequalities and exclusion. Men and women are usually shown performing different activities, while fewer women compared to men are represented in media coverage. Women are typically associated with gentle and creative actions, while men are more often portrayed as fighters (Kolářová, 2004). Thus, the film industry is characterised by a stereotypical distribution of roles.

**Challenges to harmonious employment relations in the South African film industry since the advent of globalisation**

As mentioned earlier, the film industry has conventionally been characterised by long hours and casual employees as opposed to formal employees (Tuomi, 2006). Hence, some employers are becoming concerned about the shortcomings of casual employment in the film industry, including the lack of commitment to the production company, lack of skills, and other burdens associated with casualisation of the workforce (Lansbury, 2000; Lekara, 2019). It is not easy to resolve disputes, as most employees in this industry fall outside of the scope of collective representation. Employees in the film industry continuously desire better working conditions. This has constantly given rise to disputes in the employment relationship, as some employees in this industry feel exploited. Additionally, training is a major weakness in the industry owing to a lack of standards and communication between the industry and the training institutions (Cultural Strategy Group, 1998). Breakey (2018) also insists that the lack of training prospects, as

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well as learning opportunities in the South African film industry, are major challenges. The lack of training opportunities results in employees feeling insecure, as they do not experience a sense of belonging and do not perceive that their companies value them.

## Research Methodology

This article used a qualitative research approach to best answer the research question. The research was conducted at a privately-owned entity within the film industry, which is situated in the vicinity of the north-western part of Johannesburg. Ten employees from various levels of employment in the organisation were selected using the purposive random sampling technique. Levels of employment for the sample included top level management, middle management, junior management, and operational management. In-depth, face-to-face, semi-structured interviews were utilised. For accurate data reporting and analysis, interview transcripts were repeatedly reviewed to identify common themes and similarities from the participants' responses.

## Findings

### Research Participants

**Table 1. Sample Profile**

| *Research Participant* | *Sex* | *Age* | *Org Management Level* | *Tenure* | *Highest Level Of Education* | *Union Affiliation* |
|---|---|---|---|---|---|---|
| **REP1** | F | 60 | Top Level | 14 | Diploma | No |
| **REP2** | M | 43 | Junior Level | 15 | Grade 10 | No |
| **REP3** | M | 41 | Middle Level | Undisclosed | Degree | No |
| **REP4** | F | 33 | Middle Level | 11 | Matric | No |
| **REP5** | M | 33 | Actor | 4 | Matric | No |
| **REP6** | M | 53 | Top Level | 9 | Degree | No |
| **REP7** | F | 20 | Actress | 4 | Matric/Currently studying towards degree | No |
| **REP8** | F | 34 | Top Level | 7 | Diploma/Currently studying towards degree | No |
| **REP9** | F | 40 | Non-Managerial | 8 | Diploma | No |

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|---|---|---|---|---|---|---|
| **REP10** | M | 38 | Middle Level | 3 | Degree | No |

*Source: Authors Fieldwork 2021*

Pseudonyms were used to protect the identities of the research participants. Several of the research participants have worked in the film industry for 7 years or longer. A total of 60% of the participants hold a tertiary education qualification in this field and 20% are currently studying. However, most of the participants have acquired vast experience at the organisation, as they have worked there for a long period, with only one participant being younger than 30 years. This indicated that most participants had an in-depth understanding of how operations and structures in the organisation have changed since globalisation. However, none of the participants in the organisation belong to a union.

Field notes were taken during the interviews, whilst recognising and noting gestures. An interview guide was also utilised to assure that the interviews did not deviate from the study's objective. Once the interviews were completed, the notes that had been taken and the interview content were compared to the posed questions.

## Data presentation and discussion of findings

The study focused on establishing the effects of globalisation on employment relations within South Africa's film industry. The participants' responses are summarised in the following table.

**Table 2 Summary of participants' perceived effects of globalisation on employment relations**

| Representative | Response |
|---|---|
| **Rep1** | Channel of communication, competition, working hours |
| **Rep2** | Working hours |
| **Rep3** | Technology and systems |
| **Rep4** | Technology, working hours, contracts |
| **Rep5** | Competition, trends, use of short-term contracts |
| **Rep6** | Process of globalisation changing the world, technology, diversity and increased racism, which managers fail to manage |
| **Rep7** | Diversity, technology, type of contracts |
| **Rep8** | Management systems, competition, innovation |
| **Rep9** | Equality especially between genders |
| **Rep10** | Ever changing technology and lack of skills training |

*Source:* Author's fieldwork 2021

Findings revealed that most of the research participants shared similar views in terms of the effects of globalisation on employment relations in their organisation, which is in the South African film industry

**Establishing the effects of globalisation on employment relations in South Africa's film industry**

The effects of globalisation on labour markets are concepts, which affect employment relations directly. The article revealed that globalisation is not merely a new concept but has been part of human life for decades and, therefore, its effects on employment relations in any industry cannot be denied. Such effects uncovered by this article include increased use of casual employments which often causes tensions in the employment relationship. However, only about 20% of the research participants felt strongly about the tension and conflicts that arose owing to globalisation, as some understood that tension is an unavoidable aspect within the industry.

In this vein, Rep1 stated: "We terminate contracts and do not renew the contracts, though some employees understand that this is the nature of the industry other(s) don't understand..." Similarly, Rep5 indicated that "disagreements between employers and employees are quite often."

There has been a shift in the labour market leading to an emergence of non-traditional employment patterns instead of the traditional permanent full-time work pattern, as the concept of jobs for life has gone forever. The new patterns of employment include casual labour, freelancing, part-time work, informal work, and outsourcing. These forms of employment emerged and accelerated since the dawn of globalisation. This, however, triggered an inherent conflict between employees and employers, as employees normally seek stability and assurance in terms of job security. The findings also revealed that none of the participants belong to any union; hence, conflict resolution in the workplace may not be as easy in the film industry compared to other industries. For most producers, non-unionisation is the only way to go because the schedules, working conditions, and overtime in the film industry varies vastly from other industries. Thus, according to Gruber (2018), union activity in the film industry is relatively limited.

As noted in this study, conflict is inevitable in any industry, and the film industry is no exception because of its nature of utilising casual employment and long working hours. However, findings also found that globalisation has not

merely brought tensions to the employment relationship but has also contributed to improving the employment relationship. Aligning with the above perspective, Rep6 stated that the employment relationship had improved compared to 15 years ago. Rep8 highlighted the need for decentralisation and remarked that "employees nowadays need a more decentralised management style versus a centralised one and in addition we need to be innovative so that we stay competitive."

Rep9 is of the view that globalisation has improved employment relations in specific areas such as gender equity. He said the following in this respect: "I think it has improved the employment relationship through fairness and gender equality because nowadays compared to maybe 15 years ago, I make outfits for women who play roles that only men played back then." (Rep9). Of note from the article's findings is the fact that globalisation has played a big role in eliminating stereotypes in the film industry, as different cultures and beliefs are given a worldwide acceptance.

**Existence of trade unions in the film industry in South Africa**

Employees in the film industry are now more aware of their right to join unions in order to benefit from collective bargaining. However, it was observed that in spite of the fact that most of them are aware of the option to utilise trade unions, they rely on their own relations with their employers instead. The findings revealed that 70% of the research participants mentioned that they were aware that they are allowed to join and participate in union activities, while 30% of the research participants indicated that they were unaware of this, and all the participants said that they did not use unions. In fact, the use of trade unions in the film industry seems to have declined over the years since globalisation.

**Key globalisation dynamics that affect employment relations in the film industry**

In summary, the article findings point to technology, diversity, labour standards, contract types, communication channels, and management styles as key globalisation dynamics that affect ER. It was also discovered that globalisation has brought about an improvement in communication, team relations, and workplace morale, as teams become more accessible to each other. Of interest is the role of globalisation on diversity in the film industry, where organisations comprise people from different nations, cultures, genders, and generations. Although findings revealed that there are still challenges that relate to racism and discrimination in the

film industry, it is also worth noting that there have been visible attempts to eradicate stereotypes as a way of bridging these gaps.

Globalisation has led to changes in labour standards, bringing about casual, informal, and short-term contracts, which have become a source of tension, as mentioned previously. The upside of these contracts, however, is that they allow employees to hold more than one contract or one job, which enables them to develop in many aspects of the industry. In support of this, Rep7 remarked: "I think it is diversity and technology, and also because of the short-term contracts in different projects done and I also get income from different projects simultaneously." Also, in concordance with the above statement, Rep5 averred: "I have been able to work on various jobs, including post production on different contracts from acting and this has improved my employment relationships because I work closely with management sometimes."

Owing to competition, companies also need to introduce sustainable strategies and to remain competitive; for example, they should provide training for their employees. In terms of constant training owing to competitiveness, Rep3 noted: "Due to technology and ever-changing systems, I need to continuously train and develop myself." The research findings indicate that technological innovation has been one of the most influential dynamics of globalisation that has affected employment relations. Technology has introduced a need for constant training and development to ensure that employees are competitive and relevant, which leads to continuous improvement in the quality of productions. This aspect of globalisation, however, also eliminates the need for unskilled and older employees, which could have a ripple effect on employment relations.

There is a need to escalate employee training in the film industry, as previous studies and current findings show that there is a lack of training in this particular sector. In addition, Rep10 observed: "In my case I think the ever-changing technology and lack of training affects employment relationships in the company." This opinion supports the position of Breakey (2018), who insists that the lack of training prospects, as well as learning opportunities in the South African film industry, are major challenges in the industry. A lack of training is a major weakness in the industry.

Hence, the current findings indicate that technological innovations, changes in working hours, stiff competition, new forms of contracts, rapid training, and high-level communication are key globalisation dynamics that have affected employment relations in South Africa's film industry. Organisations in the film

industry, therefore, need to focus more on those positive elements of globalisation that could improve employment relations.

**Limitations of the study**

One of the innate limitations of the study is that it was restricted to a single organisation in the South African film industry, situated in Johannesburg and did not consider other organisations in the film industry in other provinces. Hence, the findings cannot be generalised to all organisations within the film industry in South Africa. Being a qualitative enquiry, the study was not inclusive of all employees, as only ten employees were interviewed during the data collection process. Hence, not all employees' views were considered. As mentioned earlier, this study was a qualitative study, which undertook an in-depth analysis of the perceptions of a few research participants of the phenomenon under study. Therefore, the bias of these few participants may also have affected the study's outcome. Another limitation of this study was the effects of the COVID-19 pandemic outbreak under which this study was conducted. Hence, some of the interviews were conducted telephonically, while others were done via video conferencing. These approaches, to a great extent, limited the full observation of respondents' expressions and nonverbal cues.

**Recommendations**

Recommendations are significant to assist organisations within the film industry during the era of globalisation. Therefore, in order to improve employment relations, the recommendations presented below are worth pondering.

**A need for strategies that foster an inclusive workplace**

An inclusive workplace is beneficial for everyone in it. Hence, for increased productivity, satisfaction, and morale, employers need to strive to establish an inclusive workplace. This can be done by using a decentralised management approach, which will ultimately increase levels of employee engagement and innovativeness within organisations, as everyone's ideas are considered. In addition, all parties in the employment relationship are most likely to be satisfied in an all-inclusive workplace. Hence, enhancing harmonious employment relations is imperative. Moreover, managers need to be trained on how to effectively manage diversity.

**A need to improve communication channels**

Evidently, conflict in the film industry is inevitable. Management within the film industry should institute ways to deal effectively with conflicts in their workplaces. This may be done by introducing anonymous suggestion boxes, having open and honest discussions with employees, and by using unbiased conflict resolution platforms, where procedures are followed to hear the concerns of all parties in the conflict before judgement is passed.

**Efforts should be made to improve working conditions**

All employees, both permanent and casual, should feel safe and secure within their workplaces. Casual workers need some form of protection and statutes that provide some form of relief for them, including receiving certain benefits that are afforded to permanent employees. Therefore, employers in the film industry should provide benefits and secure jobs for employees, regardless of the type of contract that they have. In other words, human resource management policies that support the need for job security for casual employees may also need to be developed and implemented.

**Fair and equitable treatment of all employees**

It is important for managers to be aware of what employees consider to be fair treatment in order for them to be able to create a workplace that is fair and equitable. All employees should be treated fairly to avoid perceptions of inequality and discrimination arising from diversity in organisations owing to globalisation. Fair treatment of all employees will go a long way to ultimately improve employment relations within the workplace during the era of globalisation. Fair treatment of all employees, including temporary ones, would make them feel valued and appreciated by the organisation for their respective contributions.

**A renewed need for constant and effective training and development**

There is a significant lack of training in the film industry. Organisations in the film industry should implement an effective training and development plan to ensure that their skills base is both locally and internationally competitive.

**Conclusion**

It can be concluded that globalisation affords benefits and opportunities to all countries involved in the process (Birol, 2012). However, globalisation also has its disadvantages. It has posed challenges to the employment relationship in South

Africa, specifically in the film industry. Evidently, globalisation has triggered a mixed feeling, and has affected employment relations in the film industry both positively and negatively. Technology and the use of casual employees are noticeable aspects of globalisation that have affected employment relations in the film industry. The findings indicate that globalisation has introduced new standards, competition, diversity, improved communication channels, as well as better opportunities for skilled labour. The downside, however, is the casualisation of labour, which leads to exploitation, conflicts, discrimination, and unfair labour practices. Therefore, it is necessary to capitalise on the positive aspects of globalisation towards employment relations and to effectively manage threats against harmonious employment relations in the film industry. It is pertinent to emphasise that harmonious and good employment relations are significant to maintain productive and highly performing organisations. The key to harmonious employment relations is honest and open communications between and amongst the parties involved. This helps to clarify what is expected of all parties involved in the employment relationship, thereby leading to healthy relations.

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# INVESTIGATING HOW MANAGERIAL COMMUNICATION INFLUENCES EMPLOYEE MOTIVATION. STUDY CASE AT A ROMANIAN CRUDE OIL PRODUCTS TRANSPORT COMPANY

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**Abstract**

*This paper aims to research the motivation of human resources, with a case study at CONEREPET SA PLOIEȘTI[1], a Romanian crude oil products transport company.*

*In the first part of the work, we dealt with the theoretical aspect of environmental pollution with petroleum products: polluting factors and methods of depollution. Then we presented theoretical aspects of human resource management, so that we can approach a research study in the second part of the paper. Also, we analyzed the CONEREPET SA company, and, like the research study, we dealt with the motivation of human resources within the company. We chose this topic due to the experience in the field.*

[1] We will not divulge the name of the company where we conducted the case study for security reasons of the data and information provided. Thank you for understanding the situation.

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*We concluded that human resources are primary among those needs and resources available to the organization in carrying out the activity to achieve its objectives and, consequently, it is logical to pay special attention to their management. At the center of all business are the people. All other resources, land, buildings, machinery, equipment, vehicles, or money are only of secondary importance. Business cannot be done without people. Businesses have no other purpose than to serve people's needs.*

**Keywords**: *motivation of human resources, managerial communication, employees, transportation of petroleum products*

**JEL Classification**: J24, J52

## Introduction

The object of activity for SC CONEREPET S.A. Ploiesti is the supply of indigenous and imported crude oil (including in the processing system) and its derivatives (gasoline, liquid ethane, and condensate) to refineries in the country, as well as the transit of foreign crude oil to the Danube. This product involves the processing, storage, transport, selection, and delivery of crude oil.

The quality, safety of the transport and the protection of the environment are supported by the company's involvement in the repair and maintenance of the pipelines, tools, equipment and means of transport. (Hu, Q., Dollard, M. F., & Taris, T. W., 2022).

Environmental protection is one of the most pressing concerns of modern society. Protecting the environment and ensuring optimal conditions for human, animal or plant life, represents a problem that is given great importance on a global scale, constituting a busy world.

At present, there are numerous means and methods for the depollution of soils and aquifers, more or less expensive to implement.

In general, the methods of depollution of oil-polluted areas, presuppose in the first phase the stopping of the spread of oil, respectively the closing-securing of the contaminated area and later, its elimination and the return of the polluted land to the considered concentration limit norm.

In the context of historical pollution existing in Romania, as well as of the accidental pollutions that can be produced in the transport of crude oil through the pipeline, within the framework of the present work, it is proposed to present the particularities of the pollution of soils and water with crude oil, as well as the

possibilities of remediation. (Rabiul, M. K., Shamsudin, F. M., Yean, T. F., & Patwary, A. K., 2022)

In the activity of CONEREPET SA, the protection of the environment is a major concern, as a component part of the transport process, representing at the same time a moral, social and legal obligation towards the population and the property and the public sector. (Pekkala, K., & van Zoonen, W., 2022). Starting with the year 2003, CONEREPET S.A. started the strategy of integrating the environment with all its components, in the policy of the European Union in the field. (Omilion-Hodges, L. M., & Ptacek, J. K., 2022)

Principle elements of environmental management are:

- establishing environmental policy objectives.
- drawing up an annual environmental program, which aims to protect the environment with all its components
- identification, tracking and control of pollution sources
- preparation of an action program for emergency interventions
- procurement of modern intervention equipment and equipment and staff training for such situations
- carrying out simulations in case of damage to the pipeline
- collaboration with Environmental Protection Agencies and resource agencies. (Parent-Rocheleau, X., & Parker, S. K., 2022).

The operating procedures of the crude oil and petroleum products transportation system have been modified in accordance with the environmental protection regulations imposed by the legislation in force and the international norm.

Organizational measures taken to reduce the impact on the environment:

- the existence of a staff with specific attributions at each level of the organizational structures.
- environmental protection tasks assigned to operating personnel at all workplaces (Rabiul, M. K., Shamsudin, F. M., Yean, T. F., & Patwary, A. K., 2022)
- internal (within the company) and external (with environmental authorities) communication based on periodic reports (Ozyilmaz, A., & Taner, D., 2022)
- "Environmental authorizations" for existing facilities and "Environmental agreements" for new or rehabilitated ones (Song, B., & Tao, W., 2022).
- monitoring program of liquid and gaseous effluents
- procedures regarding the prevention of environmental pollution and the method of intervention in accidental cases.

The work is carried out based on bibliographic sources of authors in the field as well as up-to-date legislation. (Rabiul, M. K., Shamsudin, F. M., Yean, T. F., & Patwary, A. K., 2022)

## 1.National and International Development of The Crude Oil Market

Pollution represents the direct or indirect introduction, because of an activity carried out by man, of substance, of vibrations, of heat and/or of noise in the air, in water or in the soil, which can bring harm to human health or the quality of the environment, which can damage to material assets or may cause deterioration or prevent the use of the environment for recreational or other legitimate purposes.

### 1.1. Crude oil, condensate, gasoline, and ethane transport activity at the national level

CONEREPET S.A. provides transport services for its clients both through the National Transport System (SNT), based on the Petroleum Concession Agreement for the SNT operation activity of crude oil, gasoline, condensate, and ethane, as well as on the railway, from the loading platform to refining, for oil areas that are not connected to the main transport pipeline. (Raina, R. 2022)

SNT was built considering the natural distribution of oil fields, to ensure the transportation of oil from all these fields to the refinery. The operation of the system is carried out through local dispatchers, coordinated by the company's central dispatcher.

The SNT pipeline network is approximately 3,800 km long, currently being used by the 3,161 km pipeline network.

The National Transportation System of Crude Oil, Condensate, Gasoline and Ethane is composed of several transportation subsystems, as follows:

• The Country crude oil and condensate transport subsystem, consisting of a pipeline with a total length of approximately 1,540 km through which crude oil and condensate are transported from the extraction units all over the country to the refinery. The domestic production of crude oil and condensate is transported by pipeline, by rail with tank cars or combined (rail and pipeline).

• The gasoline transportation subsystem is intended for the transportation of gasoline from the gas stations in Ardeal (Biled and Pecica) to the Petrobrazi refinery.

• The ethane transport subsystem ensures the transport of ethane from the Turburea de-ethanization platform to the Arpechim Pitesti refinery. Currently, due to the inactivity of the Arpechim refinery, only part of the subsystem is used,

namely the pipeline that connects the Totea deposit to the Petrobrazi refinery to transport condensate.

• The import crude oil transportation subsystem ensures the transportation of crude oil from Constanta Terminal to the refineries in Ploiești, Arpechim-Pitești and Midia.

To provide the service of transporting crude oil, condensate, and gasoline, CONEREPET SA must annually prepare its own transport program, so as to offer free access to the available capacity of the system, to all applicants, authorized legal persons, under equal conditions and in a transparent, non-discriminatory manner. The available capacity represents the difference between the total physical capacity of the system and the amount of crude oil programmed for transport in the respective year.

The transport contracts concluded with the beneficiaries of the services are in accordance with the framework contract approved by the National Agency for Mineral Resources (ANRM) and ensure the legal framework for the provision of transport services.

The transport of quantities of crude oil is carried out from the points of delivery of products by producers or importers, from the extraction areas, or from the Terminal Oil to the processing units (refining), using the facilities of the pumping stations and reception points.

These facilities consist of crude oil storage tanks and condensate, gasoline storage tanks, technological pipelines from pumping/receiving points, pump aggregates, main pipelines, loading and unloading ramps, and cisterns. (Song, B., & Tao, W., 2022).

The level of use of the transport system in 2020 decreased by 2.4 pp compared to 2019, reaching the level of 37.1%. The degree of utilization decreased due to the transportation of smaller quantities by 439 thousand tons (6.2%) compared to 2019.

In 2020, the amount of 1,149 thousand tons of crude oil was transported by rail, 33.8% of the total products (crude oil, gasoline, and condensate) from domestic production and delivered to refineries.

The technological consumption recorded during the transport is within the allowed limits, provided for in the transport contracts.

Tariffs for the provision of crude oil, gasoline and condensate transport services are regulated and approved by ANRM and are differentiated for each transport subsystem.

The transport tariffs include a modernization fee that is exclusively intended for the financing of investments related to the National Transport System.

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The transport services are performed based on the contracts concluded with the clients, elaborated based on the framework contract approved annually by the National Agency for Mineral Resources.

The company holds a monopoly position on the crude oil transportation market, having no such competitors in its field of activity.

The income realized in 2020 based on the transport contracts concluded with clients, in the amount of 402.8 million lei and is presented as follows:

All statistical data used are coming from inside the studied companies.

| CLIENŢI | AN 2020 | AN 2019 | ▲ 2020/2019 mil. lei | % |
|---|---|---|---|---|
| PETROM | 327,1 | 328,3 | -1,2 | ▼ 0,4% |
| PETROTEL LUKOIL | 73,4 | 70,7 | +2,7 | ▲ 3,8% |
| ROMPETROL energie vie | 1,6 | 2,6 | -1,0 | ▼ 38,5% |
| ALŢI CLIENŢI | 0,7 | 0,4 | +0,3 | ▲ 75,0% |
| TOTAL VENITURI DIN TRANSPORT | 402,8 | 402,0 | +0,8 | ▲ 0,2% |

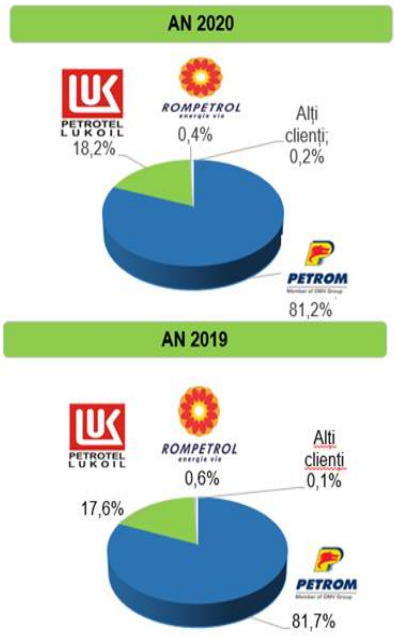


**Chart 1 – Share of revenues from transport on refineries**
Source: https://www2.deloitte.com/

The transport services provided by the company are addressed to a small number of clients, the quantities of transported crude oil being closely related to their commercial policy.

OMV Petrom is the client that holds the largest share in the company's transport revenues (81.2%).

All statistical data used are coming from inside the studied companies.

### 1.2. The risk determined by the correlation with the evolution of the global market

#### 1.2.1. The international and regional level (European Union)

The unpredictability of crude oil prices will continue to impact the global economy. In the short and medium term, oil prices are expected to continue to be pressured by the uncertainties related to the world economy, the commercial war between the United States and China, as well as the relations between OPEC + (the OPEC member countries to which the non-member countries, including Russia, are added). Futures contracts on the oil market (5 years) do not exceed the barrier of $60/barrel. (Raina, R., 2022)

At the end of 2019, the price of crude oil was above 65 USD /bbl, in a range that allowed positive evaluations for the beginning of 2020, marked by the tensions between the USA and Iran.

During the months of January and February of 2020, as the information about the possible epidemic of the new coronavirus appeared in China, but also against the background of the increasingly high tensions between the OPEC member countries and Russia, the price of crude oil began to constantly depreciate.Starting in March, the price of crude oil collapsed after Saudi Arabia cut prices and flooded the market with cheap oil, signaling the beginning of an oil war between OPEC and Russia. Thus, Brent crude oil reached the level of $17.7/bbl., - the lowest level in the last 18 years.

The shock generated by the COVID-19 pandemic, respectively economies at near-zero levels with air transport almost stopped and the global measures to stop the sanitary crisis with rapid development have generated an evolution unprecedented in history on the market of global demand for crude oil and implicitly its price. Thus, on April 20, we are dealing with a sharp drop in the price of oil, the quote for WTI oil for delivery in May reached -37 USD/bbl. A negative price means that, if the transaction goes through, the seller is willing to pay the buyer to take the goods, the reverse of a normal commercial situation.

The physical crude oil market was negatively affected by an oversupplied crude oil supply and full storage. Since the decrease in production could not keep up with the decrease in consumption, it reached the situation where the oil was stored. Producers and traders tried to sell crude oil using substantial discounts, which led to significant decreases in the resulting differences between crude oil types in all regions.

For the horizon of 2030, to have an ensemble view of these price developments, several main market actors can be followed closely, as well as the current pandemic situation, which, at least, is not present as of now, not having concrete and sure means to achieve this. (Raina, R., 2022)

Some degree of certainty is given by the fact that the big demand players will be India and China, as the world's largest oil consumers, (1/5 of global oil consumption. Meanwhile, US demand for crescut. There is also another reason why China and India should monitor. Both countries rely overwhelmingly on imported oil. In China, the percentage of imported oil in its total consumption is almost 70%. In India, this percentage is more than 80%. The United States, despite the modest increase in its demand - only by 0.5% in the last decade, is still the largest consumer of oil in the world, raising daily approximately 20 of crude barrels.

In terms of supply, you should watch the USA, OPEC, and Russia. Also, tracking all information about the US-China trade war as the main driver of lower oil prices is essential. All statistical data used are taken from STATISTA.COM site.

### 1.2.2. On the downstream segment, European/regional refining

It is expected to reduce the decline of refining capacities, by increasing investments in the area of the efficiency of existing capacities and the implementation of superior technologies that will allow the growth of the refining margin. This trend is confirmed in the period 2018-2019 by the stagnation of the closure of refineries in Central and Eastern Europe, as well as by the continuation of the modernization and integration of the capacities of Crucifix, Hungary, etc. At the regional level of the Black Sea, there is an increase significant increase in the refining capacity of Turkey (25-30%) through the opening in November 2018 of the new STAR refinery (located in Izmir province, capacity 10 million tons/year) built by the Azerbaijani company SOCAR, which will supply the main raw materials to the Petchim petrochemical plant. It is estimated that the products of the petrochemical complex will also be addressed to the Romanian market, through SOCAR Petroleum.

The European refining sector experienced the most important recession in the period 2008-2013, the total refining capacity being reduced from 765 million tons/year to 691 million tons/year, by closing 12 refineries. Until 2018, another 9 refineries were closed, the refining capacity decreasing by 13%.

After a relative stabilization in 2019, the COVID 19 pandemic and the deep crisis generated throughout the value chain of the petroleum industry, determined the negative reactions of the refining sector throughout the continent: the European.

• The Antwerp Belgium Refinery (115,000 bbl/day) will record certain losses in the near future, in any of the Covid evolution scenarios;

• The Grandpuis – Paris refinery (90,000 bbl/day) owned by Total, will be converted into a biorefinery, in the best case;

• Total-owned Lindsey Refinery in the UK (110.00 bbl/day) is sold to the Prax Group for integrated petrochemical conversion;

• The Priolo Italy refinery, owned by Lukoil (35,000 bbl/day), has been operating for many years at less than 40% of capacity and is exposed to the risk of closure;

• Europort Rotterdam, (80,000 bbl/day) did not start after the scheduled stop at the beginning of 2020;

• The Galp -Porto, Portugal refinery (110,000 bbl/day) was closed in April 2020, with the intention of reopening (unconfirmed) in July 2020;

• The Petroineos Grandmouth Refinery in Scotland (200,000 bbl/d) is under review for capacity reduction / closure.

All statistical data used are coming from inside the studied companies.

### 1.2.3. The national level, in the upstream segment - exploration and production of crude oil and condensate

In the short term, the main player in this segment – OMV Petrom will continue its exploration activity in the high-impact and deep-sea areas (>4,000 m) and the extension of offshore licenses in the XIX Neptun Black Sea. The medium-term strategy will focus on maximizing the rates of Recovery of deposits and rationalization / outsourcing of the existing portfolio through the transfer of exploitation licenses (e.g., the agreement with Mazarin Energy Romania). As a result of taking over the licenses, players with small annual productions appeared in the upstream-production segment in 2018 and 2019, but they were added to the client portfolio of CONEREPET S.A. (NIS Petról, Serinus Energy).

In the medium and long term, the downward trend will continue until the years 2025-2030, after which a sharp decline is expected. According to the data presented in the framework of the Energy Strategy of Romania 2016 – 2030, with the perspective of 2050 (October 2018 version), the decrease in crude oil production will reach approximately 1.7 million tons in 2030 and up to 1.15 million tons in 2050.

In the context of the massive decline in domestic production and the growth moderation of petroleum product consumption - especially in the short and medium term, an increase in the quantities of imported crude oil is estimated (under the conditions of maintaining the same refining capacity of the country). Although in 2018 crude oil imports of the principal domestic producer - OMV Petrom were almost 45% below the level of 2017, the commissioning of the multi-fuel installation of the Brazi refinery at the beginning of 2019 supports the future import of crude oil and the use of it for the climate installations at maximum capacity.

For the first semester of 2020, the production of hydrocarbons at the Group level decreased compared to 2019 by 2.3%, to 27.09 million bpd.

In Romania, hydrocarbon production was 25.81 million bpd or 141.8 thousand bpd (1-6/19: 26.45 million bpd or 146.1 thousand bpd). The production of crude oil and condensate in Romania was relatively stable. All statistical data used are coming from inside the studied companies.

**1.2.4. The national level in the downstream segment - fuel refining, storage, and distribution**

Likewise, the total amount of oil refined in 2019 (4.456 million tons) increased by approx. 8% compared to 2018. Total refined product sales at the OMV Petrom Group level were 4,987 thousand tons in 2018, representing a 2% decline compared to the level recorded in 2017.

Lukoil oil registered in 2019 a decrease of 5.6% compared to 2018, managing to refine 2.503 million tons of oil (the refinery was under scheduled revision in 2019).

The projection of the specialty analyzes on the segment of downstream-refining and selling fuel in the medium term, we consider a relatively constant consumption until the year 2025, the argument being the balance between demographic decline and energy consumption and the impact of electric mobility at the highest level. In the long term, beyond the year 2025, a significant decrease in fuel consumption is expected, generated by the major impact of the expansion of electromobility in the goods transport / industry sectors. All statistical data used are coming from inside the studied companies.

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## 2. A Short Economic Investigation of CONEREPET SA Ploiesti

### 2.1. Brief history and presentation of CONEREPET SA Ploiesti

With its existence under various names and organizational forms, CONEREPET SA with its seat in Ploiești, operates the national crude oil transport system by pipeline, having a common transport status.

The foundations of the crude oil transport activity by pipeline were laid as early as 1901, with the construction of the first crude oil transport pipeline connecting the Bustenari area to the CFR Băicoi railway station, Prahova County. Thus, the National Pipeline Joint Stock Company was established with headquarters in Ploiești.

In 1904, this company merged with the Buştenari Company, and in 1905 with the Petroleum Credit.

Having a profitable activity, the company developed every year, so that in 1912 it was already the owner of a pipeline network of about 180 km. In the same year, the Petroleum Credit Company came under the control of Deutsche Erdoel A.G from the Gesellschaft. Also in the same period, SC Crêditul Petrólifer is absorbed by the Concordia company, which creates a special pipeline and tank service, with a centralization agency in Ploiesti. In 1937, the pipeline network reached 620 km and 87,000 tons of storage capacity.

After the nationalization in 1948, the oil industry is divided into three units: Sovrómpetról, Petrólifera Muntenia and Petrólifera Moldova, each with its units for transporting crude oil and petroleum products.

In 1950, the entire oil industry in Romania was concentrated under the sole management of Sovrómpetról, under which the Directorate of Goods and Transport was established. On this occasion, the transport of crude oil and gasoline is separated from that of petroleum products. (Parent-Rocheleau, X., & Parker, S. K., 2022).

In 1956, the Ploieşti Crude Pipeline Transport Enterprise (ITTC) was established, which became an important link in the chain that connects the production scaffolds to the refineries. Unique from the point of view of the specific activity carried out, ITTC soon becomes an enterprise of national interest.

The exploitation of new crude oil reserves in Olt, Argeş, Dâmboviţa and Prahova counties, and the establishment of refineries in Brazi and Teleajen favored the expansion of pipeline networks. The period 1960-1968 is characterized by the appearance of new oil deposits in the western part of the country. In this way, CF ramps were built at Suplăcu dă Barcău, Episcopia Bihor, Valcăni, as well as those

in the south of Grindu, Cirăşu and Independenza. The first main gasoline pipeline from Ticleni to Ploieşti was also built and put into operation.

The year 1968 marked the beginning of the transportation of imported crude oil through the Constanța-Pitesti distance, initially through the boiler, CF tank, and from 1969 on the first main pipeline of 14. In 1974, the second main pipeline for the import of crude oil was put into operation from Constanţa to Pitesti, with a connection to Ploiesti.

In 1977, the construction of the third highway for the import of crude oil from Constanța to Onești and Ploiesti began, the largest investment in the company's history.

In the period 1979-1981, two more highways were built for the transport of gasoline and ethane from Oltenia to Ploiesti, respectively Pitesti. After 1982, no more investments were made. After the 1989 revolution, through the restructuring of the national economy, on January 22, 1991, ITTC was transformed into CONEREPET SA Commercial Company.

1996-2008 CONEREPET S.A. went through an extensive process of modernization, as a result of the implementation of the Project for the Rehabilitation of the National Pipeline Transportation System in the amount of USD 143.66 million, USD 91.00 million from own funds and USD 52.66 million by borrowing from the World Bank.2007 The "Integrated Management Quality - Environment - Health, Occupational Safety" system was certified by the German company Germanischer Lloyd Hamburg. (Parent-Rocheleau, X., & Parker, S. K. , 2022).

2009 At the beginning of the year, the Central Dispatch of the National Transport System of Oil, Gasoline, Condensate and Liquid Ethane through the Pipeline was put into operation, at the company's new headquarters, in Ploiesti.

2010 The implementation of the Integrated Information System was completed.

2013, September 5, shares of CONEREPET S.A. They were listed on the regulated market administered by the Bucharest Stock Exchange, in the "Capital Securities" section, category I, currently "Premium".

2014 CONEREPET S.A. ranked 20th in the Top 100 issuers by market capitalization at the end of the year.

2016 CONEREPET S.A. ranked 16th in the Top 100 issuers by market capitalization at the end of the year.

2017 On January 3, 2017, the stock market capitalization was 690,870,734.4 lei (79.8 lei/share).

2018 On January 3, 2018, the stock market capitalization was 861,424,036 lei (99.50 lei/share).

According to the provisions of the petroleum law, the operation of the national crude oil transportation system is subject to the regulations of the National Mineral Resources Agency, the competent authority of the state. (Su, W., & Hahn, J., 2022). All statistical data used are coming from inside the studied companies.

### 2.1.1. Presentation of the object of activity

CONEREPET SA provides transport services for its clients, both through the National Crude Oil Transportation System, concessioned in the basis of the oil concession agreement, as well as on the railway, from the loading ramp to the beneficiaries, for the oil areas that are not connected to the transport highways.

The National Crude Oil Transportation System represents the ensemble interconnected main pipelines that ensure the collection of the oil extracted from the exploitation area or of that originating from the import and its routing from the delivery point, by producers/importers, to the processing units, through the fire stations, loading ramps - unloading on the railway, as well as through all the installations, equipment and equipment related to them.

The Concessionaire of the National Crude Oil Transportation System is the quality of a common carrier and the obligation to ensure, in accordance with the legal provisions, free access to the available capacity of the system, for all applicants, authorized legal persons, under equal conditions and in a non-discriminatory manner. The National Oil Transport System concessioned by CONEREPET SA belongs to the public domain of the Romanian State and consists of the following subsystems:

- the import crude oil transport subsystem - transport capacity of approximately 20.2 million tons/year;
- the domestic crude oil transport subsystem - transport capacity of approximately 6.9 million tons/year;
- the gasoline and ethane transport subsystem - transport capacity of approximately 0.23 million tons/year for gasoline and approximately 0.1 million tons/year for ethane.

### 2.1.2. Mission and vision

The mission of CONEREPET S.A. is the operation of the National Pipeline Transport System in safety and efficiency conditions, as well as ensuring free access to the system's available capacity for all applicants, authorized legal entities,

under equal conditions, in a non-discriminatory and transparent manner. (Hu, Q., Dollard, M. F., & Taris, T. W., 2022).

The vision consists in maintaining the position of a strategic player in the oil industry as a carrier of crude oil, gasoline, condensate and liquid ethane through the pipeline and CF in Romania and, in the future, to become a regional player.

The values of CONEREPET S.A.Ploiesti are:

- continuous learning and improvement;
- respect for people and the environment;
- opening and qualitative growth;
- flexibility and dynamism;
- communication and cooperation. (Ozyilmaz, A., & Taner, D., 2022)

**2.2. The microenvironment of CONEREPET SA PLOIESTI**

***The threat of potential competitors***

Access at the channels of distribution It is critical for insurance success in the this field. This one factor has a importance big, causing a level raised al the threat from the side of the competitors potentials.

With all this, the high level of necessary investments, as well as the high degree of regulation al areas of activity, I do like the threat CANDIDATE potentials to be one reduced.

***The bargaining power of customers***

The threat of upstream integration is high given the high degree of customer concentration.

Corroborating the high degree of concentration that could turn into a monopson, industry precedents regarding upstream integration, as well as the availability of services of substitution like argument of negotiation, consider that the power of negotiation and customers is average.

***The bargaining power of suppliers***

The threat determined of the power of negotiation a providers It is one reduced. The only one elements with power of negotiation real him represents employees.

***The threat of substitute services***

The threat of substitution services is considered low, as a result of their lack of price competitiveness.

This one threat It is one real only analyzing it together with the power of negotiation of customers.

***The intensity of competition between competitors in the industry***

Given the quasi-monopoly nature of the activity carried out by CONEREPET SA, the intensity of competition between competitors in the industry is theoretically zero.

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In the reality, the only one competitor al company It is even society, through module more good or less _ good in the which succeeds to update network of transport at the realities economic, such as the base of costs fixed, can genera like this a lower of competitiveness in the report with services of substitution.

### 2.3. The international macroenvironment - PEST Matrix

PEST Analysis takes into consideration the influences of political, economic, social and technologically order existing in the environment in the which a company operate. (Omilion-Hodges, L. M., & Ptacek, J. K., 2022)

The exercise of a PEST analysis it is useful for CONEREPET SA because the goal it is to identify the factors which affects in the present the company and contour on those with the one bigger probability to affect the activity in the future.

Continuing this analysis, the key influences identified can be associated either with opportunities or threats, both present in the external environment and to whom the company must to offer an answer.

#### 2.3.1.Political factors

The highly regulated environment in which CONEREPET SA operates determines an increased risk of sanctions in the case non-compliance with the legal requirements in force (repair notices, environmental authorizations)

Frequent changes to some normative acts under which CONEREPET SA carries out its activity (increased taxes, elimination of some tax incentives) may cause increases of costs

The National Transport System Regime is very important from the point of view of its uniqueness, any change in this sense having very important effects on the stability and continuity of the activity CONEREPET SA. Intergovernmental decisions regarding the construction of transnational pipelines have a direct effect on CONEREPET SA

#### 2.3.2.Economic factors

• The decline in domestic crude oil production leads to a decrease in the degree of utilization of transport capacities

• The transport system developed by Rompetrol has a major impact on the imported crude oil transport segment

• Reduced refining margins and negative financial results recorded by Romanian refineries could lead to the closure/resizing of production capacities

• The macroeconomic context at the national and international level determines restrictions at the level of industrial activity, affecting the basic activity of CONEREPET SA

• Commercial policy applied by the main clients of CONEREPET SA (Petrom, Lukoil and Rompetrol) decisively influences the volume of transport services provided.

**2.3.3.Social factors**

• The decline in the population growth rate, forecasted for a medium and long term horizon, will determine the slowdown of consumption and industrial activity, with an effect on the need for crude oil transport

• The income of the population will contribute to determining the general need for oil production, thus influencing the volume transported

• The division of the population into urban and rural areas and the reconfiguration of these areas in the future will have an effect on the need for crude oil consumption and implicitly its transport

• The environmental risk as a result of pollution affects the activity of CONEREPET SA, a high degree of awareness being necessary in terms of responsibilities towards the environment and communities

**2.3.4.Technological factors**

The global development of refineries with a high degree of complexity and very large production capacities leads to a decrease in the competitiveness of refineries premises

The use of modern technologies of crude oil extraction with the potential effect on limiting the decrease in quantity extracts

There is a technical limitation in terms of use partial or preservation installations of transport respectively the continuation the activity of maintenance in the in order to maintain functionality these.

**2.4. SWOT Analysis**

In the current context**,** after carrying out the diagnostic analysis (SWOT) of the company, we identified the main strengths and weaknesses of CONEREPET SA:

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**Table 1. The SWOT Analysis**

| Strengths | Weaknesses |
|---|---|
| Monopoly of course on the market transports of oil through pipelines;<br>Corporate governance structure professional;<br>Professional team and performance of management;<br>Initiatives to diversify the activity of base;<br>The experience >20 of years in the the frame company a 51% from employees;<br>Very good retention rate employees;<br>Very good operational performance of the company, with significant improvements over the last 3 years. | Costs big of remove from use a installations and of conservation a ducts unused;<br>High degree of dependence on a limited number of customers;<br>Grad big of addiction face of the authorities of regulation which act like a referee;<br>Dependence on ANRM not only from the point of view of tariff regulation, but also for taking some decisions (e.g. decommissioning of pipelines, etc.);<br>The configuration network, being enough of broad and reaching out on 24 of counties;<br>Old age of employees - average age: 49 years;<br>Lack of performance indicators for employees;<br>IT vulnerability by exposing one's system third party. |
| **Opportunities** | **Threats** |
| Efficiency activities – renegotiation contracts with providers (ex. telecom, electricity, gas);<br>Optimizing the company's capital structure and improving the return on capital employed by distributing unused cash to shareholders the company;<br>Defining the company as a strategic player at the regional level by interconnecting the National Oil Transport System with the systems zonal;<br>The supply of services of storage a oil and a products oil tankers;<br>Diversification of the activity of base;<br>Possible financing at a cost competitive al the company, being a society listed at EXCHANGE with access to various sources of capital;<br>Possible legislative changes favorable;<br>The possibility of certain outsourcing services | The risk of the customer portfolio (e.g. the possibility at some point of relocating the activity of the Lukoil refinery from Romania);<br>Lack of interconnection of the transport system with the systems adjacent;<br>Degradation of the National Pipeline Transport System as a result of the low level of use;<br>Strategic decisions with major impact (potentially disruptive) of the 3 main clients: OMV Petrom, Lukoil and Rompetrol. |

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## 3. Research on The Investigation of The Way in Which Managerial Communication Influences the Motivation of Employees at CONEREPET SA Ploiesti

### 3.1. The purpose of the research

The purpose of this research was to identify the way of assessing the role of managerial communication in the motivation of employees within the CONEREPET SA.Ploiesti.

### 3.2. Research objectives

The objectives of the research were to identify the perception of the employees within the CONEREPET SA company regarding the way they communicate with the managers. Also, the role of managerial communication, the influence this communication has on the relationship between employees and managers, as well as solutions to improve managerial communication. (Ozyilmaz, A., & Taner, D., 2022)

The specific objectives of the research are the following:

- evaluation of the causes and effects produced by managerial communication with employees
- evaluating the role of managerial communication in employee motivation
- the effects of employee motivation
- the search for concrete and relevant solutions for the examined problem (Prouska, R., Nyfoudi, M., Psychogios, A., Szamosi, L. T., & Wilkinson, A. , 2022).

### 3.3. The research hypotheses were:

- managerial communication at the level of the commercial company CONEREPET SASA
- the role of managerial communication in employee motivation
- the negative consequences of a faulty managerial communication (Lee, Y. , 2022)b

### 3.4. Research sample:

The research population was represented by company employees, from several departments. The sample consisted of N = 30 employees.

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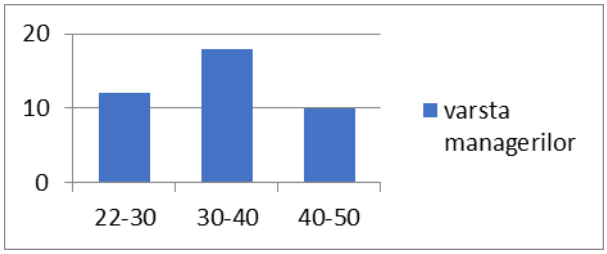
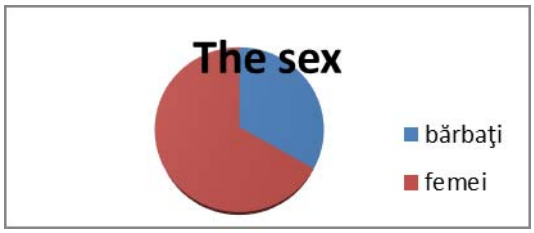
**Figure no. 1 - Age of employees**




As we can see in the graph above, the predominant age of the interviewed employees is between 30-40 years, followed by 22-30 years. In a smaller proportion are those aged between 40-50 years.

What stands out is the fact that the company's employees are young, with the power to work. (Rabiul, M. K., Shamsudin, F. M., Yean, T. F., & Patwary, A. K., 2022) But the other categories are not very different either, hence the balance in terms of age of the employees of the company CONEREPET SA

**Figure no. 2 – The gender of the respondents**




The graph above shows the fact that the majority of respondents are women (the red part of the chart), which means that most of the company's employees are represented by women. But the difference between the two sexes is quite small.

**3.5. Tools used:**

For data collection we used the questionnaire as an instrument.

For the analysis and interpretation of the data, after the research we used:

- the Excel program
- the Word program

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### 3.6. Construction, application, and interpretation of a satisfaction barometer

The direction of the research goes towards the employees of the company CONEREPET SA, more precisely their perception regarding communication with managers, as well as the role of managerial communication in the relationship with employees. (Ozyilmaz, A., & Taner, D., 2022)

After the application of the questionnaires of the thirty employees from the different departments, the obtained results were studied from a quantitative and qualitative point of view. (Prouska, R., Nyfoudi, M., Psychogios, A., Szamosi, L. T., & Wilkinson, A., 2022).

By using the questionnaires, I wanted to capture the perception of the employees regarding the relationship they have with the managers from the point of view of communication, as well as the role of managerial communication on the job. (Ozyilmaz, A., & Taner, D., 2022)

### 3.7. Information processing obtained on the base of worksheets

**Question no. 1**

1. Is there good internal communication within your company?

- ☐ Yes
- ☐ Not
- ☐ I do not know
- ☐ I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 15 | 50% |
| Not | 5 | 16.66% |
| I do not know | 6 | 20% |
| I do not answer | 4 | 13.34% |
| Totally | 30 | 100% |

From the analysis of the answers to the question above, the fact emerges that half of the interviewed employees consider that there is good communication within the organization of CONEREPET SA.

The rest of 16.66% consider that there is no good internal communication within the company, and 13.34% refused to answer.

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**Question no. 2**

2. Does the superior tell you what they expect from you and how your activity contributes to the achievement of the department's goals?

- Yes
- Not
- I do not know
- I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 15 | 50 |
| Not | 10 | 33,33 |
| I do not know | 2 | 6.66 |
| I do not answer | 3 | 10.01 |
| Totally | 30 | 100% |

To this question, half of the interviewed employees said that they have good communication with the hierarchical superior, that he tells them what he expects from them, as well as the way in which their activity contributes to the realization of the work of the whole profession.

33.33% consider that they do not have a good relationship with their direct manager, that he does not tell them what he expects from them, nor if their activity contributes to the achievement of the department's objectives.

The rest of the employees do not know or refuse to answer this question.

**Question no. 3**

3. Does the manager listen to your opinions?

- Yes
- Not
- I do not know
- I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 15 | 50% |
| Not | 9 | 30% |
| I do not know | 6 | 20% |
| I do not answer | 0 | 0 |
| Totally | 30 | 100% |

To this question, half of those asked answered that the manager listens to their opinions, 30% said that they are not listened to by their direct manageres, and 20% said that they do not know if they are listened to or not.

It is certain that more than half of them consider that there is open communication between them and their direct superiors.

**Question no. 4**

Do you consider that the manager provides you with the necessary information to be able to carry out your activity efficiently?

- Yes
- Not
- I do not know
- I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 16 | 53.33% |
| Not | 6 | 20% |
| I do not know | 3 | 10.01% |
| I do not answer | 5 | 16.66% |
| Totally | 30 | 100% |

To this question, 53.33% of the employees asked answered affirmatively, they consider that the manager gives them the necessary information to be able to carry out their activity efficiently.

Those who answered negatively were 20", and 16.66% refused to answer this question.

**Question no. 5**

5. Do you consider that employees are sufficiently motivated by managers?

- Yes
- Not
- I do not know
- I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 14 | 46,66 |
| Not | 8 | 26.66 |
| I do not know | 2 | 6.66 |
| I do not answer | 6 | 20.02 |
| Totally | 30 | 100% |

As we can see from the image above, the majority are still employees who consider that there is a good motivation provided by managers.

Thus, 46.66% consider that the manager does not sufficiently motivate his team, and 26.66% of the employees consider that there is no employee motivation, and 20.02% of the interviewed employees refuse to answer the question.

**Question no. 6**

6. Does your superior know how to motivate you, does he give you regular feed-back regarding the activity you carry out?

- Yes
- Not
- I do not know
- I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 10 | 33,33 |
| Not | 10 | 33,33 |
| I do not know | 5 | 16.67 |
| I do not answer | 5 | 16.67 |
| Totally | 30 | 100% |

From the image above, we can see the equality of the answers.

Thus, 33.33% of the interviewed employees consider that the superior gives them regular feed-back regarding the activity they are carrying out, also 33.33% consider that the manager does not give them the feed-back.

**Question no. 7**

7. Within the company where you work, do you consider that there is accessibility and availability on the part of the superior managers to listen to the employees' opinions?

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- Yes
- Not
- I do not know
- I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 12 | 40 |
| Not | 10 | 33,33 |
| I do not know | 3 | 10 |
| I do not answer | 5 | 16.67 |
| Totally | 30 | 100% |

From the analysis of the answers to this question, it is clear that 40% of those asked who said that there is accessibility and availability on the part of senior managers to listen to their opinions, 33.33% consider that there is no accessibility and availability on the part of their managers, and 16,67% refuse to answer.

**Question no. 8**

8. Do you consider that you have an open communication relationship with your manager?

- Yes
- Not
- I do not know
- I do not answer

| | Frequency of answers | % |
|---|---|---|
| Yes | 10 | 33,33 |
| Not | 10 | 33,33 |
| I do not know | 5 | 16.67 |
| I do not answer | 5 | 16.67 |
| Totally | 30 | 100% |

Regarding the communication relationship between managers and employees, the latter consider that there is a good communication relationship.
Both those who answered affirmatively and those who answered negatively were in an equal percentage of 33.33%.
Also, the rest of the employees did not know how to give a concrete answer.

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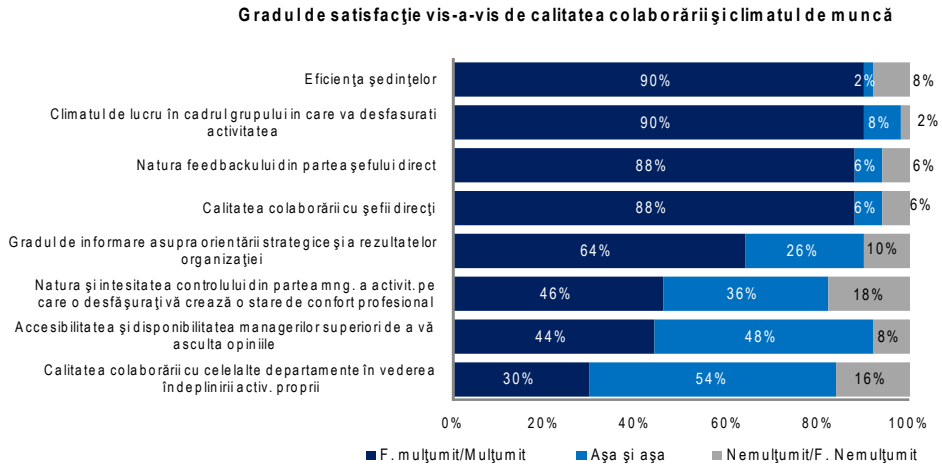
**Question no. 9**

9. The importance given by employees to the quality of collaboration and the work climate.




We observe that the participants in the study are very satisfied/satisfied with the efficiency of the meetings and the working climate within the group in which everyone carries out their activity (90%), the nature of the feedback from the direct manager and the quality of the work with the direct manager (8%) of the degree of information on the strategic orientation and results of the organization (64%).

Instead, the nature and intensity of control on the part of the managers of the activity carried out creates a state of professional comfort only for 46% of the employees - what represents a normal phenomenon to some extent, the accessibility and availability of senior managers to listen to the opinions of the employees thanks to only 44% of the performance of the others questioned with those questioned, and the quality of the department in the department their own activities 30% of the respondents - a fact explained, in part, by the competition within the department. (Ohunakin, F., & Olugbade, O. A. , 2022)

Therefore, the aspects that must be taken into consideration, in the view of some possible improvements, are available to senior managers to listen to the opinions of the employees, whose percentage of dissatisfied or only partially satisfied is quite high, 56%, and the quality of collaboration with the other department in terms of

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the performance of own activities, which is very important for employees, but the existing situation leaves much to be desired for 70% of them. . (Ohunakin, F., & Olugbade, O. A. , 2022)

**Question no. 10**

9. Is the communication relationship with the direct manager important for you?

- ☐ Yes
- ☐ Not
- ☐ I do not know
- ☐ I do not answer

| | **Frequency of answers** | **%** |
|---|---|---|
| Yes | 30 | 100 |
| Not | 0 | 0 |
| I do not know | 0 | 0 |
| I do not answer | 0 | 0 |
| Totally | 30 | 100% |

To this question, all the interviewees answered the same, that is, affirmatively to this question. The communication relationship with the direct manager is important for all employees.

**Question no. 11**

10. Do you think that communication with your manager should be improved?

- ☐ Yes
- ☐ Not
- ☐ I do not know
- ☐ I do not answer

| | **Frequency of answers** | **%** |
|---|---|---|
| Yes | 20 | 66,66 |
| Not | 2 | 6.66 |
| I do not know | 0 | 0 |
| I do not answer | 8 | 26.68 |
| Totally | 30 | 100% |

To this last question, 66.66% of respondents considered that communication with the manager should be improved. 26.68% considered that it is better not to answer, while only 6.66% say that it would not be necessary to improve the communication relationship, not the direct manager.

### 3.8. Conclusion of the questionnaire analysis

The questionnaire is proposed as a general model for implementing a human resources satisfaction process in relation to communication with managers within the organization. (Ozyilmaz, A., & Taner, D., 2022)

The applied questionnaire consisted of a total number of 10 questions. The users were asked to carefully choose the answer variant considered closest to their personal point of view.

From the analysis above, it is clear that most of the interviewees gave affirmative answers, that is, they appreciate the communication relationship they have with the direct manager. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

To be an efficient manager, it is necessary to exercise the role of leadership, a common concept is that the job of a manager requires leadership skills, and the leadership of the land is like that. (Lee, Y., & Kim, J., 2022)

To increase performance related to organizational communication, the majority of managers develop their ability to process information obtained from subordinate employees and to transmit it as a feed-back. ( Dlamini, N. P., Suknunan, S., & Bhana, A., 2022)

Such feedback ensures good reception and understanding of the message, adapting the information to the characteristics of the receivers, social regulation through the flexibility of the roles and functions performed by the receivers, as well as increasing job satisfaction. (Pekkala, K., & van Zoonen, W., 2022). Following the completed questionnaire, a series of conclusions emerged that managers should take into account. (Omilion-Hodges, L. M., & Ptacek, J. K. , 2022)

These recommendations that I have tried to suggest should be followed by all organizations that care about their employees. Because the communication with the staff contributes to the motivation and increase of the cohesion of this team. (Gagné, M., Parent-Rocheleau, X., Bujold, A., Gaudet, M. C., & Lirio, P., 2022)

Communication between manager and subordinate represents a key element in upward or downward vertical communication in the organization. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

Ideally, this exchange should give the manager the opportunity to direct his subordinates towards the proper performance of tasks, clarify the context of the reward and provide social and emotional support. . (Ohunakin, F., & Olugbade, O. A. , 2022)

At the same time, it should allow subordinates to ask questions about their work roles and make proposals that allow the optimal achievement of the objectives proposed by the plans and policies at the level of this organization. .( Dlamini, N. P., Suknunan, S., & Bhana, A., 2022)

But, as always, this model remains at the desired ideal, at the level of organizations, in the process of communication between the manager and the subordinate, existing a series of deficiencies, of communication barriers, among which we mention: the conflicting demands of the role, the effect of the status of the function, the string. Of these, the most frequent is that of the effect of the status of the function. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

The job status effect represents the tendency of manageres to over a little price on communication with their subordinates, because the status they have determines them to manifest a clear desire to communicate with people having the same status as them or a higher status. (Tumi, N. S., Hasan, A. N., & Khalid, J. , 2022). Often this tendency has no connection with the professional training of subordinates. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

### 3.9. Perfecting the process of managerial communication in motivating employees within the CONEREPET SA Ploiesti Company

Employees represent one of the resources that can ensure the company's success. These are key factors in production, marketing and sales, whether it is about products or services.

Unfortunately, many employers/companies do not value the idea of employee satisfaction, which should have at least the same importance as customer satisfaction.

On the other hand, for successful companies, employee satisfaction is a clear goal stipulated in the company's mission statement.

To achieve satisfaction, employees must first feel accepted, and this presupposes a certain level of information. For the company, the advantage is that informed employees can think in the company's style, show initiative, and be involved in the decision-making process.

The communication between the manager and the subordinate represents a key element in the upward or downward vertical communication in organizations. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

Ideally, this exchange should give the manager the opportunity to direct his subordinates towards the proper performance of tasks, clarify the context of the reward and provide social and emotional support. (Ohunakin, F., & Olugbade, O. A., 2022) At the same time, it should allow subordinates to ask questions about their work roles and make proposals that allow the optimal achievement of the objectives proposed by the plans and policies at the level of the organization. (Ohunakin, F., & Olugbade, O. A. , 2022)

We conclude that the manager-subordinate interpersonal relationship is the most important interpersonal relationship at the organizational level; most activities that take place at the unit level are based on this relationship.

The manager is "the person who has to make others do", as defined by T. Hersini. From this point of view, he is the one who must create a working atmosphere, he must set up those conditions in which the subordinates can be the most efficient. The subordinate is obliged, somewhere, to sell his labor power in exchange for a salary. (Yue, C. A., 2022) Even if the logic is simplistic, it is not obliged to have the ensemble image of what happens in the unit; He must execute the order received or fulfill the duties provided for in the job description. (Tumi, N. S., Hasan, A. N., & Khalid, J., 2022).

Obviously, it is desirable for subordinates to be open, to have initiative and to be able to create work environments. But this is not obligatory for them; this obligation belongs to the manager (manager).

Starting from this simple observation, we can affirm that the decisive role in the efficiency of the manager-subordinate relationship belongs to the first. From this point of view, the modalities that you will enumerate (without exhausting them all) concern the express activity of the manager and less that of the subordinate.

Self-control has a very important role in establishing interpersonal relationships; It is an extremely important trait and, at the same time, an efficient way to improve the relationship.

Autocontrolul, ca modalitate, îi impune şefului o conştientizare a efectelor propriilor sale acte comportamentale: să-ţi precizezi, mai întâi ţie însuţi ceea ce vrei să spui, să nu vorbeşti sub impulsul momentului sau sub stăpânirea unei emoţii puternice care tulbură gândirea, obiectivitatea şi clarity.

Self-control presupposes mastery, emotional control, objective attitude, and the ability to overcome daily challenges and stress.

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***Improving communication***

In international relations, it is very important to create an atmosphere favorable to communication and collaboration, cohesion, and active solidarity. (Ozyilmaz, A., & Taner, D., 2022) Communication represents one of the most important aspects of the organization; many aspects of leadership depend on the way in which people communicate with each other. (Lee, Y., & Kim, J., 2022)

From this point of view, the manager must take care of the communication he exercises with his subordinates.

***Clear transmission of messages***

The information can be given either "coldly" - through strictly rational means, through objective data, figures, graphs and arguments, or "warmly" - with their personal explanations regarding the people from whom they come from and the people who put in the applications. For people to correctly understand the need for effective communication, manageres must speak their language, must present their message simply and effectively. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

***The simplicity of the messages***

Let's not transmit more information at once, without any order and logical connection between them. The manager must beware of information overload as well as its insufficiency; also, he must adapt the message to the degree of understanding of his people. (Raina, R., 2022)

***Repetition of communication***

It is useful to repeat the communication and to convince ourselves that, indeed, they were understood and remembered. In communication, there is a rule called "rule 7" which states that something must be said seven times, in seven different ways to be understood; if this is the case, this must be done by the manager. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

All these methods can help manageres to promote efficient interpersonal relations, aim to ensure a working climate and a relaxed atmosphere so that subordinates feel good at work. This does not mean that these methods are signs of weakness on the part of the manager who must necessarily behave in this sense.

***The logic of discourse***

A clearly written document with correct punctuation or a speech made in an elevated language becomes, when the rigor of their logic is uncertain, an unpleasant thing to accept.

Due to this fact, it is necessary to logically structure the information we want to transmit and to respect the rules of written or spoken communication. For example: loose speeches, briefings, or reports, without well-defined goals, make

communication inefficient and the receivers (subordinates) reject or remain indifferent and reduce the authority of the manager. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

***Downward communication,*** which takes place from the top of the hierarchy to employees, also known as "the manager's word", can be improved by:

• presenting the work tasks in a clear way to each employee, so that they understand exactly what is expected of them;

• explaining the reasons that determined the request for the employee's contribution, so that the person understands the meaning of his effort;

• providing frequent feedback on the quality of the performed performances to motivate the employee to achieve the goal; (Dlamini, N. P., Suknunan, S., & Bhana, A., 2022)

• multiplication of communication channels in order to increase the probability of receiving the message; (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

• repeating important messages to allow their integration.

***Upward communication*** or the transmission of individual messages transformed into actions, personal contributions, responses from employees to the top of the hierarchy, can be made more efficient by:

• the existence of a favorable climate in the company, which allows subordinates to express negative or positive messages, without fear of penalty; (Lee, Y., 2022)b

• the occurrence of malfunctions is more quickly felt by collaborators and the manager must know this;

• the reduction of social and status barriers at different levels of the enterprise favors the spontaneous expression of employees; (Omilion-Hodges, L. M., & Ptacek, J. K., 2022)

• considering the information that can contribute to the formulation of decisions. (Wang, Y., 2022).

***Horizontal communication*** or within the same hierarchical level can follow the strategies:

• the development of inter-individual relations between the members of a team or a department is based on the development of trust between the members of the company;

• the company aims to facilitate cooperation and to eliminate as much as possible the situations in which the success of one team can only be conceived as a failure of another; (Song, B., & Tao, W., 2022).

• the development of meetings allows the exchange of information between different departments;

• every time it is possible to make joint decisions between the different departments.

These types of formal communication in the company must have strict rules that allow its uninterrupted functioning. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

Upward communication channels are interrupted more often; It is a sign that the company's policy and applied organizational procedures are not working properly and that human relations are suffering.

The informal channels of communication are particularly strong and are formed by virtue of the existence of certain relationships determined by work or affectivity. It is interesting that over 50% of the information reaches the manager through this channel. Although the messages can often be distorted, they are more credible than those in formal channels and are faster.

The way of communication influences managerial behavior and we could classify the style according to the degree of communication as follows: (Lee, Y., 2022)a

a. The managerial style is suitable in situations where employees' tasks are complex and when they are not experienced or motivated to perform them or when they are under time pressure. They will have to give explanations about what they must do and how. Additional explanations are necessary but lead to additional time.

b. The coaching style is suitable when there is sufficient motivation for employees who have good experience. Only then are the professional details necessary and to allocate time to establishing friendly relations with them. (Gagné, M., Parent-Rocheleau, X., Bujold, A., Gaudet, M. C., & Lirio, P., 2022)

c. The supportive style only works when people are familiar with the techniques involved and are interested in developing relationships with the manager. You need to set aside time to talk with them and involve them in decision-making, to get to know their suggestions aimed at increasing performance. (Ohunakin, F., & Olugbade, O. A., 2022)

d. The delegation style can only be applied if the employees have proven efficient in their job performance and can be left to organize themselves. However, control over employees is necessary to ensure the maintenance of the required standards. (Ohunakin, F., & Olugbade, O. A., 2022)

Consequently, if we want effective communication and an efficient managerial style to exist in the company, we must understand the importance of the stages and channels involved in this process. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

Perception, learning and communication have a special influence on motivation and behavior. (Lee, Y., 2022)a. Modern management emphasizes the development of managers of this type of skills in order to be able to mobilize, train and coordinate their team. Although controversial, the performance elements of Japanese management are based on these dimensions. (Dlamini, N. P., Suknunan, S., & Bhana, A., 2022)

Managers must constantly pursue the perfection of managerial communication due to its increasing importance in modern enterprises. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

Directions for action in this regard include:

– improvement of oral (speaking and listening) and written (reading and writing) communication style;

– increasing the ability to choose the most suitable means of communication;

– taking into consideration the psychological peculiarities of communication partners depending on gender, cultural level, language differences, etc.

For the efficiency of communication in managerial activity, the fundamental condition is full concordance between emotions, thinking and action.

It is also very important that the manager-subordinate relationship is based on transparency and trust, to facilitate the acceptance by the employee of a negative feedback. In this sense, the specialists recommend giving first the positive feedback, and then the negative one. (Song, B., & Tao, W., 2022).

Always, the negative feedback that the manager gives to the employees must be constructive, and not limited to just saying that it is not good. Exclusive feedback of this type can only lead to frustration and in no case will it have the role of improving the employee's performance. (Lee, Y. , 2022)b

At the same time, positive feedback has the role of stimulating the employee, which is why it must be given in a balanced way, so that he feels valued and appreciated by his direct manager.

In my opinion, giving feedback to subordinates should occupy a very important place in the agenda of every manager, because the manager-subordinate relationship is the most fragile and extremely difficult to manage.

It is essential that a manager always tries to respond in a timely manner and as promptly as possible to requests from his employees, even if time represents a thorny problem. Efficient communication between the two parties can only lead to

the construction of a solid relationship with a direct positive effect on individual and organizational performance. (Ohunakin, F., & Olugbade, O. A., 2022)

Managers' awareness of the importance of communication with employees is necessary because communication is extremely important, without which no operation can be carried out within the framework of any organization. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

- the relationship with the superior - the fact that the direct manager directly expresses concern for the employee, recognizes the effort made or delegates an important task to the employee so that the employee perceives himself to be much more valuable to the company than in the absence of this aspect.

- the creation of an adequate framework - by this understanding that the workplace should offer the employee the possibility to develop his dynamism autonomously and in accordance with his interests. This automotive framework is necessary at all hierarchical levels.

- good training and necessary tools (courses, specializations, exchange of experience). The possibility of continuous learning mobilizes employees in their careers. (Syed, F., Naseer, S., Bashir, F., & Fatima, T. (2022). Training and development are fundamental for the continuous improvement of employee training and for the provision of services at the best standard. (Syed, F., Naseer, S., Bashir, F., & Fatima, T., 2022).

- feedback (strategies of providing information) - regular feedback from superiors is a strong motivating factor for a representative number of employees.

Thus, the superior can and is even desirable to establish regular meetings with the members of his team, meetings in the framework of which they receive reinforcements related to the activities carried out during the week

- set stimulating but tangible goals, establish clear activity goals and performance standards, provide appropriate feedback to encourage goal achievement. Reward employees for behavior that leads to the achievement of the organization's goals. Make sure that the reward you give is considered by the employee to be valuable and motivating. (Lee, Y., 2022)a

**Negative motivation** - it is generated by the use of some aversive motivational factors. Although it represents a primitive type of motivation, based on threat, punishment, it should be included with certain precautions in the manager's motivational tools.

The personal knowledge of the risk of the sanction has a greater motivational effect than the sanction itself.

Sometimes the use of this method is indicated because employees in different conditions (such as those currently with the global crisis) can react unexpectedly well.

A new method of motivation is Non-financial Motivation, which it is based on the regulation of all personal, work and corporate factors that influence the energy, tenacity and enthusiasm of employees and determine them to work at the highest possible parameters.

In continuation, we want to present a series of methods and techniques of non-financial motivation: (Gagné, M., Parent-Rocheleau, X., Bujold, A., Gaudet, M. C., & Lirio, P., 2022)

- it is recommended to create a short relaxation and energizing program at the workplace, aimed at eliminating stress and creating new mental associations between the workplace and the state of mind of the employee
- celebrating and rewarding successes to develop the team's ambition and thirst for success, any success should be celebrated.
- organizing parties or short evenings to celebrate professional successes
- offering diplomas, certificates, packages, medals or personalized objects to reward employees with good results
- descriptions of employees' achievements and promotion announcements published in the company's notice board
- personal congratulations
- sending, through all the internal means of communication at your disposal, a visible "sign" of the manager's trust, addressed to all the members of the team he leads. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)
- the development of ambition through internal competitions on professional topics. Ambition is the catalyst of success and must be practiced like any ambition! We transform service goals into "finish lines", work into competitions and first goals into trophies and diplomas.
- rewarding employees with a sincere "Thank you!", providing them with information, involving them in the decision-making process - especially when it comes to decisions that affect employees! Remember that the cash prizes only work for a short period of time!!! The moment you give your employees frequent financial rewards, it will seem natural to them to receive them continuously, they will expect to receive more money continuously. Therefore, it is not a reward method to motivate employees to work more efficiently for a long time. The results of this type of reward are short-term. Instead, an employee feels much more responsible and more important for the company if you thank him for the effort he

has put in and if you tell him how much the work he does means to the company. Therefore, the motivation of an employee can be done with a low budget, or even without money. It is important to show your appreciation. How to do this depends on the creativity of each manager and what would motivate the respective employee. (Gagné, M., Parent-Rocheleau, X., Bujold, A., Gaudet, M. C., & Lirio, P., 2022)

- Management is what you do with employees, not something you do to employees; Tell the employees what you want to do and why! By involving them too, you will more easily win their support and dedication. Do not create a reward program to impose on employees! Involve them in its creation, asking them what they would like the respective program to contain. By involving them they will have a feeling of importance, something that will attract them to your side and to the program you want to implement. Employees must understand from your attitude that the reward program is something you do for them, not something you impose on them. (Parent-Rocheleau, X., & Parker, S. K., 2022).

- Coaching is a methodology, a form of communication, a process of personal exploration and discovery, establishing findings and implementing a specific action plan, followed by feedback. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

A coach does not teach you but supports you to discover yourself. It asks exactly the questions you need for the answers you need at that moment in your development. Through coaching you understand what limitations you have, which is the source of your successes, it offers you support in discovering the perceptions that keep you in place and why you cannot evolve in a certain area or period.

Anyone who wants to develop needs a coach. A coach has the power to show us the direction, to take us out of the box we live in, to make us see other perspectives. A coach can change your paradigms that keep you in place, can support you to discover new ways of seeing, listening, and communicating. He will never give you techniques to be a better manager. You will discover, with his support, how to be more than that. You will learn to listen so that subsequent conversations lead to valuable actions, you will experience what 100% responsibility means, what passion means.

A coach motivates you and gives you support in reaching your goals, but more importantly, he leads you to discover the best goal for you at that moment.

- Team building - a method very often used by the company in the last period, to consolidate and complete the team.

Team building is important because it is not done to dispose of employees, but to find the strong points of each team member, helping them to integrate, to

discover their common points, influencing in a positive way teams and helping them to perform more efficiently, the team's results being thus better. In fact, team building succeeds in a relatively short time to unite a team, its members to have confidence in the values of the other members, they get to relate much more efficiently.

This kind of non-financial motivation of employees is beneficial not only for employees, but also for the company, because it will form a team that knows its values, its potential, and is ready to carry it to the end.

Therefore, team building is one of the most efficient methods of non-financial motivation of the employees, and we recommend you resort to such an exercise, because all these will have great effects on the results of the team. The explosive development of new communication technologies and their large-scale expansion had a series of notable consequences in terms of organizational communication. (Gagné, M., Parent-Rocheleau, X., Bujold, A., Gaudet, M. C., & Lirio, P., 2022)

Thus, communication networks (Intranet) streamline interdepartmental communication and horizontal interpersonal communication, saving the physical time of employees who can perform other activities; secondly, it simplifies the process of consulting employees and transmitting decisions, so vertical communication. (Ndlovu, T., Quaye, E. S., & Saini, Y. K., 2021)

Finally, the use of the Internet and the calculator in general is great the weight of formal communication compared to communication informal (privileged especially by situations of direct and verbal communication of employees) reducing the risk of developing informational structures "parallel" to formal structures, with the disadvantage of reduced internalization.

**Conclusion**

Communication was and remains the inseparable component of social life, it is not just a notification, news, relationship, but as I stated in the previous chapters without fear of making a mistake, it is the engine of the development of human society, without communication the development of live itself could be blocked.

The continuous exchange of messages generates the unity of views and implicitly, by action, by harmonizing the knowledge regarding the findings, the way, and the means to achieve them, by promoting the necessary skills, by the relative homogenization of the groups under the affective aspect (emotional, sentimental) and motivational one (points of views, interests, beliefs, attitudes).

Communication is part of the "infrastructure" of the organization. Any effort to develop an organization must prioritize the human side of its development, and

effective and efficient communication is the only way through which people can relate synergistically.

Communication is a very important factor in decision-making, in promoting the image of the bank and in ensuring its stability. The decision presupposes paying more attention to the processing of messages and their feedback.

Managerial communication emerged as a management discipline from the need to provide managers with the optimal tools and means of interaction for the purpose of fulfilling their functions and roles.

Carrying out the managerial functions identified by the illustrious Frenchman H., namely planning, organizing, commanding, coordinating, and controlling would become impossible in the absence of communication, as none of these functions could be performed in the absence of internal and external information, without a clear formulation and the clear transmission of the objectives, without ensuring the motivation of the human resources.

Regardless of the social system, of its way of organization, communication fulfills some functions such as: information, socialization, motivation, dialogue, education, promotion of culture, integration of human resources, etc.

The existence of an ample, open communication about the work and its significance allows the understanding and expansion of the work atmosphere in the company. The art of communicating based on respect for others and avoiding conflicts is efficient for the company. For the work climate, for its reactivity and creativity, it is important that the company develops through its own culture the true art of communication. The manager's attitude, the example he sets for his subordinates, the judgments he follows are decisive in the company's progress.

The competent employee does not communicate on occasion or according to his own good please, but conform to a strategy, both in terms of the act of communication itself, and the existing strategy at the level of the organization, a strategy that has the role of creating a positive image about it.

Any employee with a management function, in his capacity as a manager, controls to what extent his decisions have been implemented only if he can communicate with those who execute them. Only in this way can the executors know what they have to do, when it has to be done and they can make their suggestions and problems known.

At the level of organizations in Romania, especially at the level of those from public sector, communication is poorly realized due to excessive bureaucracy that often makes information go through many hierarchical levels to reach the recipient.

Often, senior managers are deprived of real information, being fed up with endless reports that say nothing.

Efficient communication would have in mind precisely the avoidance of such situations by renouncing useless and costly methods that make it difficult to make decisions and solve problems.

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# CRITICAL EVALUATION OF EU MIGRATION POLICY IN CRISIS AGENDA WITHIN FRAMEWORK OF BORDER MANAGEMENT

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**Abstract**

If we try to define the concept of migration, which is one of the critical issues faced by all countries today, we will see that it is more a search for innovation stemming from a "problem", and this process has tried to preserve this feature from the very beginning of history until today. When we open the concept of "problem" here, it can be seen that sometimes there can be a direct threat to human existence, such as natural disaster, war, oppression and persecution, and sometimes this process can occur for personal reasons, such as unemployment, the desire for a better life. At the same time, the issue of migration can be considered optional as well as mandatory within the framework of interstate agreements and various difficulties experienced.

It is known that the migration crisis observed in 2015 as a result of the fragmentation trend among the member states turned into an integration crisis in the EU migration policy. In this regard, this study aims to reveal the validity of independent national policy requirements by analyzing them. The secondary data methods have applied for this study by using different official sources from EU and other statistical sources. With this aim, the evaluation of the EU's migration policy goals, financial, legal and institutional tools in the context of inter-national and intergovernmental tension in the example of border management is considered as the main final goal of the study.

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**Key words:** *Border management, migration policy, migration crisis, institutional tools*

**JEL Classification**: F22

## Introduction

In recent times, the widespread human mobility at the international level, which each of us faces, is considered one of the most important international problems of the modern era. From this point of view, migration, which is perceived as a threat or an opportunity depending on the character of the immigrant and the current situation of the destination country, is one of the important issues that the European Union is sensitive to and tries to solve (Rosamond, B., 2000). As it can be seen, the political environment in African countries and the Middle East and the intense human mobility that occurred as a result of it and the inability of the European Union states to develop effective policies within the framework of the union at any level in the face of this situation have caused this issue to become a global crisis (Bale, T., 2008).

It is known that in the period after 2011, although human mobility aimed at European countries took place more intensively, this process was more evident in the first periods after the collapse of the Soviet Union (Ryabov, Y.A., 2012). The countries of the European Union that were most affected by this wave of migration were Austria and Germany. After the collapse of the Soviet Union, the European Union as an organization tried to implement multifaceted policies in order to prevent intensive migration flows. As a result, the member countries of the European Union, which once migrated to the north and west, have now started to become a new place of immigration as a result of the processes taking place. Considering the general migration policy implemented in the European Union, it can be easily seen that the migration policy is formed on two different levels. One of them is that some elements of this policy are developed at the national level, and other elements at the Union level, reflecting the seriousness of the issue. Thus, the research conducted in the direction of the development of the general policy of the European Union on both border control and illegal migration fight once again confirms the importance of the two issues mentioned above (European Commission, Relocation and Resettlement, 2017).

Looking at the purposeful policy carried out by the Union in this direction, it can be seen that the European Union (EU) gained the status of a legal entity with

the entry into force of the Treaty of Lisbon in 2009, and as a result, the Charter of Fundamental Rights became binding and the jurisdiction of the Union was expanded. As a result of increasingly limited migration, the arrival of nearly two million asylum seekers in the EU in 2015 led to a "migration crisis" that rekindled the trend of fragmentation in member states (European Commission, Security, Borders, Police, 2017). As a result of this, discussions on leaving the EU membership among the member countries began to gain momentum. In order to make correct assessments within the framework of these ongoing processes, it is necessary to remember the reasons that led member states to adopt a common migration policy by uniting them under the EU umbrella, and to emphasize the great need to review the content and nature of granting supranational powers in this direction. The main purpose of this study is to examine the effectiveness of the migration policy and instruments implemented by the European Union within framework of border management from the point of view of the common tendencies and interests of the member states.

**Overview of migration policies of member states**

It is known that the European Union has been manifested by various expansion processes since its inception, and this process has led to the strengthening of integration within the Union and the provision of free movement between member countries. At the same time, on the other hand, in order to strengthen the protection of the external borders of the European Union, it aimed to minimize illegal migration (Guiraudon, V., 2003). In accordance with the EU policies aimed at the free movement of people on the one hand, and services, goods and capital on the other hand, the Treaty of Amsterdam signed in 1997 transferred immigration and asylum issues to the policy area where the joint decision-making procedure is valid. As a result, concerns in the field of migration and asylum began to be discussed in the institutional structure of the EU in a broad context for the first time in the Amsterdam agreement (Boswell, C., 2003).

Since the signing of that agreement, the EU has focused its policy on unwanted migration, as well as strengthening border controls in the EU and neighboring countries (https://eur-lex.europa.eu/EN/legal-content/summary/the-hague-programme-10-priorities-for-the-next-five-years.html#:~:text=The%20Hague%20Programme%20provides%20for,readmission%20and%20return%20of%20migrants). As a result of both the driving force of the continuously developing globalization processes and the several enlargement policies of the EU, the member countries of the European Union have fallen into a

framework where the borders are sometimes uncertain, and in this regard, the member countries emphasized the need to revise their border policies. It was considered one of the most important issues faced by the Union countries to clarify the issues of which groups will be accepted from their national borders under which conditions with the immigration policy covering issues such as work permits, visas, residence permits, and the right to settle in general (Geddes, 2003).

Economic migration (Sasse, G.,2005), which is considered one of the main purposes of coming to the countries of the European Union, and the immigration policy, which includes asylum, controlled the classification of the flow of immigrants to these countries according to their origin and form. At the same time, it controlled the classification of immigrants according to the duration and forms of settlement. Issues such as cross-border human trafficking, the fight against organized crime and terrorism, the situation of illegal migrants and deportation are also within the scope of migration policy (Hollifield, J.F., 2004).

At the same time, many areas of concern to both immigrants and society, for example, the rights of immigrants to the Union countries and the principles of acquiring citizenship after a certain period of time, formed important contours of the integration policy that regulated their interaction with society and the state. Here the focus should be on the concept of migration mode. According to the approach of Doble and Rutledge, the system of national and international rules and laws that form the framework of immigration and integration policies with the possibilities of immigrants to enter and settle in any Union country and what rights and opportunities they have there is generally called the "migration regime". (Doble and Rutledge, 2010).

**Development of eu migration policy by authorities and targets**

Today, migration, which is the main target of research, has always been considered a human rights issue regulated by international law, except for the EU and its member states. As a result of the Geneva Convention signed in 1951, the developed international legal regime came to Europe from different countries and supported the granting of rights and opportunities to asylum seekers, especially guaranteeing the principle of non-refoulement (Hansen, R.,2011). As a continuation of this process, although the issue of migration was first tried to be resolved informally at the intergovernmental level, later this issue began to be resolved formally and was gradually included in the founding treaties of the European Union. It is known that the basis of the first such regulation among European Union members was laid by the Schengen Protocol signed in 1985

(Papagianni G., 2006). As a result, the main goal of the organization was to gradually abolish the internal borders of the European Union and adopt a common external borders policy. As a continuation of this protocol, the Maastricht Treaty was signed in 1992 (Polat C., 2006), where the issue of "justice and home affairs" was brought to the fore and designated as the third pillar after the common foreign and security policy with the Union. This agreement further strengthened the terms of the Schengen Agreement and declared the goal of turning the Union into a security zone of the European Union in accordance with the principle of free movement of people, including asylum and migration issues (https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC_1&format=PDF).

However, since the Union does not have legislative authority, only the general position of the Council as a structural tool of the organization was considered sufficient for provisions on cooperation and coordination of member states and regulatory issues. According to the Treaty of Amsterdam signed in 1997, the discussion process started with the proposal of the European Commission is intended to make a decision on the issue of migration, but at this stage it is not possible to talk about full nationalization, that is, a unified migration policy of the union. The decisions taken at the Tampere Summit, taken in parallel with the entry into force of the Treaty of Amsterdam in 1999, can be considered as the first systematic attempt to develop a common immigration and asylum policy as a whole (https://ec.europa.eu/economy_finance/publications/european_economy/2009/index_en.htm).

However, in 2009, after the rejection of the draft Constitutional Treaty, the Treaty of Lisbon was signed between the member states of the European Union, which changed both the institutional structure and the immigration policy of the Union. The content and obligations of the Treaty of Lisbon are distinguished from those of the previous treaties, in which "policies related to border control, immigration and asylum" have already been regulated under a separate title (European Commission, 2017). While the policies reflected here are governed by the principle of devolution at EU level, it basically confirms that the ordinary legal procedure applies. Under the agreement, the principle of unanimity in border management was partially preserved, and the issue of harmonization in integration policy was also prohibited. In the Stockholm Program (2009-2014), established within the framework of the aforementioned Lisbon Treaty, it was seen that the goals of protecting the rights of asylum seekers and immigrants, ensuring their

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security and strict border control, as well as reducing costs in the fight against illegal immigration were judged. (Council of the European Union, 2009).

The action plan prepared by the Commission under the Stockholm Program includes border control, visa policy, common asylum system initiatives, determining the impact of immigration policy on other policies of the Union, combating illegal immigration and human smuggling and supporting victims, common standards for reception of third country nationals, family preparation, examining the impact of immigration on development in countries of immigration, as well as improving the rights of immigrants, harmonizing immigration statistics, improving relations with third countries and signing readmission agreements (European Commission, 2010). At the end of the Stockholm Program adopted in 2009, a common asylum system of the European Union countries was formed in the field of migration and asylum, and as a result, the entry and admission conditions for legal migration were further specified and some common rights of immigrants were accepted (http://www.votewatch.eu/). At the same time, the Union's foreign policy framework was defined and relations with third countries began to be continued in accordance with the adopted foreign policy framework, and there were certain improvements in the visa policy. (European Commission, 2014).

**Figure 1**. *Non-EU citizens subject to immigration law enforcement in 2021 (number)*
**Source***: Eurostat (May 2022)*

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The indicators described above explained the official record of persons subject to the application of immigration legislation in the member states by assessing the results of the current situation on territorial control and control procedures in the EU.

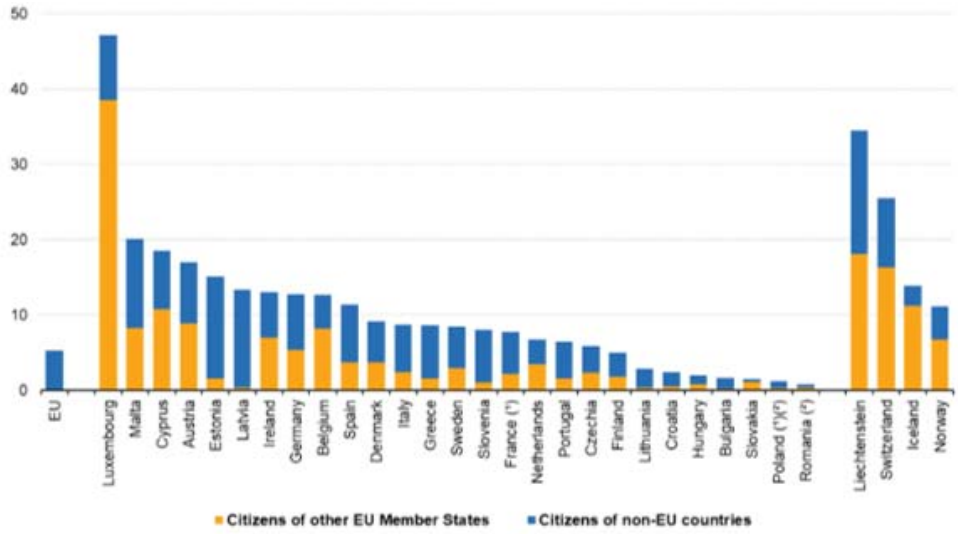


**Figure 2**: *Share of non-nationals in the resident population, (January 2021 (%))*
**Source***: Eurostat*

If we analyze the number of non-citizens who have become citizens in the EU member states, then based on the 2021 statistics presented above, it can be clearly seen that the EU Member State with the highest share in relative terms is Luxembourg, which is about 47% of its total population. is made up of non-citizens. However, a high proportion of foreign citizens (more than 10% of the permanent population) was also observed in Belgium, Malta, Ireland, Austria, Estonia, Cyprus, Latvia, Germany and Spain. In contrast, non-citizens made up almost less than 1% of the population (0.8%) in Romania. However, the relative share of foreign nationals in the total population was highest in Luxembourg (49%), Malta (23%) and Cyprus (22%).

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**Management of external and internal borders**

In the management of the external borders of the European Union, the integrity of the union is at the forefront of risk minimization and entry control (Zaiotti, R.,2011). The process of creating common standards between the European Union and its member states to ensure integrated border management will play a decisive role in ensuring information exchange and increasing border security (European Union, 2014). These mechanisms and standards are closely related to each other and to other areas of immigration and security policy. The Schengen Borders Regulation (SBR), which is considered one of these mechanisms, under the heading of "external border control" defines the objectives of external border control, approval and rejection procedures, the rules and controls to be applied at border crossings as a whole, the qualifications of personnel responsible for border control of member states, and members in border operations. regulates the principles of coordination between states (https://op.europa.eu/en/publication-detail/-/publication/42fba6c3-f0c5-11e5-8529-01aa75ed71a1).

At the beginning of enforcement mechanisms, the Schengen Information System (SIS) was created to enhance border security by exchanging information between Schengen member states, Europol and Eurojust. Bulgaria, the UK, Ireland and Romania only participate in SIS in the framework of security cooperation (European Commission, 2017c).

This system is for the purpose of identification and the purpose of protecting personal data, and if we look at 2016 alone, we will see that this system, where all crossings from the borders of the Schengen area are questioned and recorded, was accessed by member states about four billion times in that year (EU-Lisa, 2017, https://www.eulisa.europa.eu/Publications/Corporate/eu-LISA%20Annual%20Activity%20Report%202017.pdf).

Another mechanism put forward by the Union is the Entry-Exit System (EES) and Passenger Registration System (PRS), proposed by the European Commission as part of the fight against illegal migration, which were rejected by the European Council and Parliament for a long time due to technical and financial difficulties (European Commission, 2018a). However, since the recent migration crisis and the 2015 Paris terror attacks, it has come into force in a revised form. The EES was established in 2017 by amending the Schengen Borders Regulations. Now, in addition to checking all border crossings in SIS and other databases, the authorities must confirm that there is no threat to "the public policy, internal security, public

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health or international relations of any Member State" (European Commission, 2018b).

An interesting fact to note is that the illegal migration flow within the Union decreased dramatically during 2015-2018, an exceptional period in terms of global human mobility, which can be seen more clearly in the figure below:

**Figure 3**: *Illegal migration flows in EU (1990-2018)*
**Source**: *Conseil de l'Europe*

It is considered that there are serious concerns about the reception of migrants in Europe, especially migrants from African countries, which raises fears of a possible threat to European society and its culture. According to this approach, as a result, Europe is firstly invaded by migrants from different countries who want to benefit from the economic advantages and social laws of Europe, as well as to change their existing traditions by not integrating.

It is well-known that the common border management, which is considered the main institutional management of the EU, was prepared to abolish the internal borders, but it could not do it completely. Of course, under certain conditions, internal borders can be checked in limited regions and for limited periods. This can be easily seen in practical experiences when traveling to various countries of the Union. Schengen member states in the European Union had the right to implement internal border control within the SBR for the first time after the abolition of internal borders (1995) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32016R0399). These adopted regulations allow for internal border control under certain justifications and procedures, such as emergency situations.

**Financial support to border management of EU**

Various programs have been developed in the European Union to ensure effectiveness in the field of border management, and targeted financial resources have been allocated in this direction. One of these programs is the Odysseus Program (1998-2002), which is considered one of the first programs on border management of the Union. By using this program, the Commission provided 12 million Euros of support to provide education and cooperation between relevant institutions of the member states, academics and non-governmental organizations for the reason of border management from asylum, migration and external border crossings together. (European Commission, 1998). After this program, the External Borders Fund (EBF), established under the "Solidarity and migration management programme", in 2013. Around 1 billion 820 million Euros, would be directed mainly to border countries in financial bottleneck, such as Portugal and Greece. (European Commission, 2017a).

Beside above mentioned, the Internal Security Fund (ISF) (2014-2020) has a total budget of 3.8 billion Euros, is devoted to the subject of "external borders and visas" (European Commission, 2017e). It should be noted that the European Asylum Office (EASO) cooperates with different border management platforms such as Europol in its work on criminal activities and transnational terrorist in the registration and deportation procedures of asylum seekers and migrants (Frontex, 2018). The next platform is called as the European Border Control System (EUROSUR), which is established in 2013. This center through Frontex (http://frontex.europa.eu/about-frontex/origin/) and the national coordination centers will establish, determines the specific framework for external border

management for the purpose of combating illegal immigration and identifying unauthorized crossings, cross-border crimes, and coordination.

**EU policy for the migration crisis and assessment of requests by national policies of member states**

From different periods of history to the present day, mass movements of people to different countries caused by political, economic or security reasons have been evaluated as a "crisis" by the countries to which it is directed (Lenart, J., 2012). Thus, in the history of the Union, many processes took place after the Cold War, in the context of the acceleration of economic migration and asylum movements as a result of the reunification of Germany, at the same time, the expansion of the EU to the countries of Central and Eastern Europe, as well as the disintegration of Yugoslavia, in the context of various international wars and crises, the influx of asylum seekers justified the need to implement urgent measures (Völkel, J.C., 2017). According to the visible picture, there have been significant changes in the number of immigrants entering the borders of the European Union illegally, which led to an increase in this number from 280 thousand in 2014 to 2 million in 2015. About 200,000 of these immigrants, most of whom are of Afghan, Syrian and Iraqi origin, went to Hungary, and the largest group, about 1 million, went to Germany (Schimmelfennig, F., 2017).

The response to this crisis covered all areas of migration policy within the European Union, except for legal migration. Thus, after the emergency meeting of the European Council in 2015, the commission's urgent intervention proposals were put forward, reflecting the separation of 120,000 asylum seekers in Greece, Italy and Hungary to other member states of the European Union, and at the same time accepting 20,000 refugees outside the borders of the Union. proposed the creation of a long-term resettlement scheme within (European Commission, 2015b). As a result, the issue of temporarily sending 20,000 people from third countries and 100,000 people from Greece and Italy to other member countries was approved by two different decisions of the European Council in 2015. Host countries will receive support through EASO through the European Migration and Integration Fund (AMIF) in the amount of 6,000 Euros per resettled person, Greece and Italy. It is reported that the migration crisis in 2014-2017 cost an average of one to two billion euros per year. (https://www.oecd.org/els/mig/migration-policy-debates-13.pdf).

Considering the border management dimension of the migration crisis, it can be said that there is a border security crisis

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(http://www.europarl.europa.eu/summits/tam_en.htm). The administration of the external borders has entered into a bottleneck, especially for Italy and Greece, where there are intense entrances to the Union lands. As a solution, the funds allocated to border management have been increased and directed mainly to border countries (European Commission, 2017a). Frontex's functions have been increased, including budget and return support. It has been tried to strengthen the border management in the third countries where the refugees pass through (De Bellis, M., 2017). However, it has been reported that member states continue to carry out border operations, especially return, mainly at the national level, despite the 2016 regulation amendments aimed at increasing Frontex's operational capabilities, and slowing the process by avoiding personnel and ammunition support to joint operations and the border policing unit (European Commission, 2017b). The most striking development in the field of border management is that the control of internal borders has started to turn from the exception to the rule (Table 1).

**Table 1:** *Schengen Area Internal Border Controls (2006-2017)*

| Member states | Number of applications | Requirements |
|---|---|---|
| Hungary, Slovenia | 1-2 | Immigration pressure |
| Netherland, Spain, Portugal, Italy, Poland, Lithuania, Estonia, Finland, Iceland | 1-3 | Gatherings |
| Malta, Belgium | 2-3 | Gatherings, undocumented immigrants, terrorist threat |
| Denmark, Germany, Austria | 8-13 | Gatherings, immigration pressure |
| Sweden, Norway | 9-12 | terrorist threat, immigration pressure |
| France | 14 | Gatherings, terrorist threat |

**Source**: *European Comission, 2018b*

If the migration processes related to Poland is reviewed, it will be clear that although Poland has been found to be sending back asylum seekers from different countries in violation of the European Union obligations, no sanctions have been applied to this country (Amnesty International, 2017c).

After the referendum on June 23, 2016, Great Britain assessed the current situation and decided to withdraw from the EU membership (Brexit), and as a result, the demand for a national determination of immigration policy for Great

Britain was brought to the fore (The Guardian, 2016). These ongoing processes provide grounds for the re-nationalization of the migration policy and the fragmentation of the Schengen zone, rather than the centralization of the anti-immigration policy in the member states within the EU framework.

**Conclusion**

According to the result obtained while evaluating the research work, it can be seen that the root of the problem faced by the European Union in connection with immigration and asylum has not been examined in a wider framework. Thus, it can be concluded that the EU is increasingly trying to find more restrictive and short-term solutions to the problem of migration.

As a result of the research, it should be noted that the border management programs and mechanisms implemented by the European Union in order to prevent the flow of migration have not yet been able to fully demonstrate their effectiveness. As the main reason for this, the fact that the member countries of the European Union prioritize their national policies on migration over the general policy of the Union indicates that the European Union has not formed a single migration policy. Of course, if we look at the political goals of the European Union, which have been determined at the intergovernmental level since its inception, it can be seen that this policy, when compared with the general trends and interests of the member states, is not revealed by any serious differences of opinion. On the other hand, in terms of the financial and institutional tools (https://ec.europa.eu/home-affairs/financing/fundings/migrationasylum-borders/external-borders-fund_en) we talked about above, it can be said that effective results can be achieved thanks to the joint initiatives of the member states, unlike the international nature of migration and the principle of border security and subsidiarity. Based on this, especially in the recent migration crisis, these institutional tools have been found to be inadequate instead of replacing or burdening member states. From the visible picture, it is clear that when evaluating the conflicts of the member states regarding the migration crisis, the main difference is that there are serious problems in the distribution of short-term human and financial costs.

Based on the results obtained from the study, it can be seen that the reflection of the migration crisis on border management is not destructive due to the authorization of internal border control, and it is found that the regulations to increase the security of external borders are continued. On the other hand, this process also shows that it is clear that the member states may not fulfill their

obligations by using the weakness of the relevant sanctions' mechanism adopted by the European Union.

Although various migration border management programs and mechanisms are implemented within the EU, border operations are still mainly managed at the member state level. The current migration crisis shows that the EU member states' immigration and related border management policies confirm a "variable geometry" or "multi-geared" integration process, which may suspend their currently minimal commitments.

In the end, it can be noted that if there were any disruptions in the development process of policies and instruments implemented by the European Union before the migration crisis, and if we take into account the deepening differences between the areas of migration policy, it is clear that the ongoing processes will not lead the migration crisis to a new direction, on the contrary it will affect its further deepening for some time. If in the future, as a way to solve the problem, Europe is based on the mechanism of unification within the framework of a single migration policy, here, first of all, the actions of the member countries in a single context regarding the procedure for accepting migrants should be brought to the fore. Among the countries that will decide to implement a common policy, common standards of treatment should be adopted for the adaptation of asylum seekers, and the existing camps should be systematically inspected and improved to protect the basic human rights of refugees who have arrived in these countries.

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# RISK AVERSION AND SELF INSURANCE UTILIZATION: EVIDENCE FROM SMALL AND MEDIUM SCALE BUSINESS OWNERS IN LAGOS STATE

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***Abstract***

*This study is to examine the influence of risk aversion on the adoption and utilization of self-insurance among Small Medium Enterprises (SME) owners in Lagos State. This study employed cross sectional class of survey research design. Three hundred and fifty SME owners were selected using Taro Yamane formula and the data obtained was analyzed using correlation and t-test inferential statistics. Questionnaires were administered through convenience sampling method. The result of the study revealed a significant relationship between risk aversion and self-insurance utilization among SME owners in Lagos State. Additionally, the result of this study also revealed that there is no significant difference between preference for conventional insurance and self-insurance among Lagos State SME owners. Based on the findings of this study, it is recommended that conventional insurers should endeavor to develop products that address the actual needs of SMEs. It is also recommended that SME owners should be highly disposed to risk improvement measures as this would help to reduce the cost of market insurance and self-insurance even if both are taken up contemporaneously.*

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**Keywords**: *small medium enterprises, risk aversion, self-insurance, conventional insurance*

**JEL Classification:** M11

## Introduction

In daily life, individuals and firms take up insurance cover to manage various kinds of risks (Lee & Fung, 2021). Entities can either invest in reducing the extent of a potential loss or in reducing the frequency of a hazardous event while making efforts to manage risks (Hofman & Peter, 2012). Aside the utilisation of conventional insurance, risk management techniques also incorporate self-protection and self-insurance mechanisms (Pannequin & Corcos, 2017). In consideration of a number of foreseeable risks, individuals and firms often expend great efforts to reduce the severity/consequence of losses or to minimize the frequency of losses (Lee & Fung, 2021).

Because of the rapid rate of technological advancement and the globalisation of markets, the business climate is becoming increasingly risky and challenging for businesses (Zoghi, 2017). As a result, in today's corporate climate, learning how to detect, assess, and respond to different categories of risks is critical for business survival. When compared to large corporations, Small Medium Enterprises are more impacted by the effect of numerous risks due to their limited resources and structural peculiarities (Zoghi, 2017). In this regard, risk-averse entrepreneurs tend to choose safer enterprises, while risk-seeking entrepreneurs tend to opt for riskier ventures (Chodokufa, 2014). However, increased risk aversion leads to increased self-insurance expenditure if only the loss state is the worst condition, as intuition implies. (Lee, 2010; Hofman & Peter, 2012; Dionne & Eeckhoudt 2012; Hurley, 2014).

The decision to expend efforts in managing risk involves the consideration of risk and uncertainty (Huber, 2021). Given that an entity is confronted with such quandary, the risk management component of self-insurance is more likely to dominate especially for those who are risk averse (Hofman & Peter, 2012). Theoretical findings further corroborate this notion by showing that greater risk aversion brings about optimal self-insurance (Huber, 2021). However, theoretical research into market interactions between conventional insurance and self-insurance has not been developed extensively (Pannequin & Corcos, 2017).

Furthermore, the behavioural tendencies of SME owners in the light of expressing their preference for the utilisation of either conventional insurance or

self-insurance calls for a serious concern and needs to be empirically unraveled. For example, where there is no compulsory insurance in respect to a class of risk, will an entrepreneur choose to transfer his risks or retain them given that he has the capacity to retain the risk? Also, if self-insurance truly correlates positively with risk aversion as posited by earlier studies, what implication would such have on conventional insurance given that a substantial number of SME owners who are risk averse decide to self-insure? Although, Pannequin and Corcos (2017) found that self-insurance opportunities act as a threat on the insurance market and therefore reduce insurer market power and market share. However, an empirical investigation may be necessary to substantiate this finding. Taking a cue from Yaari's model insurance and self-insurance remain substitutable. However, one of the arguments advanced for some risk management techniques, such as self-insurance, is that investment in some of these risk management techniques and their induced risk reduction are assumed to occur concurrently, but in the real sense, they frequently occur temporally separated (Huber, 2021).

Several studies have established that a nexus exists among self-insurance, self-protection and risk aversion. For example, Menegatti (2009) examined self-protection in a two-period environment and discovered that prudence is linked to self-protection investments. Peter (2017) replicates the one-period result and explains his findings through the substitution effect between self-protection and saving by incorporating endogenous saving (Menegatti & Rebessi, 2011). Alary, Gollier and Treich (2013) revealed how ambiguity aversion might increase the demand for self-insurance. In a two-period anticipated utility framework with and without saving, Hofmann and Peter (2016) investigated self-insurance and self-protection utilisation. However, having perused several other literatures, it appears that little study has been carried out on the implication of higher demand for self-insurance by the risk averse on the conventional insurance market. This study therefore aims to fill this empirical gap. The rest of this paper therefore includes; literature review, methodology, data analysis and interpretation and conclusions together with recommendations.

**Objectives of the study**

The aim of this is study is to examine the effect of risk aversion on self-insurance among Small and Medium Scale Enterprises Owners in Lagos State. The specific objectives are to;

i. assess if risk aversion has significant relationship on self-insurance utilisation among SME owners in Lagos State.

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ii. examine if there is any difference between preference for self-insurance and conventional insurance among SME owners in Lagos State.

## Literature Review

### Concept of Self- Insurance and Risk Aversion

The purpose of risk management is to determine the optimum effort that is expected to be expended in risk prevention and insurance operations (Zhang, 2017). In order to combat risks, individuals could lower the severity of prospective losses (self-insurance or loss reduction) or limit the likelihood of a risk occurring (self-protection or loss prevention) (Lee & Fung, 2021). Self-insurance is defined as a situation in which a person or a business does not enter into insurance arrangements with commercial insurers and instead relies on alternative risk management strategies (Holly, 2016). The idea of self-insurance is that an entity bears consequence of an unanticipated event when the entity decides to bear the risk on its own. When an organisation fails to self-insure, it may fall into great loss when awareness about an exposure is low and in consequence fail to address it (Outreville, 1998). In this sense, self-insurance provides a means of transferring wealth from lower-marginal-utility states to higher-marginal-utility states, whereas self-protection just improves the likelihood of higher-utility states at the price of losing wealth in all states (Zhang, 2017).

It seems to reason that as people become more risk adverse, they would make more efforts to decrease risk (Zhang, 2017). Risk aversion is at the heart of insurance, and it is seen as the phenomenon which makes insurance feasible. This is because policyholders prefer the certainty of a lesser loss (the amount of an insurance premium) to the chance of a greater loss, which is why insurance transactions occur (Abraham, 2015).

In this regard, a risk averter would therefore be ready to pay premium that is greater than the expected value of their exposures (Abraham, 2015). In consequence, risk-averse entities would be more likely to employ self-insurance (Hurley, 2014). The reason for this is that as self-insurance improves, so does the amount of insurance available for all types of loss exposures faced by businesses (Lee, 2010). Self-insurance, like insurance, reduces final wealth in a good condition with no loss by raising solely the cost, while increasing final wealth in a poor state with a loss by lowering the loss rather than raising the cost (Lee, 2010). However, it appears that the question of whether insurance and self-insurance are also public-policy alternatives is crucial (Pannequin & Corcos, 2017).

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**Theoretical Review**

This study is anchored on the expected utility theory. The expected utility framework laid the foundation for the behavior analyzed above. Ever since the development of the expected utility theory as an axiomatic theory of choice under risk from von Neumann and Morgenstern (1944), expected utility theory has become a prominent tool in analyzing individuals' choices and economic behaviour (Lee & Fung, 2021). This theory identifies that there are three categories of human disposition to risk; risk aversion, risk neutrality and risk preference. A risk averse individual is an individual who hates the existence of risk. Such individual will most likely insure and are often ready to pay an amount greater than their loss exposures in order to minimize their losses. A risk preferer on the other hand, is an individual who seeks out risk. Such an individual will rarely insure since he is not prepared to pay an amount greater than his expected loss. Risk neutrality, however, relates to an individual's indifference to risk.

According to the Expected Utility Theory (EUT), a decision maker (DM) may choose between risky and uncertain prospects based on expected utility values, which are weighted sums produced by summing the utility values of occurrences multiplied by their respective probabilities (Mongin, 1997). People's wealth is evaluated in terms of their utility function rather than merely their wealth, according to this theory. Decision making using expected utility theory involves comparing E[u(wX)] and E[u(wY)] and to choose the result that has the greatest expected utility.

The expected utility theory is a fundamental theory that is relevant in the discussion of possibility of an individual to purchase insurance considering their perception of risk. This theory is however relevant to the utilisation of self-insurance by entities as one of the tools of risk management. This is because self-insurance and insurance have been established to be substitutes. Therefore, ceteris paribus, an increase in the price of insurance could induce a risk averter to search for other cheaper methods of handling risk and in consequence, such an entity may consider self-insurance as a prudent option.

**Empirical Review**

Empirical findings have revealed that insurance and self-insurance are related in such a way that, when the unit price of insurance rises, demand for insurance falls while demand for self-insurance comes up (Pannequin, Corcos & Montmarquette, 2016). The former reduces the market power of the insurer while it has no impact on the policyholder's well-being (Pannequin & Corcos, 2017). However, the

discussion of demand for self-insurance is grasped without unraveling its interactions with conventional insurance (Pannequin, Corcos & Montmarquette, 2016). Hence, self-insurance opportunities may weaken the monopolistic power of an insurer and enable the policyholder to claw back a portion of the rent (Pannequin & Corcos, 2017). Therefore, controlling what may appear to be a crowding-out effect due to the fact that self-insurance becomes a major issue for the insurer (Hurley, 2014). At equilibrium, it is expected that self-insurance opportunities will reduce the insurance market, whereas conventional insurance contracts saturate policyholder's participation constraint allowing the insurer to maximize his market power on the residual insurance market (Pannequin & Corcos, 2017).

Self-insurance pricing changes have some effects on market insurance demand; a scale effect and two substitution effects. The scale effect refers to the impact of a change in the price of self-insurance on indemnification demand. Demand for market insurance tends to rise as demand for indemnification rises (Dionne & Eeckhoudt, 2012). The first substitution impact indicates how changes in the price of self-insurance affect demand for self-protection and, eventually, market insurance prices. The second substitution impact indicates how a rise in the cost of self-insurance encourages people to switch to market insurance rather than self-insurance (Alary, Gollier & Treich, 2013). When the price of self-insurance rises, it discourages indemnification or self-protection, since these sorts of demand reductions implicitly discourage market insurance, despite the direct incentive offered by the higher price of self-insurance (Hurley, 2014).

Several anomalies have been identified in the literature on this subject, where the application of self-protection and self-insurance produce quite different outcomes. Ehrlich and Becker (1998), for example, establish that self-insurance is necessarily an alternative for market insurance (the indemnification of a loss by an insurance firm). Although, self-protection and conventional insurance might be complementary. A more risk averse customer will expend more on self-insurance activities, but not necessarily more in self-protection activities (Dionne & Eeckhoudt, 2012).

Ehrlich and Becker (1972) were the earliest researchers who investigated people's desire to insure themselves and protect themselves from risk. Their research focused on the interaction between market insurance and preventive measures. According to this study, an insurer's increased degree of protection is projected to reduce the investment of a rational decision maker in self-insurance. Also, Boyers and Dionne (1989) argued that increasing risk had an ambiguous

impact on self-protection activities when they examined the association between increased external risk and self-protection behaviors.

The study of Briys and Schlesinger (1990) shows that the association between risk aversion and self-insurance remains significant in diverse scenarios, but that this relationship is not true for self-protection. However, there was no consideration of guaranteed dependability in the study conducted by Briys, Schlesinger, and Schuenburs (1991) into the link between conventional insurance, self-insurance, and self-protection. The inductive connection between high risk and high self-insurance and the replacement relationship between market insurance and self-insurance were shown to be flawed as a consequence, leading to the dissolution of multiple initial linkages.

Sweeney and Beard (1992) examined the effect that changes in loss probability and magnitude have on optimal self-protection. Loss severity and loss frequency were shown to have a mixed impact on self-protection, with benchmarks corresponding to the absolute risk aversion function in both circumstances. Self-insurance and self-protection were explored from the perspective of loss distribution and it was found that if the initial loss frequency is low enough, risk-averse agents are more likely to choose a higher level of self-insurance.

A study by Chiu (2000) found that people's tendency to self-protect is linked to their real loss likelihood and risk aversion. Based on the result of this study, it was found that as the likelihood of loss increases, the average inclination to protect oneself diminishes, and the same is true for the marginal propensity under a certain amount of restriction. However, increased self-protection efforts were found to be a direct result of higher levels of risk aversion. In the same vein, the impact of risk preference on self-insurance and self-protection was examined by Hofmann and Peter (2015) using a two-period model. Based on the result of the study, it was found that risk aversion causes increased self-insurance and self-protection actions when the initial probability of loss is low enough.

Lee and Fung (2021) studies self-insurance-cum-protection using Yaari's dual theory. The comparative statics of increased risk aversion was analyzed. In this study, two different sufficient conditions were found in the two-state model, from which an increase in the level of risk aversion will lead to an increase in the level of self-insurance cum-protection. Comparative statics was also studied in the continuous model and it was found that the results are similar to that in the two-state model. In addition, the study considered how the availability of conventional insurance affects the self-insurance-cum-protection level. The study concludes that

when the probability of loss is small, the self-insurance-cum-protection and conventional insurance are substitutes.

Andre, Bommier and Grand (2021) analyzed the impact of risk aversion and ambiguity aversion on the competing demands for annuities and bequeathable savings using a lifecycle recursive utility model. It was found that risk aversion and ambiguity aversion have similar effects i.e an increase in either of the two reduces annuity demand and enhances bond holdings. Pannequin, Corcos, and Montmarquette (2021) also looked at the two levels of insurance and self-insurance substitution. The outcomes of this study reveal that a higher unit price leads to quantity-based and between-tools substitution, but a higher fixed cost has only one effect: it reduces the insurance market.

**Methodology**

The study adopted a cross sectional class of survey research design. This class of research design was employed owing to the fact that the variables in the study reflects just one moment in time. This study adopted primary source of data through the use of an adapted questionnaire to obtain important information from SME owners in Lagos State who happen to be the respondents. The population of the study consists of 11,663 SMEs in Lagos State (SMEDAN & National Bureau of statistics, 2013). A sample size of 372 was derived from the population, using Yamane sample size formula. Out of 372 questionnaires, only 350 were returned. The Chief Executives of SMEs were used as the key respondents because they are the major decision makers. Purposive sampling technique was adopted in selecting 350 SMEs from major markets in Lagos state. These markets include; Computer Village in Ikeja Local Government Area, Ladipo market in Isolo Local Government Area, Oshodi market in Oshodi Isolo Local Government Area, Trade Fair Complex in Amuwo-Odofin Local Government Area, Owode Onirin in Kosofe Local Government Area, Idumota market in Lagos Island Local Government Area, Tejuosho market in Yaba Local Government Area, Alaba International Market in Ojo Local Government Area, Akodo market in Ibeju-Lekki Local Government Area and Apongbon in Lagos Island Local Government Area. The questionnaire was grouped into two sections: Section ‘A’ was designed to obtain information related to the bio-data of the respondents, while section ‘B’ was designed to obtain information relating to the dependent and independent variables of the study. A well-structured adapted questionnaire was employed for the purpose of this study. A five-point Likert scale of measurement was infused into

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the questionnaire to measure the strength of the respondents' opinion about each question in the questionnaire.

## Data Analysis, Interpretation and Discussion of Findings

**Table 1: Model Summary of the relationship between risk aversion and self-insurance among SME owners in Lagos state**

**Correlations**

| | | SI | RA |
|---|---|---|---|
| SI | Pearson Correlation | 1 | .139** |
| | Sig. (2-tailed) | | .007 |
| | N | 372 | 372 |
| RA | Pearson Correlation | .139** | 1 |
| | Sig. (2-tailed) | .007 | |
| | N | 372 | 372 |

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

Table 1 above shows that there is a weak positive relationship between Insurance companies' honesty and Claims settlement satisfaction in Nigeria (R = 0.139). This result is statistically significant because the p-value of the result (0.007) is less than 0.01 which is the level of significance in the model summary. The research hypothesis is therefore rejected. Hence, risk aversion has positive and statistically significant relationship with self-insurance among SME owners in Lagos state. This implies that as the level of abhorrence for risk taking continues to increase among SME owners in Lagos state, more pragmatic and decisive steps might have been sought to handle risks. Leaning on the results in the model summary, one of the risk managements tools that was employed by these SME CEOs in reducing their exposures is self-insurance. The result of this study conforms to Hofmann and Peter (2015). Based on the result of this study, it was found that increased risk aversion induces higher self-insurance activities and higher self-protection activities when initial probability for loss is small enough.

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**Table 2: Model Summary of the relationship between risk aversion and self insurance among SME owners in Lagos state**

**Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Pair 1 | SI | 2.5753 | 372 | 1.11458 | .05779 |
| | CI | 2.4946 | 372 | 1.15741 | .06001 |

**Paired Samples Test**

| | | Paired Differences | | | | | T | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | SI – CI | .08065 | 1.60490 | .08321 | -.08298 | .24427 | .969 | 371 | .333 |

Table 2 above shows that there is no significant statistical difference between preference for self-insurance and conventional insurance among SME owners in Lagos state. This is because the p-value of the result (0.333) is greater than 0.05 which is the level of significance in the model summary. Based on this result, the research hypothesis is accepted. This implies that SME CEOs in Lagos state considers conventional insurance and self-insurance as close substitutes and do not view any of this risk handling technique to be superior or better than the other. Hence, aside self-insurance, SME CEOs in Lagos state adopt some other techniques of risk management such as the conventional insurance, in treating their exposures.

## Conclusion and Recommendation

Businesses are not immune from risks. Small and Medium Scale businesses in particular are considered to be highly vulnerable to the detrimental flux of various risks affecting all classes of business in the society. The resultant effect of such risks could wield debilitating effects on the performance of businesses in this industrial sector and in addition threaten their survival. Owing to the need to ensure

survival, various techniques of risk management may be adopted to combat the aftermath of exposures of this class of business to losses. However, the propensity to utilize some of this risk handling tools such as self-insurance depends on the aversion of individual owners of SMEs for risk. In the light of the findings of this study, it is plausible to draw conclusion that SME owners who are risk averse will most likely utilize self-insurance as a technique of handling risk. Additionally, based on the findings of this study, it is safe to conclude that SME CEOs in Lagos state who are risk averse would willingly utilize either conventional insurance or market insurance depending on the availability of each of this risk handling methods.

It is therefore recommended, in the light of the findings of this study that conventional insurers should endeavor to develop products that address the actual needs of these firms, since they do not have preference for risk retention over conventional insurance. Also, it is recommended that SME CEOs should be highly disposed to risk improvement measures as this would help to reduce the cost of market insurance and self-insurance even if both are taken up contemporaneously.

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# GROSS PREMIUM INCOME AND CLAIMS SETTLEMENT FOR FIRE INSURANCE POLICY IN NIGERIA: A PANEL APPROACH

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***Abstract***

*Claims, being the heartbeat of the workability of insurance, are the most critical contact influencer between the insuring public and the insurer. It serves as a critical path to truth that shapes the policyholders' ultimate perceptions of their insurers. This study evaluated the relationship between gross premium income and claims settlement with specific focus on fire insurance business in the Nigerian insurance industry from 2010 to 2021. Data on gross premiums income and gross claims paid over the period were extracted from Nigerian Insurers Association (NIA) annual reports and digest. Stationarity test carried out on the data revealed that data is stationary at the 1%, 5% and 10% levels of significance. Using the ordinary least squares regression, the calculated probability value of 0.0000 is lower than the 0.05 significant value, which shows that there is a significant significance of the data. The computed linear co-efficient of determination ($R^2$= 0.928731) shows that 92.87% of the total return on asset is accounted for by the independent variables which are expense ratio and net claims. It was therefore concluded that there is a significant relationship between gross premium income and*

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*gross claims payment of fire insurance in careful consideration must be given to other administrative costs, such as underwriting, which have the potential to reduce the Revenues and profits of the company*

***Keywords:*** *profitability, premiums income, claims settlement, premium calculation principles*

***JEL Classification:*** E64, G22

## Introduction

The term "fire insurance" refers to property insurance that protects against fire-related loss or damage. In the event that their property is at risk of being damaged by fire, homeowners can acquire supplementary coverage. (John, 2017). Fire insurance will cover the cost of replacement, property rebuilding, and repairs to the damaged item or structure. War, nuclear war, and other related risks are often excluded from coverage under this policy. (Ade, 2018). Nigeria has been dubbed a global economic behemoth for failing to reach its full economic growth and development potential. The country also features a big number of urban centres that outperform certain African countries in terms of economic strength and market size. (Taiwo, 2017). The economy of every country is strongly reliant on markets. Nigeria's national economy has lost around N6 trillion in the last five years as a result of constant fire outbreaks, with major cities like Lagos, Ibadan, Kano, Port Harcourt, and Abuja suffering catastrophic consequences. (Izuoba, 2017). Risk management is what insurance is often referred to as. Its importance to market participants cannot be emphasized. The most popular type of property insurance is a regular fire insurance policy. Any unexpected property loss or damage caused by fire or other risks covered by the policy is covered by the fire insurance policy (Donelon, 2014). A fire insurance policy covers homes, offices, shops, hospitals, and places of worship, as well as their belongings such as machinery, plants, equipment, and accessories; finished goods in factories, such as raw materials, material in process, semi-finished goods, finished goods, and packing materials, among other things (Taiwo, 2017). The fire crisis in the country has reached worrisome proportions. In Nigeria, there isn't a day that goes by without some form of mishap, the bulk of which involves fire. Fire is known as the best servant but the worst master since it is impossible to manage when it erupts into an inferno and continues to burn everything in its path. (Danielle, 2016). Fire, as we all know, bears no regard for man's wealth or financial difficulties. There is always the risk

of fire, theft, floods, and a range of other hazards. Insurance tries to mitigate the impact of all of these risks. Many individuals assume that if they are cautious, they will be less likely to have a fire. (Rumah, 2015).

The popularity of fire insurance appears to have reversed, since the rate of premium growth among major insurance providers has slowed (Ali, 2016). According to results based on the financial records of roughly eight insurance companies, the fire policy premium increased by 19 percent year-on-year to N13.4 billion, compared to 59.2 percent in the same time of 2019 (James, 2016). Fire insurance premiums increased by 59.2 percent year on year in 2019 to N11.19 billion from N7.03 billion in 2018, reversing a 35.5 percent fall in 2018 compared to N10.9 billion in 2017. However, in 2018, the figure fell by 35.5 percent to N7.03 billion, down from N10.9 billion in 2017. The incident comes amid a string of fires around the country, with a total worth of assets damaged estimated at N32 billion every year. In 2020, the Federal Fire Service (FFS) responded to 3,555 fire calls and 353 rescue crises, according to the FFS. In addition, 1,100 lives were saved while 147 were lost, according to the report. Property was projected to be rescued at N1.351 trillion, with a loss of N32.12 billion. Meanwhile, payment of claims by the eight insurers has followed a same pattern, falling by 11.4 percent year on year in 2020 to N7.7 billion from N8.71 billion in 2019. From N6.7 billion in 2018, claims payments climbed by 35.8% to N9.1 billion in 2019. However, the figure fell by 24.7% to N6.7 billion in 2018 from N8.9 billion in 2017, with the value of assets destroyed estimated at N32 billion each year. The Insurance Act of 2003 lists public building insurance as one of the five mandatory insurance products, however it has yet to be implemented at the federal and state levels (Jude, 2017). Section 65 of the Insurance Act 2003 requires the owner or occupier of every public structure to be insured against responsibility for property loss or damage, as well as death or physical harm, caused by collapse, fire, earthquake, storm, or flood. A public building is one to which the general public has access for educational, recreational, medical, or commercial purposes, according to the Act. (Idowu, Okoye, Oni, Benjamin, Bello, 2016). Noncompliance has a maximum penalty of N100,000 in fines or a year in prison, or both. In addition, under Section 64 of the same Act, any owner or contractor of a building under construction with more than two floors must purchase insurance to cover liability for construction risks caused by his or her servants', agents', or consultants' negligence, which may result in death, bodily injury, or property damage to workers on the job or members of the public. This coverage also covers you in the event that a building you're working on collapses. Failure to comply with this clause carries a penalty of N250,

000 in fines or three years in prison, whichever comes first. The Nigerian Council of Registered Insurance Brokers (NCRIB) has encouraged the Lagos State Government to pay greater attention to market insurance across the state in order to give safety and succor to victims in the event of human and material asset losses.

**Statement of problem**

Fire is one of the most common sources of waste in any country. As a result, in the insurance sector, the term "fire waste" is employed. Man has been afflicted by fire-related losses since the invention of fire at the dawn of civilisation. Surprisingly, the rate of fire losses has increased as a result of today's sophisticated nature. (Izuoba, 2017). Every year, fire claims the lives of hundreds of people and destroys property worth millions of naira. Calculating the extent of damage to property and people in Nigeria is exceedingly challenging due to the fact that most damages caused by fire-related risks are not typically covered. Even if a fire-ravaged property's owner is reimbursed, fire insurance can only cover the financial side. A fire could be caused by arson, natural elements, defective wiring, gas equipment, and other things.

**Literature Review**

**Theoretical Review**

The theory of insurance risk premium is applicable to this research. However, actuaries are largely responsible for forecasting insurance premiums, and they have proposed and used a variety of statistical methodologies in the past to try to build a relationship between risk occurring concepts and risk factors. It is necessary to convert the unpredictable future losses or gains into monetary terms in order to calculate a price or premium for a risk. (Landsman & Sherris, 2010). Leaven and Groovaerts (2007) stated that the price of insurance is a monetary value whereby two parties agree to share risk. They went on to say that the cost of insurance is determined by two factors: when the person who bears the risk buys insurance from an insurance company at a predetermined price, and when insurance portfolios are exchanged on a financial market. According to Sukono, Riaman, Lesmana, Wulandari, Napitupulu, & Supian (2018) noted that the statistical model for such risks, the economic model for desirable outcomes, and premium principles to convert risk estimates into financial terms are the components of appropriate insurance risk pricing or premium. David (2015) stated that the estimations for differentiated prices in the insurance portfolio are based on the principle of

premium calculations, as reflected by pricing methodologies that include both a priori and a posteriori premium determination. Kahane (1979) Previously, it was hypothesized that administrative costs are frequently included in predicted gross claims. It should be highlighted that an insurer's ratemaking decisions are dependent on its ability to assess projected claims as well as the choice of a fair, reasonable, and equitable risk loading (Eeckhoudt, Fiori, & Gianin, 2018; Francis, Harel, & Harpaz, 2010; Ramos, 2017)

**Empirical Review**

Angima and Mwangi (2017) examined the relationships between *underwriting and claims management and the financial performance of property and casualty insurance companies in East Africa.* The research was conducted using a descriptive research approach. Primary and secondary data were used in the investigation. While a questionnaire survey was used to collect data from 82 members of staff at property and casualty firms, secondary data was obtained from the annual financial report for the years 2010 to 2014. In the research outcome, a linear regression model was used to analyze the data. Significant correlations between the variables were confirmed and established in the study. Nwite, Okparaka, and Okeke (2020) Between 2007 and 2017, the progress of claims settlement in the Nigerian insurance business was assessed. While their study used an ex-post facto research design, secondary data on total claims settlement and insurance penetration in the business was acquired. The ordinary least square regression technique was used to analyze the data, and it revealed a positive but negligible link between insurance claims settlement and insurance density in Nigeria's insurance business. According to the survey, efficient claims departments should be well-equipped by insurers with cutting-edge technology and employ skilled and experienced claims managers.

Several surveys have been conducted in Nigeria and other countries across the world to identify and establish the relationship between claims settlement and insurance premium income, as well as how they relate to motor insurance plans (e.g. Bortoluzzo, Claro, Caeteno, & Artes, 2011; Gangil & Vishnoi, 2020; Gurung, 2016; Islam & Hossain, 2018; Mathiraj & Nagalakshmi, 2020; Yusuf & Ajemunigbohun, 2015).

Assessment of employee perceptions on the purchase of motor insurance was conducted by Epetimehin and Akinselure (2016). With a sample size of 250 individuals, a survey research approach was used. The data was analyzed using simple frequency percentages and the Chi-square statistical approach. The study

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found a link between employee perceptions at Joseph Ayo Babalola University and the purchase of car insurance. When it comes to purchasing automobile insurance, the report suggests that employees consult with an insurance professional.

Angima and Mwangi (2017) The study looked at the links between underwriting and claims administration, as well as the financial performance of East African property and casualty insurance carriers. The research was conducted using a descriptive research approach. Primary and secondary data were used in the investigation. While a questionnaire survey was used to collect data from 82 members of staff at property and casualty firms, secondary data was obtained from the annual financial report for the years 2010 to 2014. In the research outcome, a linear regression model was used to analyze the data. Significant correlations between the variables were confirmed and established in the study. Nwite, Okparaka, and Okeke (2020) Between 2007 and 2017, the progress of claims settlement in the Nigerian insurance business was assessed. While their study used an ex-post facto research design, secondary data on total claims settlement and insurance penetration in the business was acquired. The ordinary least square regression technique was used to analyze the data, and it revealed a positive but negligible link between insurance claims settlement and insurance density in Nigeria's insurance business. According to the survey, efficient claims departments should be well-equipped by insurers with cutting-edge technology and employ skilled and experienced claims managers.

## 3. Research Methods

An ex-post facto research design was used to achieve the study's goal. The researchers chose this research strategy because it allowed them to look into two or more groups, people, events, or objects (Oyeniyi, Abiodun, Obamiro, Moses, & Osibanjo, 2016; Rowthwer, 2013). This study tried to quantify the relationship between gross premium income (GPR) and gross claims paid (GCL) for the years 2010 to 2019, using data from the Nigeria Insurers Association's insurance digest. The Augmented Dicker Fuller unit root test and Ordinary Least Square Regression techniques were used to quantify the data collection. A total of forty-one (41) non-life companies were included in the data extraction.

Thus, the model is represented in a functional form below:

GCL = F (GPR)…… (1)

Where

GCP = Gross Claim Payment (dependent variable)

GPI =Gross Premium Income (independent variable)

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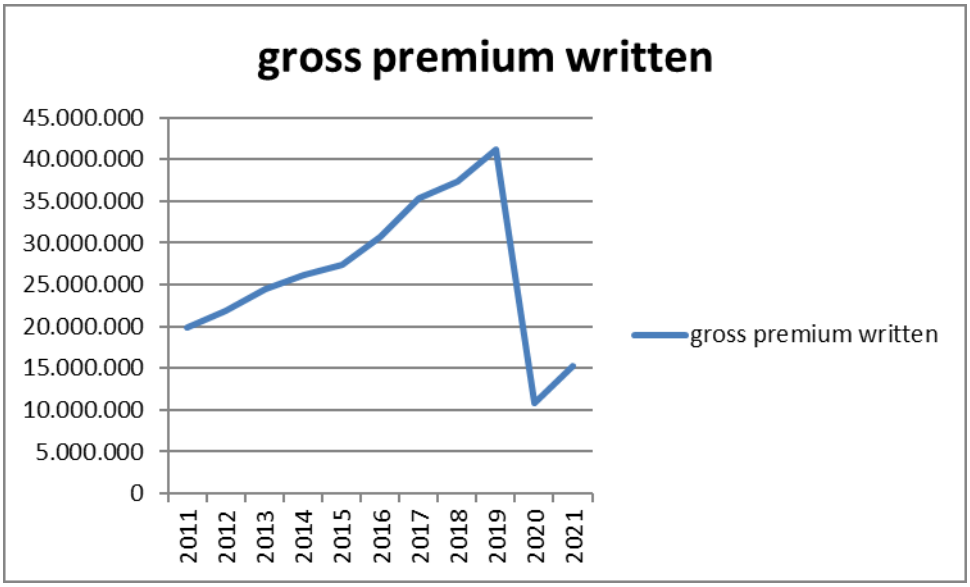
In a linear function, it is represented as follows:
GCL = $\beta_0 + \beta_1$GPR + μ…… (2)
Where $\beta_0$= constant term, $\beta_1$= regression co-efficient of GPR and
$\mu_t$ = error term.

**4. Results and Discussions**




The figure above shows the analysis of gross premium written for a period of 11 years from 2011 to 2021.the gross premium income includes contributions from insured in Nigeria. From the chart above, it showed an upward movement from 2011 to 2019 before a sharp downward movement in 2020 and a sharp upward movement in 2021.

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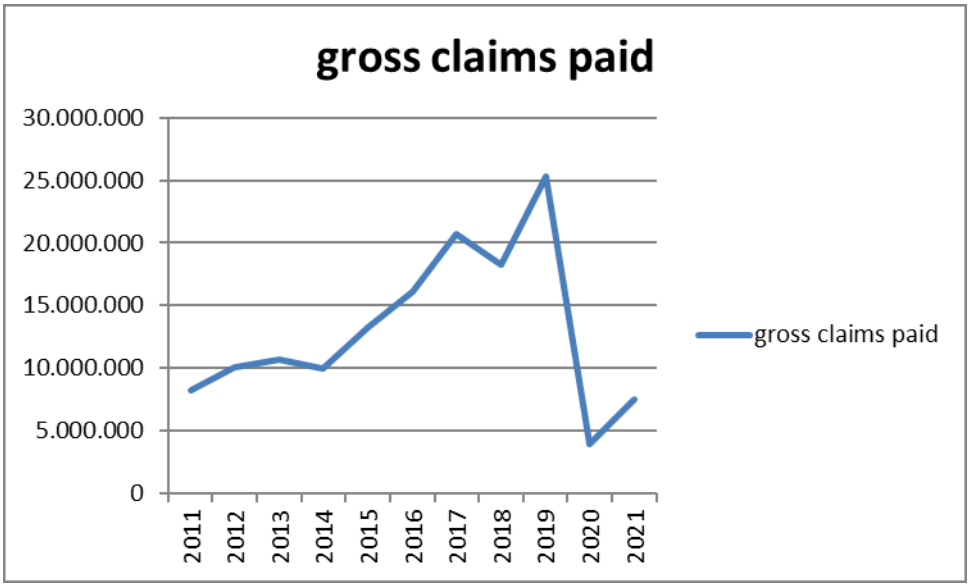
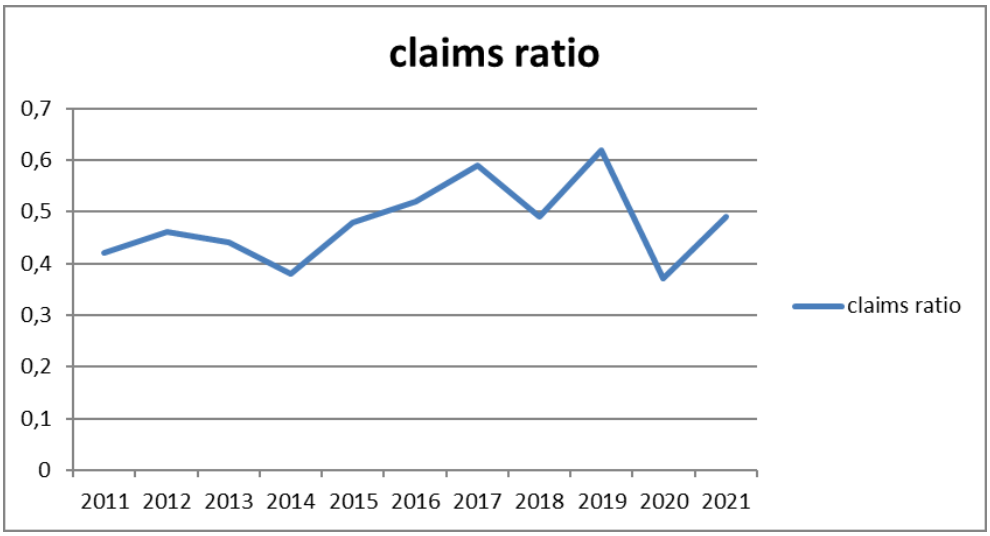



The figure above shows the trend analysis of gross claims payment from 2011 to 2021. The movement showed an upward and a sharp downward movement in 2020 even though there are fluctuations in the upward movement.



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The figure above showed a slight downward linear movement of the claims ratio which shows the relationship between gross premium written and gross claim paid, the graph above shows that there was a sharp downward movement in 2018 and a sharp upward movement in 2019. The relationship between gross premium written and gross claim showed a very sharp downward movement in 2020 and an upward movement in 2021.

Dependent Variable: GCL
Method: Least Squares
Date: 05/26/22 Time: 12:34
Sample: 2011 2021
Included observations: 11

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -4202611. | 1687837. | -2.489939 | 0.0344 |
| GPR | 0.656079 | 0.060582 | 10.82966 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.928731 | Mean dependent var | 13112879 |
| Adjusted R-squared | 0.920812 | S.D. dependent var | 6372386. |
| S.E. of regression | 1793214. | Akaike info criterion | 31.79988 |
| Sum squared resid | 2.89E+13 | Schwarz criterion | 31.87223 |
| Log likelihood | -172.8994 | Hannan-Quinn criter. | 31.75428 |
| F-statistic | 117.2816 | Durbin-Watson stat | 1.802040 |
| Prob(F-statistic) | 0.000002 | | |

The long run linear regression equation is given by GCL= -4202611. + 0.656079 which shows that the absence of premium will bring about 4202611 times decrease in gross claim. and a unit increase in gross premium will bring about 0.656079 times increase in gross claims. The computed coefficient of determination (R squared=0.928731) shows that 92.8731% of the total variation is accounted for by gross premium (GPR), while the remaining 7.1269% is accountable to the influence of other factors which are not included in the multiple regression function. The value of the Durbin Watson (DW) is 1.802040 at 5% significance level shows that there is no auto correlation. Prob value 0.000002 shows that the slope coefficient is non-zero.

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**Discussions**

The relationship between gross premium income and gross claims paid for vehicle insurance in Nigeria from 2010 to 2021 is investigated in this study. At the 0 level, none of the variables were stationary. This suggests they're all rooted in the same unit. By using ADF, the two variables became stationary after the initial difference. For the period under consideration, there is a positive link between gross premium income and gross claims paid. The equation for long-run linear regression is provided by GCP = 2.193197 + 0.777503GPI shows that N1 increase in gross premium income will bring about (0.777503) increase in gross claims paid which implies that premium and claims have positive relationship. The computed co-efficient of determination ($R^2$= 0.761494) shows that (76.149%) of the total variation in gross claims paid is accounted for by the gross premium income. The remaining (23.851) of the total variation is attributable to the influence of other factors which are not included in the regression equation function. This result is consistent with the findings of Olusegun (2013) who asserted that prompt claims payment is enhanced by robust premium income. It was arguably considered thus that claim managers ought to focus only on the most significant claim tasks that required their attention, and also optimizing the net premium income. In line with the findings, earlier studies (such as Angima & Mwangi, 2017; Soye & Momoh, 2021; Uruakpa, 2019; Yusuf et al., 2017) noted that for insurers to attain operational efficiency and effectiveness in claim payment, they must look directly at implementing modern claims system that must be properly covered by equitable premium income.

**Conclusion, Recommendations and Directions for Future Research**

The study's findings clearly illustrate that claims settlements and premium income of non-life insurance companies in Nigeria are inextricably linked. If the study's conclusions are implemented, it will result in fair, reasonable, and effective claims settlement for auto insurance policyholders. The findings also revealed that claims settlement was a key element in drawing greater premium income, indicating that motorists are extremely risk cautious. As a result, policymakers and motor insurance practitioners may find the study's findings valuable in developing methods for enhancing claims settlement systems among Nigerian motorists. As a result, improving claims settlement among motorists would help to redeem their opinions of vehicle insurance plans, perhaps ensuring insurers' trust, trustworthiness, and competence in the eyes of the insured.

The study proposed that claims settlement systems be deliberately developed to create a mutually linked ambience between policyholders and insurers in order to fully justify the study's conclusions. Premium revenue generation should be made as seamless as possible by developing an efficient and effective online gateway that can ensure hassle-free payment procedures for motorists. In order to enhance the confidence level of the motoring community, car insurance providers should implement intriguing claims packages. The government should re-establish and empower the motor insurance public complaint commission to deal with concerns connected to vehicle insurance claims made by any party to the contract. Motor insurance authorities should be proactive in monitoring the contractual arrangement for the settlement of motor insurance claims, ensuring that the motorist's decision to purchase insurance is taken into account.

This study adds to the body of knowledge by alerting claims managers to the importance of taking claims settlement seriously and passionately when dealing with motor insurance policyholders. The construction of a mathematical model that describes the relationship between premium income and claims settlement will assist motor insurers as a result of this research. Further research should be focused on the nexus between asymmetric information concerns in claims settlement, premium rating, and insurance contract wordings, according to the study. Finally, future study may focus on insurance fraud issues arising from the insurance claims settlement manual.

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# FOREIGN CURRENCY TRANSACTION, TRANSLATION AND PERFORMANCE OF SUPERNATIONAL COMPANIES IN NIGERIA, WEST AFRICA

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**Abstract**

*The study examined foreign currency transaction, translation, and performance of supernational companies in Nigeria. Specifically, the study examined effect of exchange rate, transaction rate and interest rate on return on asset of supernational companies in Nigeria. In a bid to accomplish this, panel regression analysis of fixed and random effect on five (5) selected supranational companies in Nigeria were employed. The study employed secondary data; the data for the study cover the period 2012 to 2021. The Hausman test carried out showed that fixed effect model is more realistic and produced a better result which was therefore employed in drawing inferences in the study. From the result, exchange rate exhibited significant negative relationship with supernational company's performance in Nigeria. The finding further revealed that Interest rate has insignificant positive relationship with performance of the supernational companies in Nigeria while the translation rate indicated insignificant negative relationship. Hence, the study concluded that unfavorable movement or adjustment in foreign currency transaction and translation rate affect the performance of supernational companies in Nigeria, especially, when measured performance in term of return on asset. It was recommended that supernational companies should*

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*develop a mechanism to hedge against foreign exchange rate exposure caused by unanticipated movement in the exchange rate. More so, this should be supported by sound risk management strategies that can withstand macroeconomic instability especially inflation rate in the host economy.*

**Keywords:** *transaction rate, inflation rate, interest rate, exchange rate, performance*

**JEL Classification**: G21, G24

## 1. Introduction

In developing countries like Nigeria, apart from the problem of managing unrelated units, supranational company's face the problem of managing conflict with the immediate environment in which the business units are established (Shehu, 2015). This suggests that a greater degree of production diversity among multinational corporations results in more complex issues. Since the turn of the century, Nigeria's manufacturing sector has been a driving force behind the country's economic growth and development, setting the pace in industries as diverse as vehicle production, marketing, logistics, real estate, agriculture, electricity, and more. Despite the legislative shifts and financial crises that have hit Nigeria throughout the decades since many transnational enterprises were founded, many of these businesses are still going strong today (Ubesie&Ezeagu 2014). Additionally, the industry has made significant contributions in the past to Nigeria's economy by creating jobs and supplying needed products and services. Multinational corporations engage in worldwide commerce, which inevitably requires the use of a variety of currencies, each of which has its own exchange rate. Firms' domestic selling price level, profitability, resource allocation, and investment choice are all directly impacted by foreign currency transaction, which is playing an increasingly important role on companies' performance in Nigeria (Kituku, 2014). Companies are struggling to function at the minimal cost and price level intended as the exchange rate against one USD has risen to as high as N650. Importers in particular have drawn public attention to the fluctuating exchange rate because they claim the stronger naira is hurting their ability to compete (Ndungu, 2000). It is crucial for Nigeria's economy that the impact of this foreign currency and translation rate on business performance be studied. Credit allocation in an import-reliant economy is influenced by the stability of the exchange rate (Adebiyi,

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2006). Currency fluctuations in international commerce may be an intriguing component in the success of multinational corporations because of the effect on financial intermediation (Danish, 2012). Since no nation exists in isolation, all nations engage in trade with one another, facilitating the availability of foreign currency. For this reason, the exchange rate is a crucial element of the global economy and the backbone of international commerce (Adetayo, 2004). Alterations to a country's fiscal and monetary policies have an effect on the availability of its own currency. Many variables, such as interest rates, inflation, and expectations for new government regulations, may affect the demand for money (Berger & Bouwman, 2010).

The Nigerian naira has steadily depreciated from N151.51 in 2010 to N162.30 in 2011 to N156.15 in 2012 against the United States dollar, despite the government's best attempts to keep the exchange rate constant. In 1990, the naira was worth N8.0378 and in 1999, N85.98. In 2013, the Naira fell to N158.05 per dollar; in 2014, it fell to N175.85 per dollar; in 2015, it fell to N232.40 per dollar; on December 31, 2016, the exchange rate rose to N300.757 per dollar; and as of August 2022, it has risen to N660 per dollar. This research aims to fill that gap by looking at how foreign currency, translation, and performance of MNCs in Nigeria have changed over the last decade, from 2012 to 2021.

## 2. Literature Review

### 2.1 Conceptual Review

#### 2.1.1 Foreign Currency Transaction and Translation

An international company uses the accounting technique of foreign currency transaction and translation to record the financial performance of its overseas subsidiaries in terms of the company's home currency. The books of the company's international subsidiaries are maintained in their local currency. The company must convert its foreign-currency financial statements into U.S. dollars before it can use the correct approach to these assets. With the economic climate of the currencies involved in mind, the impact of foreign exchange rate fluctuations on the income statement and equity is possible. For instance, while the Indian Rupee is experiencing fast depreciation versus the US dollar, an Indian exporter to the US benefits. The same time period has a negative impact on an Indian debtor who borrows via Dollar denominated bonds (Benjamin, 2014).

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### 2.1.2 Transaction Rate

The transaction rate for translation connects buyers and sellers of products, services, and financial assets in one country with those in another (Reid & Joshua, 2004). A currency's exchange rate is its price in terms of another currency. It is the primary factor in establishing the competitiveness of local and foreign products and the extent to which the private sector participates in international commerce. In international finance and among developing-world economists, debates about the appropriate exchange rate persist, even as more and more countries recognize the importance of trade liberalization to their own economic development (Owolabi & Adegbite, 2017).

### 2.1.3. Inflation Rate

Inflation is the average annual percentage rise in the cost of a basket of goods and services, expressed either as a percentage or as a percentage of the total cost of living in the economy. The rate of inflation is defined as the average annual percent change in the prices of a basket of goods and services (Katarzyna, 2014).

### 2.1.4 Interest Rate

An amount of money that is due every month, expressed as a percentage of the total loan, deposit, or borrowing amount, It has been said that the interest rate is a measure of how much people value immediate cash flow above future earnings potential. The borrower has an immediate need or need for the loaned funds and is ready to pay a premium, represented by the interest rate, in exchange for this service. After adjusting for inflation, the real interest rate is what investors, savers, and lenders earn on their money. The Fisher equation provides a formal description of this phenomenon, which indicates that the real interest rate is roughly equal to the nominal interest rate minus the inflation rate (Ahmed, 2015).

### 2.1.5 Exchange Rate

Exchange rate isdescribes asthe cost of exchanging one currency for another. The exchange rate is the proportion by which one currency is valued in terms of another. Currency exchange, or the foreign exchange market, is a market where the currencies of several nations may be traded. It is a marketplace for the trading of various currencies. The foreign exchange market is the greatest market in the world since it operates in every country and deals in the currencies of all nations, as

observed by Jhingan (2004). Exchange rate is the cost of one foreign currency expressed in terms of another, as described by Bradley and Moles (2002). The exchange rate connects the domestic and global markets for goods, services, and financial assets by determining how much one unit of a foreign currency is worth in terms of the domestic currency.

### 2.1.6 Corporate Performance

According to European Central Bank (2010), a firm's success may be measured by its ability to create long-term profits within a certain time frame. A bank's capacity to generate profits serves as a buffer against losses, since doing so increases the bank's equity and allows it to reinvest in order to grow its business. According to Alabede (2012), the profitability of banks is affected by both internal and external variables. Both internal and external factors influence an organization's viability. Internal factors include things like liquidity, capital sufficiency, high operational expenditures, etc. External ones include things like financial structure, exchange rate, inflation rate, economic development, etc. Therefore, these elements have consequential effects on business success, and investors will choose to put money into a profitable firm.

### 2.1.7 Transaction Rate and Company Performance

Companies that engage in international commerce are often characterized by a high transaction rate, which is defined as the ratio of domestic to foreign product prices and the level of engagement in international trade by the external sector. Ability to meet financial commitments to shareholders is a significant performance indicator used by current and future investors in evaluating a company's health. One of the most crucial factors in a company's financial success and the quantity of profit it makes is the efficiency with which it pursues its primary aim, which is to engage in commercial activity (Banafa et al., 2015). A company's performance during a certain time period may be used as a surrogate for its financial health. Financial performance may be compared between firms in the same sector as well as between organizations in other industries.

Ogunbiyi and Ogunyemi (2014) conducted research on the impact of transaction rates on the performance of listed businesses on the basis that they hypothesized that these rates had an effect on company performance. Transaction and interest rates were shown to have a large and unfavorable effect on the performance of listed enterprises, as assessed by return on assets and return on equity.

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### 2.1.8.The Relationship between Inflation and Corporate Performance

The inflation rate is the average annual percentage increase in the prices of a basket of goods and services. There is a stronger empirical link between the inflation rate and the financial success of corporations in the manufacturing sector, particularly those involved in cross-border commerce. Spending money on materials and labor is an ongoing need in the manufacturing sector. This ensures that final consumers get high-quality items that are attractively packaged. According to the research conducted by Riaz (2010), who suggested that inflation rate affects the performance of companies, inflation rate has a substantial positive link with the corporate performance of firms. Loto (2012) added weight to the discussion by looking at how inflation affected the success of manufacturing companies; the results showed a positive insignificance.

### 2.1.9. Corporate Performance and Interest Rates

Putting it simply, interest is what you pay when you borrow money or use credit. As stated by D' Alberto (2015), interest is the payoff for investing one's savings rather than keeping them in cash. An interest rate is the annualized percentage of the principal that is required as a periodic payment. Interest rates have been analyzed and criticized throughout history due to their potentially far-reaching effects on the formation of savings and the encouragement of investment. Interest is paid on deposits and charged on loans and advances both by businesses and individuals. The interest spread, or the difference between these two interest rates, is a major contributor to corporate earnings. Minimum rediscount rate, loan rate, deposit rate, treasury bills rate, and interbank rate are all examples of interest rate variables.

Interest rates and profits in developed economies have been the focus of several academic investigations. Banks in Nigeria were evaluated by Enyioko (2012) in light of their interest rate strategies and how they affected the institutions' performance. The research concluded that interest rate strategies have not considerably enhanced banks' overall performance. According to Aburime (2008), the real interest rate has a favorable correlation with ROI for businesses. The impact of economic factors on the growth of the Nigerian economy was also investigated by Ilegbinosa et al. (2012). The study found that interest rates have a negative effect on GDP, the agriculture sector, the manufacturing sub-sector, and non-oil exports. Okech (2013) also investigated how interest rates affect Kenyan

businesses. The research analyzed management efficiency and operational cost efficiency, with reference to lending interest rate. The correlation between loan rates and business success was found to be modest yet favorable. Being that just 14% of earnings came from interest.

### 2.1.10 Corporate Performance and the Exchange Rate

Theoretically speaking, a country's exchange rate is more indicative of the financial health of industrial businesses, particularly those involved in international commerce. The requirement for high-quality finished goods is not just critical in the retail sector, but also in the production sector. According to the idea of supply and demand, a manufacturer would often choose to import raw materials from abroad if it is unable to fully use domestic resources. Therefore, the amount of money spent by manufacturing enterprises to reach output levels is strongly impacted by variations in the exchange rate. Competitors are the building blocks of firms in today's global economy (Marimuthu et al., 2009). With the expansion of worldwide trades, this research firmly thinks that global companies have an influence on the corporate performance of the company, and this has relevance to the exchange rate of a country. It stands to reason that in order to protect them against financial loss; businesses must meticulously assess their corporate finance requirements and think about hedging options before engaging in any trades. When there is doubt about the country's currency rate, this makes sense. It will have a negative effect on a company's value and bottom line as a result of its foreign transactions (Kang & Dagli, 2018).

The foreign currency rate has been cited in some research as a potential moderating factor. Mantari and Nuryasman (2017) discovered that the exchange rate has a modest association with the performance of a corporation, including profitability and leverage to firm value. As a result, the impact may result wholly or in part from the company's management plan.

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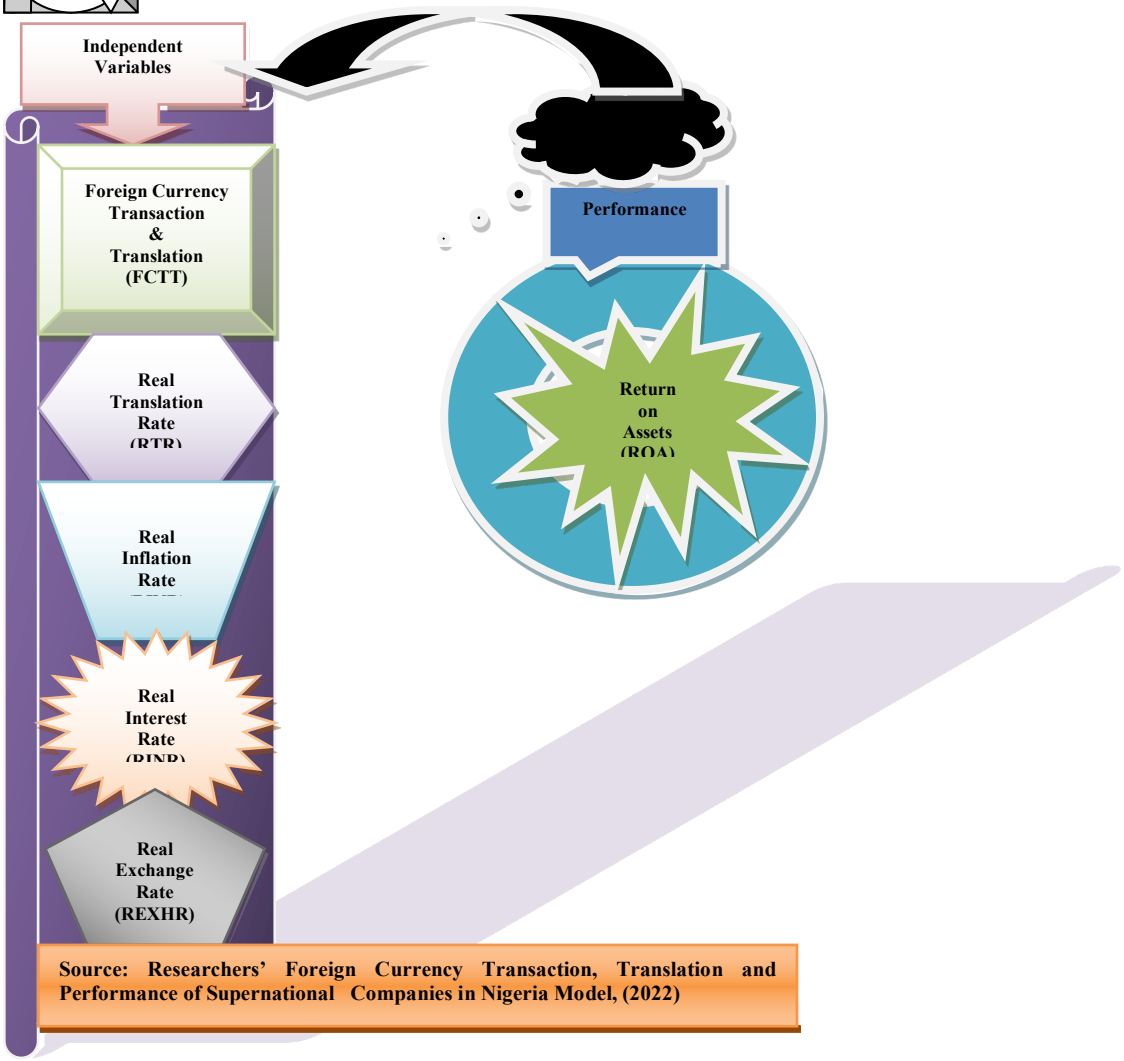
## 2.1.11 Conceptual Framework on Foreign Currency Transaction, Translation and Performance of Supernational Companies in Nigeria




Source: Researchers' Foreign Currency Transaction, Translation and Performance of Supernational Companies in Nigeria Model, (2022)

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### 2.2 Theoretical Review

#### 2.2.1 Purchasing Power Parity Theory.

This research relied on the concept of purchasing power parity. PPP theory, proposed by Menon and Viswanathanin (2005), states that the value of identical commodities across nations is equivalent when expressed in terms of the local currency. They argue that stable currency exchange rates are achieved when people in various nations have about the same buying power. According to the theory put forward by Reid and Joshua (2004), the ratio of commodity price levels should match the currency of the nation. It is possible for a currency to be incorrectly valued, such that it cannot be used to buy goods at the market price in the country (Ross, 2008). This theory assumes that there are no transactional costs, no obstacles to trade, and that the goods being exchanged are identical. A uniform product should cost the same in every country if the trade currency is converted at the instant exchange rate. In order to compare the prices of similar goods in different nations, the theory advocates using price indices.

#### 2.2.2.Empirical Evidence

Okika (2018) looked at how changes in the exchange rate affected the profits of certain publicly traded Nigerian companies. It looked at the impact that changes in currency exchange rates have on ROI. To accomplish these ends, two hypotheses were developed and evaluated using information culled from the companies' annual reports and the CBN's annual statistics bulletin. In order to ascertain the impact of changes in the exchange rate on a company's bottom line, data were examined using the multiple regression analytical estimating approach with the assistance of SPSSv21. The results showed that none of the competing hypotheses had a chance. The research concluded that the ban on importing Nigerian-made items that are functionally equivalent should remain in place. In the event that this is strictly adhered to, greater opportunities for local manufacturing will arise. The cost of production in the industrial sector may be lowered significantly if the government pursues policies that seek to increase the value of the naira relative to the foreign currency market.

Williams (2018) studied how changes in the value of the naira affected the profitability of Nigerian businesses. After learning about the effects of currency fluctuations in the literature, it was vital to examine these effects in the Nigerian setting. Seven research questions were developed for this investigation, and seven hypotheses were subsequently tested. The primary goal of the research was to

experimentally examine how changes in exchange rates affect ROI. Descriptive statistics and conventional least squares were used for analysis. This research utilizes panel data that spans the years 2012-2016. As the majority of banks engage in foreign exchange operations, the research finds that currency exchange rates have a significant effect on ROI. The estimated exchange rate of 145.4265 has a positive correlation with Return on Investment, as shown by the regression analysis. Accordingly, a gain in ROI of 145.4265 per unit increase in exchange rate is to be expected. Specifically, we accept the alternative hypothesis that there is a significant association between the exchange rate and the return on investment (firm performance) since the T-value estimated in the research is 0.287, which is larger than 0.05, or.287 > 0.05. ROI is positively related to the other factors utilized in the analysis. The coefficient of determination is rather high in the regression outcome. It demonstrates that the model's independent variables account for about 67% of the total variations in Return on Investment (ROI).

In addition, Pitia and Lado (2015) used a granger-causality method to analyze time series monthly data from August 2011 to November 2014 to determine the correlation between the South Sudanese currency exchange rate and the inflation rate. The research found that there is a causal relationship between the exchange rate and the Consumer Price Index (CPI) that is unidirectional and without any kind of feedback. This indicates that the devaluation of South Sudanese currency is harmful to South Sudan's economy. Despite the fact that CPI had no effect on the exchange rate, there is no way to determine with more certainty that the findings are correct. The reaction of monetary authorities in trying to close the gap between the price level and the buying power of individuals in the economy may have influenced the exchange rate as a result of the pressure of a rising price level.

The effects of the exchange rate on the Nigerian economy were also experimentally assessed by Ayodele (2014). This research looked at the role that various economic factors, such as the currency exchange rate and the inflation rate, have in influencing GDP growth and decline in Nigeria. Ordinary Least Squares (OLS) multiple regression analysis was used to examine secondary data gathered from the Annual Reports of the Central Bank of Nigeria (CBN), the Nigerian Stock Exchange (NSE), and the Nigeria Securities and Exchange Commission (SEC). Exchange rate and inflation rate were shown to have a substantial effect on Nigeria's GDP and economic growth. A rising exchange rate is bad for economic development, but a high inflation rate is good, as it means businesses are more likely to invest in new production, and vice versa. As a result of the study's

findings, the government of Nigeria should take steps to improve the country's investment climate by bolstering the safety of citizens and businesses, enhancing the nation's infrastructure, and increasing domestic output in order to lessen the country's reliance on the U.S. dollar. This, in turn, would help the naira and, by extension, the country's GDP.

The relationship between real exchange rate misalignment and economic performance in Sudan was also studied by Ebaidalla (2014). The study explores the evolution of equilibrium exchange rate and actual exchange rate misalignment in Sudan throughout the period 1979–2009. Moreover, the results of actual exchange rate misalignment are analyzed for their effect on economic output. The empirical findings demonstrate that economic policy factors including trade openness, government spending, and taxation greatly impact the equilibrium exchange rate. The findings also indicate that, throughout the analyzed time period, an overvaluation of the Sudanese currency occurred.

Exchange rate changes were studied to see how they affected the Nigerian manufacturing sector over a twenty year period by Opaluwa et al. (2010). The contention was that industrial production was negatively impacted by exchange rate swings. This was due to the fact that the rate of exchange for the foreign currency needed to import the many inputs and capital goods used in Nigerian manufacturing was very unpredictable. This research relied on an empirical approach. When doing the analysis, the econometric technique of regression was used. Model explanatory variables were manufacturing output employment rate and foreign private investment. Regression analysis showed that some of the variables' coefficients were positive while others were negative. There are negative results from this research, and they are statistically significant.

Based on the above empirical reviewed, very little research has been done on the subject of foreign currency transactions, transactions, and performance of transnational corporations, especially in the context of Nigerian enterprises. Therefore, the purpose of this research was to examine how foreign currency transactions and translations affect the profitability of Nigerian firms that are listed on international stock exchanges.

## 3. Methodology

The study used an explanatory research design. The explanatory research designs was utilized because the data needed for analysis already exist and it enables exploring relationships between two or more variables. The study utilized

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secondary source of data. In order to investigate the effect of foreign currency and translation on performance of supranational companies in Nigeria, information from Central Bank of Nigeria Statistical Bulletin and annual reports of Nestle Plc; Cadbury Plc; Flour Mills Plc. and DangotePlc was used. Real translation rate, real inflation rate, real interest rate and exchange rate were utilized to measure foreign currency and translation while performance was measured with Return on Asset (ROA). The study covered period of years 2012- 2021 (10years) with aid of panel regression analysis.

### 3.1 Model Specification

The study adapted the model of Okika (2018), who examined the relationship between exchange rate fluctuation and profitability of companies in Nigeria using Exchange rate (EXCHr), Inflation rate (INFr) as the independent variables and regressed against the dependent variable Return on capital employed (ROCE) used as proxy for financial performance. The model stated as follows:

ROCE = f (EXCHr, INFr) 3.1

With modification this study introduced real translation rate, real interest rate to measured foreign currency and return on assets to measured performance. However, the modification model stated below:

ROA = f (RTR, RINR, RINR, REXHR) 3.2

Financial performance indicator is Return on asset (ROA) and foreign currency and translation variables are Real Translation Rate (RTR), Real Inflation Rate (RINR), Real Interest Rate (RINR) and Real Exchange Rate (REXHR), pooling observations across firms and time, without taking into consideration the uniqueness/heterogeneity that may exist in the firms during this time period (2001-2021). In linear forms the models are stated below:

$$ROA_{it} = \delta_0 + \delta_1 RTR_{it} + \delta_2 RINR_{it} + \delta_3 RINR_{it} + \delta_4 REXHR_{it} + \mu_2 ---\cdots 3.3$$

The definition of the variable is shown below:

**Where;**

ROA = Return on Asset

RSR = Real Translation Rate

RINR = Real Inflation Rate

RINR = Real Interest Rate

EXHR = Real Exchange Rate

$\delta_0$= Constant

$a_1a_2a_3$ = Vector of the Independent Variables

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it = cross sectional of the observation and period of the study
$\mu_1, \mu_2$ = is the error term
RINR = Real Inflation Rate
RINR = Real Interest Rate
EXHR = Real Exchange Rate
$\delta_0$= Constant
$a_1a_2a_3$ = Vector of the Independent Variables
it = cross sectional of the observation and period of the study
$\mu_1, \mu_2$ = is the error term

## 4. Results

### 4.1 Descriptive Statistics

**Table 4.1: Descriptive Statistics of Variables**

| | ROA | EXHR | INFR | INTR | TRR |
|---|---|---|---|---|---|
| Mean | 2.087550 | 5.502886 | 2.463561 | 2.779866 | 0.085190 |
| Median | 2.635585 | 5.722899 | 2.484907 | 2.816775 | 0.030907 |
| Maximum | 3.330758 | 5.864238 | 2.920470 | 2.961486 | 0.311534 |
| Minimum | -0.479953 | 5.058226 | 2.074429 | 2.511170 | -0.014990 |
| Std. Dev. | 1.199154 | 0.342986 | 0.258863 | 0.121895 | 0.104778 |
| Skewness | -0.988035 | -0.299209 | -0.114585 | -0.910290 | 0.997152 |
| Kurtosis | 2.729890 | 1.300521 | 2.116203 | 3.287919 | 2.516551 |
| Jarque-Bera | 8.121362 | 6.627926 | 1.701966 | 6.936374 | 8.597400 |
| Probability | 0.017237 | 0.036372 | 0.426995 | 0.031174 | 0.013586 |
| Sum | 102.2899 | 269.6414 | 120.7145 | 136.2134 | 4.174313 |
| Sum Sq. Dev. | 69.02256 | 5.646697 | 3.216489 | 0.713201 | 0.526962 |
| Observations | 49 | 49 | 49 | 49 | 49 |

**Source: Authors' Computation (2022)**

Reported in Table 4.1 is the descriptive statistics which revealed the mean value of return on asset, exchange rate, inflation rate, interest rate and translation rate are 2.087550, 5.502886, 2.463561, 2.779866 and 0.085190 respectively. The minimum value are -0.479953, 5.058226, 2.074429, 2.511170 and -0.014990 with a maximum of 3.330758, 5.864238, 2.920470, 2.961486 and 0.311534 for return on asset, exchange rate, inflation rate, interest rate and translation rate respectively.

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The extent of adjustment given by the standard deviation indicated that the highest deviation is return on asset while translation rate showed the lowest discrepancy rate. More so, the degree of asymmetry given by the Skewness result indicated that only translation rate has a long-right tail due to its positive value while return on asset, exchange rate, inflation rate and interest rate have a long left tail. The Kurtosis revealed that interest rate is leptokurtic due to its value that exceeded 3 while all other variables are platykurtic since its value is lesser than 3. The outcome of Jarque-Bera statistics showed that only inflation rate is normally distributed while others are not.

### 4.2 Panel Unit Root

**Table 4.2: Unit Root Test (Summary)**

| Variables | Panel Unit Root Test Method | | | |
|---|---|---|---|---|
| | Levin, Lin & Chu (LLC) | | ADF Fisher statistics | |
| | LLC statistics | Integration order | ADF Fisher statistics | Integration order |
| ROA | -3.79048 | I(1) | 26.8072 | I(1) |
| EXHR | -26.6889 | I(1) | 59.7209 | I(1) |
| INFR | -6.22200 | I(1) | 37.8710 | I(1) |
| INTR | -7.70514 | I(0) | 35.1735 | I(0) |
| TRR | -6.28371 | I(1) | 38.3586 | I(1) |

**Source: Authors' Computation (2022)**

Table 4.2 showed the unit root test conducted using LLC and ADF test statistics. From this Table, it could be revealed that all the variables employed to examine foreign currency transaction and translation on the performance of supernational companies in Nigeria were all stationary at fist difference except interest rate that was stationary at level.

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### 4.3 Correlation Analysis

**Table 4.3 Correlation Analysis**

| | ROA | EXHR | INFR | INTR | TRR |
|---|---|---|---|---|---|
| ROA | 1 | -0.3642 | -0.2090 | 0.2467 | -0.0151 |
| EXHR | -0.3642 | 1 | 0.6644 | -0.3639 | 0.0821 |
| INFR | -0.2090 | 0.6644 | 1 | -0.1614 | 0.4708 |
| INTR | 0.2467 | -0.3639 | -0.1614 | 1 | 0.3493 |
| TRR | -0.0151 | 0.0821 | 0.4708 | 0.3493 | 1 |

**Source: Authors' Computation (2022)**

Table 4.3 showed the correlation analysis in the examination of foreign currency transaction and translation on the performance of supranational companies in Nigeria. The result indicated exchange rate, inflation rate and translation rate have a negative correlation of -0.3642, -0.2090 and -0.0151 respectively with performance of supernational companies in Nigeria while interest rate revealed a positive correlation of 0.2467.

### 4.4 Estimates of Parameters for Panel Regression Model

**Table 4.4: Fixed Effect (FE) and Random Effect (RE) Specification**

| Independent Var | Fixed Effects | Random Effects |
|---|---|---|
| Constant | 3.363507 (3.676589) | 3.357772 (3.698657) |
| EXHR | -1.178617*** (0.416249) | -1.184570*** (0.416226) |
| INFR | -0.292940 (0.615395) | -0.303584 (0.615345) |
| INTR | 1.656067* (0.951407) | 1.652092* (0.951403) |
| TRR | -1.355581 (1.240363) | -1.336499 (1.240284) |
| No. observations | 49 | 49 |
| R-squared | 0.735650 | 0.343190 |
| Adjusted $R^2$ | 0.682779 | 0.283480 |
| F-statistics | 13.91429 | 5.747602 |
| Prob. (F-Statistics) | 0.000000 | 0.000823 |
| Dubin-Watson | 1.103096 | 0.983940 |

Note: Standard errors are provided in parentheses. *, **, *** showed the significance at 10%, 5% and 1% level respectively.
**Source: Authors' Computation (2022)**

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In a bid to examine foreign currency transaction and translation on performance of supernational companies in Nigeria, the study used panel regression analysis of both fixed effect and random effect models. Fixed and random effect showed that if all the independent variables (exchange rate, inflation rate, interest rate and translation rate) are held constant performance of supernational companies, will increase by 3.363507and 3.357772 units respectively. Conversely, exchange rate has a significant negative relationship on the performance of supernational companies in Nigeria in both fixed and random effect with a value of 1.178617 and 1.184570 units respectively. This implied that a unit rise in exchange rate will lead to a decrease of 21.178617 and 1.184570 units decrease in the performance of supernational companies under fixed and random effect respectively.

More so, the coefficient of inflation rate is negative and insignificant with a value of 0.292940 and 0.303584 units for both fixed and random effect model. This result implied that a unit increase in inflation rate will lead to a decrease in the performance of supernational companies in Nigeria. Interest rate is positive and insignificant with a value of 1.656067 and 1.652092 units under the fixed and random effect result. This implied that a unit increase in interest rate will lead to 1.656067 and 1.652092 units increase under the fixed and random effect model. Lastly, the coefficient of translation rate is insignificant and positively related with a value of 1.355581 units for fixed effect model while the random effect model indicated 1.336499 units. The result implied that a unit increase in translation rate will lead to 1.355581 and 1.336499 units decrease in performance of supernational companies in Nigeria.

The coefficient of multiple determinations given by the $R^2$ has a value of 0.735650 in the fixed effect result while it indicates 0.343190 under the random effect result. F-statistics in both models stood at 13.91429 in the fixed effect model while the random effect model recorded a value of 5.747602. The values of the F statistics for the two models are significant. .

### 4.5 Hausman Test Result

**Table 4.5 Result of Hausman Test**

| Correlated Random Effects - Hausman Test | | | |
|---|---|---|---|
| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
| Cross-section random | 11.256412 | 4 | 0.0072 |

**Source: Authors' Computation with E-views, Version 9 (2022)**

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From Table 4.5, the probability of the Chi-square stood at 0.0072 which is significant; hence the study accepts the fixed effect model as the most reliable model in the study hence used for prediction.

### 4.6 Discussion of Findings and Implications

This study examined foreign currency transaction and translation on the performance of supernational companies in Nigeria. In a bid to accomplish this, panel regression analysis of fixed and random effect on five (5) selected supernational companies in Nigeria were employed. The data for the study cover the period 2012 to 2021. The Hausman test carried out showed that fixed effect model is more realistic and produced a better result which was therefore employed in drawing inferences in the study. From the result, exchange rate exhibited significant negative relationship with supranational company's performance in Nigeria. The implication of this result is that unfavourable exchange rate within the country is inimical to the performance of supernational corporation. This result is supported by Williams (2018), Ayodele (2014), Ebaidalla (2014) among others. More so, inflation rate revealed a negative relationship with performance of supernational companies in Nigeria. This result implied that inflation rate is inimical to the performance of supernational companies in Nigeria. This study concurred to the discovery made in the work of Ayodele (2014), Okika (2018) among others.

Interest rate on the other hand revealed an insignificant positive relationship with performance of the supernational companies in Nigeria while the translation rate indicated insignificant negative relationship. This result supports the findings made in the work of Williams (2018), Okika (2018) among others. The statistical significant of the whole model revealed that the fixed effect model is significant at any level with a value of 13.91429 while its P value is 0.000000. The multiple determination coefficients revealed a value of 0.735650. This implied that about 74% adjustment in the performance of supernational corporations is incorporated in the model while the remaining 26% occurred due to the stochastic terms in the model.

## 5. Conclusion

From the result that emanated from this study, the study revealed that exchange rate is significant but negatively related to performance of supernational corporations in Nigeria. Inflation rate and translation rate is negative but

insignificant while interest rate is positive. The study concluded that unfavourable movement or adjustment in foreign currency transaction and translation rate affect the performance of supernational companies in Nigeria. In addition, the study showed that a negative relationship subsists between exchange rate and currency translation rate in Nigeria. From the outcome of this study, it was recommended that supernational companies should develop a mechanism to hedge against foreign exchange rate exposure caused by unanticipated movement in the exchange rate. More so, this should be supported by sound risk management strategies that can withstand macroeconomic instability especially inflation rate in the host economy.

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# EMPIRICAL STUDY ABOUT THE RELATION BETWEEN FAMILY OWNERSHIP AND FIRM PERFORMANCE: EVIDENCE FOR ROMANIAN FAMILY FIRMS

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**Abstract**

*The objective of the article is to produce and validate a statistical model for quantifying the performance of family firms. Such aim will be achieved through the analysis of a sample of 27 entities from the "family firms from Romania" group. The statistical hypothesis underlying the specification of the model is one according to which selected variables will distinguish the performing family firms from the non-performing ones, regardless of ownership. The article addresses an alternative possibility for assessing the financial performance of family businesses, namely a model created by Carton, R. The complex indicator created by Carton, R, is composed of performance factors such as asset growth, debt change and degree change survival rate (Z-score change), calculated using the Statev coefficient, Z-score. The indicators that were used are extracted from both the Entities' Balance Sheet and their Profit and Loss Account (on-line), while the modelling is carried out through the Excel statistical modelling.*

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**Keywords:** *Family Firm, Firm Performance, Z-Score Function, Financial Solidity, Family Ownership*

**JEL Classification:** D22

## Introduction

Family businesses are the predominant form of business worldwide, accounting for two-thirds of all companies [De Masis 2017]. They play a key role within the economic and social scenarios, both in developed and developing countries. Indeed, they actively influence the increase of new jobs and contribute substantially to the growth of the gross national product.

Moreover, family firms also play an important role in the economic recovery during a crisis within emerging economies. For this reason, the attention they receive from governments is extremely high, and their proximity to the government is listed among the most crucial factors in the development of family businesses [Monticelli 2017; Kim, Kandemir and Cavusgil 2004]. This rapprochement is considered one of the important resources of a family business, being part of the organizational resources' category.

Due to the increasing number and importance of family businesses in the world economy, more and more studies have focused on the analysis of the factors influencing their performance [João Miguel Capela Borralhoaet al. 2020; Martin, G.et al. 2016; Miller, D. & Le Breton-Miller, I. 2006; Miller, D. and al 2013].

The approaches to the concept of performance and its evaluation are defined within three categories [Botnari, Nedelcu 2014]:

- the one-dimensional approach: this is when the financial performance is identified with another economic concept which is called "profit" and it is under the accounting discipline. Within the accounting umbrella, the financial performance of the economic entity is identified as
- the "relationship between the income and the expenses of the entity presented in situations of profit and loss";
- the systemic approach: according to this, the financial performance is recognized as a multidimensional concept, evaluated through the prism of a system of indicators that measure distinct economic phenomena (profitability, indebtedness, general solvency – "Sg" and patrimonial solvency "Sp").

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This approach has certain limits, as the selection of indicators for the evaluation system is based on theoretical, empirically unconfirmed considerations.

The econometric approach: it involves the development of an econometric model in view of the evaluation of financial performance. The econometric modelling provides a more accurate representation of the risk of bankruptcy than the other approaches.

Regarding this, we must highlight that the development of an econometric model comprises the following phases:

Specification – it implies the definition of the model, the elaboration of an economic model and an econometric one, the formulation of statistical hypotheses.

Estimation – it refers to obtaining the numerical values of the coefficients of the elaborated econometric model.

Validation – it consists of assessing whether the values obtained during the previous stage are theoretically and statistically acceptable. From an economic point of view, it is assessed whether the data obtained comply with the constraints of the model, and from a statistical point of view, the assumptions made at the previous stage and the materiality level are checked by means of different tests.

**Literature Review**

One of the strengths of a family business is its rooting in the local community. This relationship can be transformed into a unique competitive advantage and plays an important role in creating local jobs and developing those communities.

While demographic and social changes increase, family businesses from different parts of the world are exposed to new challenges that make the traditional methods of succession and governance no longer appropriate. More and more studies have focused on analyzing the factors that lead to the growth of performance of a family business. Such studies considered the differences between the generational perspectives and the way family businesses face the challenges associated with succession and governance in the modern era [Schank M. J. 2017; Borralhoa J.M.C. and al. 2020; Jiaqi Chen et al. 2020 etc.]. There is also a wide-standing literature that addresses the family's participation in the management of the company and its impact on the company's performance. O'Boyle, Pollack and Rutherford (2012) list 78 such studies in 24 countries, published between 1980 and 2008, while list 45 studies in 20 countries published in 2003–2009 [Amit and Villalonga 2014].

According to a study by Price Waterhouse Coopers (PwC) (2017) on a sample of 2,802 owners and CEOs of family businesses in 50 countries globally, (out of which 68 were leaders of Romanian family businesses), 82% of the Romanian respondents consider that measuring success beyond growth and profit is one of the most important aspects that characterizes family business, and 75% claim that the strategy of the family and that of the company are fully aligned. With regards to the role of such companies in the economy and society, 85% of the Romanian respondents believe that family businesses bring stability to the economy, while 82% of the family businesses affirm they are doing their best to support the communities in which they operate, not only through hiring local people but also through keeping the employees even in more difficult economic times. As far as succession and governance in family businesses in Romania are concerned, 37% consider the succession planning to be an important concern over the next 5 years, and 47% have a succession plan for many key management positions, 74% have next-generation family members working in the company, and 47% plan to transfer both ownership and management of the organization to the next generation.

Within the bulk of literature, the performance of family firms in Romania has been addressed in terms of the relationship between the ownership structure of a company and its financial performance [Schank, 2017]or by analyzing the correlation between the attributes of Romanian family firms and their financial performance [Hategan et al. 2019].

Performance is a result of the links between risk indicators and financial stability, being these indicators the ones to represent the economic and financial areas. Addressing the bankruptcy risk consists of the banking or optimal method, used to predict the bankruptcy of an economic entity, and which uses certain synthetic risk notes obtained through statistical methods [Holt, 2009].

The discriminatory analysis is a technique through which discriminatory statistical models can be created to determine the financial state of an economic entity and to detect the risk of its deterioration in advance.

The variables of a model built on the discriminatory analysis are selected in such a way that they best explain, in a discriminatory manner, the performance of economic entities. They indeed manage to best differentiate economic entities in good financial condition from those facing bankruptcy [Săvoiu, 2012].

The combination of these discriminating variables results in a synthetic indicator called Z “score”, being the linear function of the Z score empirical and, focused on the company's ability to prevent bankruptcy. Thus, the Z score is a good

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indicator for the evaluation of performance and, according to Carton (2004) it is more suitable for distinguishing performing entities from and non-performing ones.

**Materials and methods**

***The Model***

This paragraph highlights the peculiarities of the evaluation of the financial performance of the family firms, using 2 methods of econometric modelling. The statistical hypothesis that underlines the econometric model states that the selected variables will distinguish the performing family firms from the non-performing ones:

1. The formulation of an economic model involving the development of a function:

$$y = (x_1, x_2, \ldots, x_n) \qquad (1)$$

Where:

$y$ is risk of bankruptcy Z score;

$x_1$, $x_2$,.... $x_n$ are the dimensions (factors) of the risk of bankruptcy, such as profitability and payment capacity;

The model of assessment of the risk of bankruptcy Z-score that we suggest is the statistical discriminant model of Statev [Statev, 2008], under the following form:

$$Z_{Statev} = 1.281 * V_8 + 1.879 * V_{16} - 0.386 * V_{32}$$

Where:

$V_8$ = Permanent capital / Total liabilities

$V_{16}$ = Total Debts / Total Liabilities

$V_{32}$ = Added Value /Total Asset

The decisive rule is as follows:

Appreciation Range $Z_{statev}$ :

- < 1: Safe Zone - Very low probability of bankruptcy,
- 1 < Z < 1.8: Unsafe zone - Risk of average bankruptcy,
- >1.8 Bankruptcy condition.

The Statev discriminant model was applied by the society of insolvency practitioners, Solvendi, in front of the court in order to prove the bankruptcy condition of an economic entity that was insolvent, according to the 2014 Report on cases that led to the insolvency of the debtor [Bebeșelea, Patache 2019].

2. Formulation of an econometric model based on the function of the economic model:

$$P_f = a * x_1 + b * x_2 + \cdots + oh * x_n + \mu \qquad (2)$$

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Where:

$P_f$ is the financial performance (dependent variable);

*a, b, oh* are the parameters of the model;

$\mu$ is the error.

We suggest the Carton model as an appropriate for the evaluation of the financial performance, under the following form:

$$P_f = 0.208 * GR\ AST + 0.244 * CLIAB/AST + 0.739 * CALTZ \quad (3)$$

Where:

*GR AST* is the level of growth (increase in assets)

*CLIAB/AST* is the change of circumstances in indebtedness (change in overall indebtedness)

*CALTZ* is the change in the survival level (the change of the Statev coefficient Z-score)

The decisive rule is as follows:

Appreciation Range $P_f > 1$: high performance,

between 1 and 0: average performance,

$\leq 0$: low performance

***Sample***

In this study, 27 economic entities declared as family businesses and registered in the Family Business Network Romania Association, were considered. The study covered a 12-years period (2008-2019) for each of the 27 family businesses with 100% Romanian capital. The sample included representatives from 8 sectors of activity (from trade, distribution, courier, food industry, production of electrical and electronic equipment, production of dermo-cosmetic goods to travel agents, car rentals and real estate developers) and 324 data were processed. The sampled firms have been active from a minimum of 10 years to a maximum of 29 years.

The annual sales for the sampled companies during the period under review ranged from around EUR 867 million to EUR 1.3 million. The average sales value is between EUR 1.2 million (minimum value) and EUR 372 million (maximum average value recorded during this period).

The total assets for the sampled companies ranged from a maximum value of EUR 622 million to a minimum of EUR 160,544. The median total assets for the sample were EUR 12.7 million and the average total assets were EUR 27,894 million.

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In order to include in our sample, the data gathered in a whole year, such year has to be considered complete from all points of view so that all the variables can be considered for the research. Moreover, the firm years of data were to be for a full period of twelve months.

Balance and Profit and Loss Account indicators presented by companies, online, on specialized financial sites, were used. Given the fact that the companies use such sites to report their financial information synthetically, rather than analytically, we could not consider Altman's Z-score function. Hence, for the application of the Carton model for assessing financial performance, we considered Statev's function which leads to the same decision rule.

The timeframe for two of the sampled firms was narrower, 9 years and 10 years, respectively. However, due to the availability of data, they were considered, being the period enough to outline the overall picture of the family businesses situation in Romania.

To calculate the function of the risk of bankruptcy $Z_{statev}$, described in the previous sub-chapter, three indicators of financial performance for each year and for all 27 family businesses included in the sample were considered. The variables have been selected to represent each of the main performance categories, depending on the frequency of usage in previous empirical studies, as well as the frequency of their usage in practice.

Since many operative calculations of a variable are accepted, we present, below, a brief description of the variables used in the statistical model for the assessment of the bankruptcy risk, $Z_{statev}$ score:

- The $V_8$ indicator was calculated by dividing the permanent capital by the total liabilities. This report was calculated using the final absolute values for both denominator and numerator.
- $V_{16}$ was calculated as the ratio between total liabilities and total liabilities, using all final absolutes of both financial indicators
- $V_{32}$ is the ratio between the added value and the total asset and it was calculated based on the absolute final values for each year and company.

In the Card model of financial performance evaluation, described above, we also used three measures of financial performance, as follows:

- GR AST which represents the level of growth of assets and which was identified as index of the total asset dynamics
- CLIAB/AST is the change in the degree of global indebtedness, and it was also calculated as an index of dynamics. The overall indebtedness was determined

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as the ratio between the total debts and the company's assets. This indicator shows the extent to which borrowed and attracted sources participate in financing the businesses.

- CALTZ represents the change in the survival level and it was calculated as index of the dynamics of the Z-Score coefficient of the previously calculated $M_{statev}$ function.

While it is not common for companies to have negative equity, there are several cases where these circumstances arise. The first example involves companies that have large amounts of intangible assets that are not reflected in their balance sheets. If these companies engage in large programs of share repurchase in the form of treasury shares, the repurchased shares are recorded at their purchase price as a reduction in equity. A second example involves companies that hold a lot of fixed capital (real estate). These companies can refinance properties with new mortgages and use the collections for distributions to shareholders, as it happens with many real estate investment trusts that are publicly traded.

There were two periods of interest for this research, the annual periods and those throughout the selected timeframe.

Moreover, both static and dynamic values were used for variables for both periods. Since dynamic values require the calculation of both starting and ending value, another year of data was needed to calculate the change over the entire period. Thus, the indicators used for the determination of Statev's bankruptcy risk function were calculated using static values, and those used in determining financial performance according to Carton's model, were calculated using dynamic values.

Both annual values and averages of the values recorded for the entire period considered were also calculated. For the $Z_{statev}$ score function and for the financial performance, both annual values and their average have been determined, being punctual values over time that neither accumulate nor compose.

**Results and Discussions**

In order to reach a correct decision on the financial solidity of a company, we analyzed the financial performance by Z score, basis within the Carton's model, and the evolution of the score for each company in the sample, during the years 2008-2019, was also determined and taken into account. Thus, the statistical hypothesis of the model was validated, meaning the selected variables distinguished performing family firms from the non-performing ones.

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There is a close direct link between performance and risk. The detection of the risk of bankruptcy is carried out through the score method, which aims at the prediction of the bankruptcy risk, starting from a series of financial rates, which are closely correlated with the state of health/weakness of the family firms. Such rates are identified through discriminant analysis and then the best linear combination of them is sought, to distinguish, as clearly as possible, high-performing entities from those at high risk of bankruptcy.

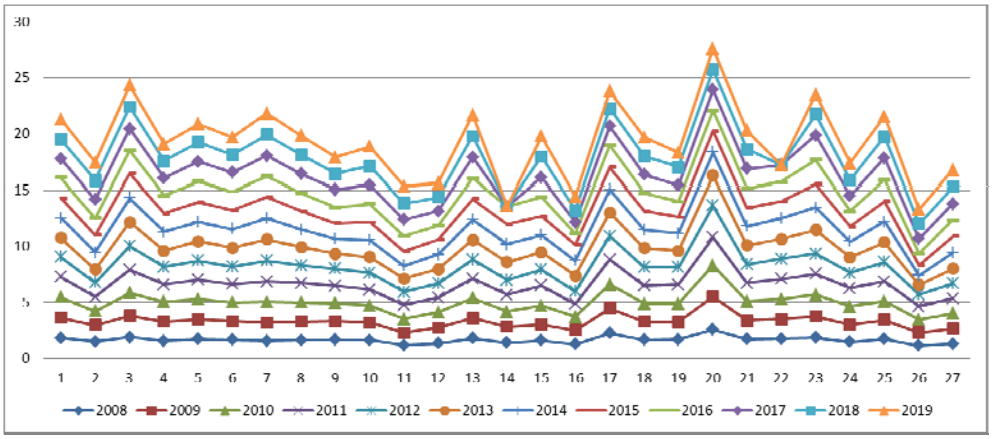


**Figure nr. 1. Annual values of Statev Z-score function**
*Source: Authors' elaboration*

From the graph analysis of the obtained scores representations, three areas by which family firms can be classified are identified:

Z < 1: Safe Zone - Very low probability of bankruptcy, for 11 of them.

1 < Z < 1.8: Unsafe zone - Risk of average bankruptcy, for 13 of them.

Z >1,8: Risky Area- High probability of corporate bankruptcy, for 3 of them.

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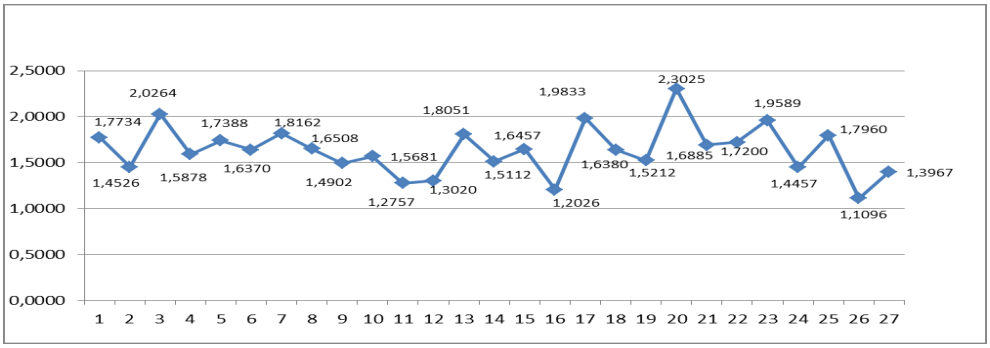


**Figure nr. 2. Average Statev Z-score function**
*Source: Authors' elaboration*

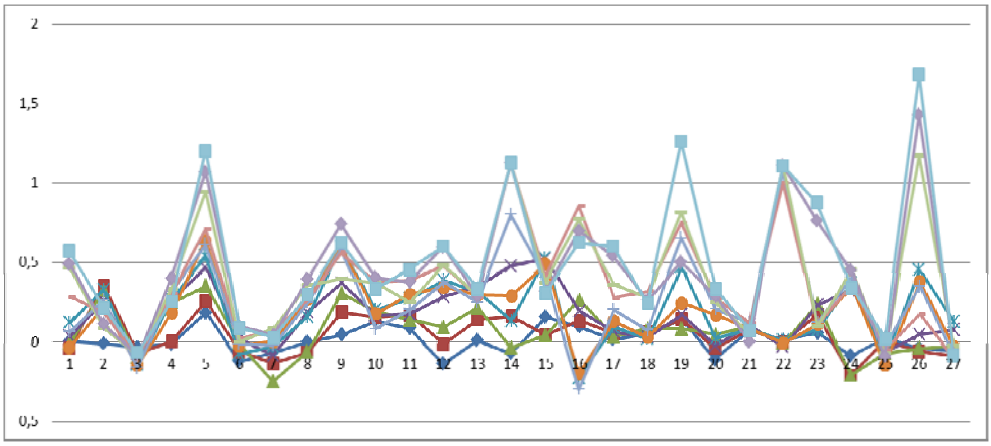


**Figure nr. 3. Annual values of Financial Performance**
*Source: Authors, elaboration*

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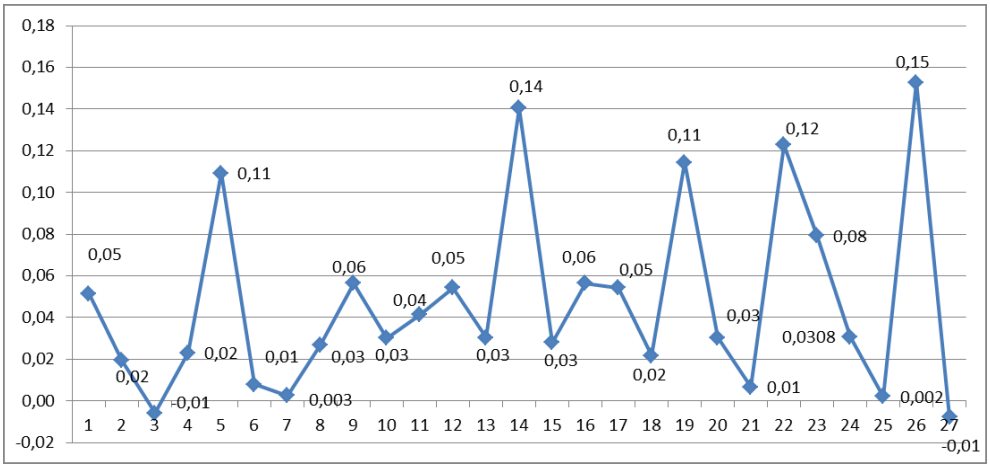


**Figure nr. 4. Average values of financial performance**

*Source: Authors' elaboration*

As expected, from the graph analysis of the representation of the financial performance of the studied family firms, three areas according to the Carton, R indicator can also be identified:

Pf = 0 and 1: average performance, for 23 of them.

Pf ≤ 0: low performance, for 4 of them.

**Conclusion**

In this article we presented an alternative possibility of evaluation of the family firms' financial performance, namely a model created by Carton, R. The complex indicator, created by Carton, R consists of performance factors such as increase of assets, change in indebtedness and variation of the degree of survival (modification of Z score), calculated by means of the coefficient Statev's Z score. This function of financial performance allows differentiation the performing family firms from the least performing ones in 80% of cases.

Based on the current research, the statistical hypothesis according to which the difference between performing family firms and non-performing family firms, regardless of ownership relationships, will be reflected in the value of the financial performance function, is confirmed.

Accordingly, it can be mentioned that the application of the discriminant analysis through the Carton model reveals that grouping and differentiating family firms through the tree above mentioned areas of the financial performance function, is correct.

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# MAXIMUM PROFIT ENSURED FOR INDUSTRY SUSTAINABILITY

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**Abstract**

*This article tries to calculate a maximum profit from sale items of an industry. This study has considered three inputs, such as capital, labor, and raw materials and other inputs for the mathematical analysis of the production procedures of the industry. In the present competitive global economy policy, to survive strongly, there is no alternate of sustainable economy. For the survival of an industry, profit maximization policy is vital. To acquire maximum profit, the production unit of the industry must be run in an efficient way. In this study an attempt has been taken to maximize the profit of an industry using Lagrange multiplier technique by applying necessary and sufficient conditions.*

**Keywords:** *Lagrange multiplier; profit maximization; Hesian matrix.*

**JEL Classification:** A13, B16, C02, C67, P43

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## 1. Introduction

In economics, profit is depend on easily available necessary inputs, their marginal productivities, factor shares in total output and degree of returns to scale [Khatun & Afroze, 2016]. If the production of an industry becomes at maximum level for each input and also if it maintains the rules of prevention of environment pollution, then the industry is considered as sustainable [Roy *at al.*, 2021].

In this study we have tried to show mathematical calculations in some details. We have also introduced theorems where necessary to make the article meaningful. We have used both necessary and sufficient conditions to determine the maximum profit and verify it.

In any industry the profit is defined by profit function and this industry tries to minimize its cost of production to obtain maximum profit [Onalan & Basegmez, 2018].

## 2. Literature Review

Two American scholars, mathematician Charles W. Cobb (1875-1949) and economist Paul H. Douglas (1892-1976) in 1928, for the first time, efficiently have derived the functional distribution of income between capital and labor [Cobb & Douglas, 1928]. Two American researchers, mathematician John V. Baxley and economist John C. Moorhouse, have considered implicit functions and have used an example by generating meaningful economic behavior. They have also discussed aspects of production functions with sufficient mathematical techniques [Baxley & Moorhouse, 1984].

Pahlaj Moolio and his coworkers have analyzed the Cobb-Douglas production function to maximize an output subject to a budget constraint [Moolio *et al.*, 2009]. Jamal Nazrul Islam and his coauthors have examined the utility maximization and output maximization strategies for multiple constraints and non-linear constraints respectively [Islam *et al.*, 2010a,b]. Lia Roy and her coauthors have tried to present cost minimization techniques of a running industry. Their mathematical modeling displays meaningful economic behavior for the sustainability of an industry [Roy *et al.*, 2021]. Haradhan Kumar Mohajan in a series of papers has tried to flourish optimization policy for the mathematical economic modeling affectionate readers [Mohajan, 2017a, 2021a,b].

Ajoy Kumar Dey shows a wise reason that profits can be maximized by increasing per unit revenue, decreasing unit cost or a mix of both. According to him, profit maximization is the process by which a firm determines the price and

output level that returns the highest profit [Dey, 2007]. Abhishek Tripathi has focused on the profit maximization and value maximization theory from the application point of view [Tripathi, 2019]. Maria-Florina Balcan and her coworkers have provided more complex mechanisms typically have higher average profit over the samples than simpler mechanisms, but more samples are required to ensure that average profit nearly matches expected profit [Balcan *et al.*, 2021].

## 3. Methodology of the Study

Methodology in a research is considered as the guidelines to do a genuine research efficiently and accurately [Legesse, 2014]. Research can be classified into three main categories as [Creswell, 2011]: 1) quantitative research, 2) qualitative research, and 3) mixed method research. Each of these methods plays important roles in modern natural and social science research areas [Mohajan, 2018, 2020]. We have used the Cobb-Douglas production function, $P = f\left(A, B, C\right) = KA^{\alpha}B^{\beta}C^{\gamma}$, for the mathematical analysis to gain maximum profit, where the symbols have their usual meanings. We have tried to find the maximum profit with necessary and sufficient conditions. In the modeling we have provided the mathematical calculations with some details.

In this article we have used secondary data that are consulted from both published and unpublished data sources, such as world famous reputed journals, e-journals, books of renowned authors, handbooks, e-books, theses, valuable conference proceedings, various publications of national and international organizations, information on internet, etc. Reliability and validity display the morality of a genuine research, and in our study we are sincere to maintain them as long as possible [Mohajan, 2017b, 2018, 2020].

## 4. Objective of the Study

The key objective of this study is to determine maximum profit of an industry. The other specific objectives are as follows:

- to show mathematical calculations more accurately, and
- to display economic analysis with necessary and sufficient conditions.

## 5. Economic Analysis of Profit Function

Let us consider an industry wants to make maximum profit using its available resources and facilities. Let it has $A$ amount of capital, $B$ amount of labor, and $C$

amount of raw materials (virgin and recycled) and other inputs, where $A$, $B$, and $C$ are considered exogenous variables. The industry must acquire maximum profit for its sustainable environment. The objective of the industry is to obtain maximum profit from its sales products [Mohajan, 2021a,b],

$$P = f\left(A, B, C\right) = KA^{\alpha}B^{\beta}C^{\gamma}, \qquad (1)$$

where $K$ is the efficiency parameter. The expression $KA^{\alpha}B^{\beta}C^{\gamma}$ is considered as Cobb-Douglas production function [Cobb & Douglass, 1928]. Here $\alpha$ indicates the output of elasticity of capital measures the percentage change in $P$ for 1% change in $A$, while $B$ and $C$ are held constants; similar expressions for $\beta$, and $\gamma$ that must satisfy the following inequality [Moolio *et al.*, 2009; Roy *et al.*, 2021]:

$$0 < \alpha, \beta, \gamma < 1. \qquad (2)$$

Also we have the budget constraint of the industry,

$$Z = aA + bB + cC, \qquad (3)$$

where $a$ is rate of interest/services of capital per unit of capital $A$; $b$ is the wage rate per unit of labor $B$; and $c$ is the cost per unit of raw materials and other inputs $C$; and $f$ is a suitable profit function. Now we introduce a single Lagrange multiplier $\lambda$, as a device to combine (1) and (3), and define the Lagrangian function $u$, in a 4-dimensional unconstrained problem as;

$$u\left(A, B, C, \lambda\right) = KA^{\alpha}B^{\beta}C^{\gamma} + \lambda\left(Z - aA - bB - cC\right). \qquad (4)$$

Here we consider, for maximum profit, the corresponding quantities of $A$, $B$, $C$, and $\lambda$ are $A^*, B^*, C^*$, and $\lambda^*$, respectively. First order conditions for maximum profit are [Mohajan *et al.*, 2013; Mohajan, 2021a],

$$u_{\lambda} = Z - aA - bB - cC = 0, \qquad (5a)$$

$$u_{A} = \alpha KA^{\alpha-1}B^{\beta}C^{\gamma} - a\lambda = 0, \qquad (5b)$$

$$u_{B} = \beta KA^{\alpha}B^{\beta-1}C^{\gamma} - b\lambda = 0, \qquad (5c)$$

$$u_{C} = \gamma KA^{\alpha}B^{\beta}C^{\gamma-1} - c\lambda = 0, \qquad (5d)$$

where $u_{\lambda} = \dfrac{\partial u}{\partial \lambda}$, etc. are partial derivatives. From (5a) we get, $Z = aA + bB + cC$, budget constraint as of (3).

From (5b) we get,

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$$aA = \frac{\alpha K A^{\alpha} B^{\beta} C^{\gamma}}{\lambda}. \qquad (6a)$$

From (5c) we get,

$$bB = \frac{\beta K A^{\alpha} B^{\beta} C^{\gamma}}{\lambda}. \qquad (6b)$$

From (5c) we get,

$$cC = \frac{\gamma K A^{\alpha} B^{\beta} C^{\gamma}}{\lambda}. \qquad (6c)$$

Using (6a,b,c) in (3) we get,

$$Z = \frac{K A^{\alpha} B^{\beta} C^{\gamma}}{\lambda}(\alpha + \beta + \gamma) = \frac{K A^{\alpha} B^{\beta} C^{\gamma} \Delta}{\lambda}. \qquad (7)$$

where $\Delta = \alpha + \beta + \gamma$.

**Theorem 1:** Maximum profit of the industry is, $P = \dfrac{K \alpha^{\alpha} \beta^{\beta} \gamma^{\gamma} Z^{\Delta}}{a^{\alpha} b^{\beta} c^{\gamma} \Delta^{\Delta}}$.

**Proof:** From (6a) and (7) we get,

$$A^* = \frac{\alpha Z}{a\Delta}. \qquad (8a)$$

Now (6b) and (7) gives,

$$B^* = \frac{\beta Z}{b\Delta}. \qquad (8b)$$

Now (6c) and (7) gives,

$$C^* = \frac{\gamma Z}{c\Delta}. \qquad (8c)$$

Using (8a,b,c) in (6a) we get,

$$\lambda^* = \frac{\alpha K \left(\frac{\alpha Z}{a\Delta}\right)^{\alpha} \left(\frac{\beta Z}{b\Delta}\right)^{\beta} \left(\frac{\gamma Z}{c\Delta}\right)^{\gamma}}{\frac{\alpha Z}{\Delta}} = \frac{K \alpha^{\alpha} \beta^{\beta} \gamma^{\gamma} Z^{\Delta - 1}}{a^{\alpha} b^{\beta} c^{\gamma} \Delta^{\Delta - 1}}. \qquad (9)$$

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Using (8a,b,c) in (1) we get,

$$P = K\left(\frac{\alpha Z}{a\Delta}\right)^{\alpha}\left(\frac{\beta Z}{b\Delta}\right)^{\beta}\left(\frac{\gamma Z}{c\Delta}\right)^{\gamma} = \frac{K\alpha^{\alpha}\beta^{\beta}\gamma^{\gamma}Z^{\Delta}}{a^{\alpha}b^{\beta}c^{\gamma}\Delta^{\Delta}}. \text{ Q.E.D.} \qquad (10)$$

The relation (10) is the profit function in terms of $A, B > 0$, $a, b, c > 0$, $\alpha, \beta, \gamma > 0$, and $\Delta > 0$. Using all the known parameters in (10) we can calculate maximum profit of the industry. Now we consider special case for some fixed values of $\alpha$, $\beta$, and $\gamma$. Let us consider a lemma in the support of theorem 1 [Mohajan, 2021b].

**Lemma 1:** If $\alpha = \beta = \gamma = \frac{1}{2}$, then profit of the industry, $P = \frac{KZ^{\frac{3}{2}}\left(\frac{1}{3}\right)^{\frac{3}{2}}}{(abc)^{\frac{1}{2}}}$.

**Proof:** Let us consider, $\alpha = \beta = \gamma = \frac{1}{2}$ then, $\Delta = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2}$. From (10) we get the profit of the industry as,

$$P = \frac{KZ^{\frac{3}{2}}\left(\frac{1}{2}\right)^{\frac{3}{2}}}{(abc)^{\frac{1}{2}}\left(\frac{3}{2}\right)^{\frac{3}{2}}} = \frac{KZ^{\frac{3}{2}}\left(\frac{1}{3}\right)^{\frac{3}{2}}}{(abc)^{\frac{1}{2}}}. \text{ Q.E.D.} \qquad (11)$$

**Arithmetic Analysis:** We consider, $K = 0.05$, $Z = \$1{,}000$, $a = b = c = 4$, then from (11) we get the profit of the industry as,

$$P = 0.05 \times (1000)^{\frac{3}{2}}\left(\frac{1}{12}\right)^{\frac{3}{2}} = \$38. \qquad (12)$$

In relation (12) we have provided a profit by using parameters through random analysis. Any industry can use its parameters from production procedures and calculate profit accurately.

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Now we will try to develop the economic model with sufficient conditions of optimization. Hence, we will operate the model with the second-order partial differentiation. The following Theorem 2 will provide the maximum production.

**Theorem 2:** Let us consider the determinant of the Hessian matrix,

$$|H| = \begin{vmatrix} 0 & -Z_A & -Z_B & -Z_C \\ -Z_A & u_{AA} & u_{AB} & u_{AC} \\ -Z_B & u_{BA} & u_{BB} & u_{BC} \\ -Z_C & u_{CA} & u_{CB} & u_{CC} \end{vmatrix}. \qquad (13)$$

For maximum profit, $|H| < 0$ [Islam *et al.*, 2010a,b; Moolio *et al.*, 2009].

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**Proof:** Given, the determinant of the Hessian matrix,

$$|H| = \begin{vmatrix} 0 & -Z_A & -Z_B & -Z_C \\ -Z_A & u_{AA} & u_{AB} & u_{AC} \\ -Z_B & u_{BA} & u_{BB} & u_{BC} \\ -Z_C & u_{CA} & u_{CB} & u_{CC} \end{vmatrix}.$$

$$= Z_A \begin{vmatrix} -Z_A & u_{AB} & u_{AC} \\ -Z_B & u_{BB} & u_{BC} \\ -Z_C & u_{CB} & u_{CC} \end{vmatrix} - Z_B \begin{vmatrix} -Z_A & u_{AA} & u_{AC} \\ -Z_B & u_{BA} & u_{BC} \\ -Z_C & u_{CA} & u_{CC} \end{vmatrix} + Z_C \begin{vmatrix} -Z_A & u_{AA} & u_{AB} \\ -Z_B & u_{BA} & u_{BB} \\ -Z_C & u_{CA} & u_{CB} \end{vmatrix}$$

$$= Z_A \left\{ -Z_A \begin{vmatrix} u_{BB} & u_{BC} \\ u_{CB} & u_{CC} \end{vmatrix} - u_{AB} \begin{vmatrix} -Z_B & u_{BC} \\ -Z_C & u_{CC} \end{vmatrix} + u_{AC} \begin{vmatrix} -Z_B & u_{BB} \\ -Z_C & u_{BC} \end{vmatrix} \right\}$$

$$- Z_B \left\{ -Z_A \begin{vmatrix} u_{BA} & u_{BC} \\ u_{CA} & u_{CC} \end{vmatrix} - u_{AA} \begin{vmatrix} -Z_B & u_{BC} \\ -Z_C & u_{CC} \end{vmatrix} + u_{AC} \begin{vmatrix} -Z_B & u_{BA} \\ -Z_C & u_{CA} \end{vmatrix} \right\}$$

$$+ Z_C \left\{ -Z_A \begin{vmatrix} u_{BA} & u_{BB} \\ u_{CA} & u_{CB} \end{vmatrix} - u_{AA} \begin{vmatrix} -Z_B & u_{BB} \\ -Z_C & u_{CB} \end{vmatrix} + u_{AB} \begin{vmatrix} -Z_B & u_{BA} \\ -Z_C & u_{CA} \end{vmatrix} \right\}$$

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$$= -Z_A^2 u_{BB} u_{CC} + Z_A^2 u_{BC}^2 + Z_A Z_B u_{AB} u_{CC} - Z_A Z_C u_{AB} u_{BC} - Z_A Z_B u_{AC} u_{BC} + Z_A Z_C u_{AC} u_{BB}$$
$$+ Z_A Z_B u_{AB} u_{CC} - Z_A Z_B u_{BC} u_{CA} - Z_B^2 u_{AA} u_{CC} + Z_B Z_C u_{AA} u_{BC} + Z_B^2 u_{AC}^2 - Z_B Z_C u_{AC} u_{AB}$$
$$- Z_A Z_C u_{AB} u_{BC} + Z_A Z_C u_{AC} u_{BB} + Z_B Z_C u_{AA} u_{BC} - Z_C^2 u_{AA} u_{BB} - Z_B Z_C u_{AB} u_{AC} + Z_C^2 u_{AB}^2$$

$$= -Z_A^2 u_{BB} u_{CC} + Z_A^2 u_{BC}^2 + 2 Z_A Z_B u_{AB} u_{CC} - 2 Z_A Z_C u_{AB} u_{BC} - 2 Z_A Z_B u_{AC} u_{BC} + 2 Z_A Z_C u_{AC} u_{BB}$$
$$- Z_B^2 u_{AA} u_{CC} + 2 Z_B Z_C u_{AA} u_{BC} + Z_B^2 u_{AC}^2 - 2 Z_B Z_C u_{AC} u_{AB} - Z_C^2 u_{AA} u_{BB} + Z_C^2 u_{AB}^2 .$$
(14)

First-order partial differentiations of (3) give,

$Z_A = a$, $Z_B = b$, and $Z_C = c$. (15)

Second-order and cross partial derivatives of (5b-d) give,

$$u_{AA} = \alpha(\alpha - 1) K A^{\alpha - 2} B^{\beta} C^{\gamma},$$
$$u_{BB} = \beta(\beta - 1) K A^{\alpha} B^{\beta - 2} C^{\gamma},$$
$$u_{CC} = \gamma(\gamma - 1) A^{\alpha} B^{\beta} C^{\gamma - 2},$$
$$u_{AB} = u_{BA} = \alpha\beta K A^{\alpha - 1} B^{\beta - 1} C^{\gamma}, \qquad (16)$$
$$u_{AC} = u_{CA} = \alpha\gamma K A^{\alpha - 1} B^{\beta} C^{\gamma - 1},$$
$$u_{BC} = u_{CB} = \beta\gamma A^{\alpha} B^{\beta - 1} C^{\gamma - 1}.$$

Using the required values from (15) and (16) in (14) we get,

$$|H| = -\beta(\beta-1)\gamma(\gamma-1)K^2 a^2 A^{2\alpha} B^{2\beta-2} C^{2\gamma-2} + \beta^2\gamma^2 K^2 a^2 A^{2\alpha} B^{2\beta-2} C^{2\gamma-2} + 2\alpha\beta\gamma(\gamma-1)K^2 ab A^{2\alpha-1} B^{2\beta-1} C^{2\gamma-2}$$
$$- 2\alpha\beta^2\lambda K^2 ac A^{2\alpha-1} B^{2\beta-2} C^{2\gamma-1} - 2\alpha\beta\gamma^2 K^2 ab A^{2\alpha-1} B^{2\beta-1} C^{2\gamma-2} + 2\alpha\beta(\gamma-1)\gamma K^2 ac A^{2\alpha-1} B^{2\beta-2} C^{2\gamma-1}$$
$$- \alpha(\alpha-1)\gamma(\gamma-1)K^2 a^2 A^{2\alpha-2} B^{2\beta} C^{2\gamma-2} + 2\alpha(\alpha-1)\beta\gamma K^2 bc A^{2\alpha-2} B^{2\beta-1} C^{2\gamma-1} + \alpha^2\gamma^2 K^2 b^2 A^{2\alpha-2} B^{2\beta} C^{2\gamma-2}$$
$$- 2\alpha^2\beta\gamma K^2 bc A^{2\alpha-2} B^{2\beta-1} C^{2\gamma-1} - \alpha(\alpha-1)\beta(\beta-1)K^2 c^2 A^{2\alpha-2} B^{2\beta-2} C^{2\gamma} + \alpha^2\beta^2 K^2 c^2 A^{2\alpha-2} B^{2\beta-2} C^{2\gamma}$$
$$= K^2 A^{2\alpha} B^{2\beta} C^{2\gamma} \left\{ \begin{array}{l} \dfrac{-\beta(\beta-1)\gamma(\gamma-1)a^2}{B^2C^2} + \dfrac{\beta^2\gamma^2 a^2}{B^2C^2} + \dfrac{2\alpha\beta\gamma(\gamma-1)ab}{ABC^2} - \dfrac{2\alpha\beta^2\gamma bc}{AB^2C} - \dfrac{2\alpha\beta\gamma^2 ab}{ABC^2} \\ + \dfrac{2\alpha\beta(\beta-1)\gamma ac}{AB^2C} - \dfrac{\alpha(\alpha-1)\gamma(\gamma-1)b^2}{A^2C^2} + \dfrac{2\alpha(\alpha-1)\beta\gamma bc}{A^2BC} + \dfrac{\alpha^2\gamma^2 b^2}{A^2C^2} \\ - \dfrac{2\alpha^2\beta\gamma bc}{A^2BC} - \dfrac{\alpha(\alpha-1)\beta(\beta-1)c^2}{A^2C^2} + \dfrac{\alpha^2\beta^2 c^2}{A^2C^2} \end{array} \right\}$$

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$$= K^2 A^{2\alpha} B^{2\beta} C^{2\gamma} \left\{ \begin{array}{l} \dfrac{a^2\beta^2\gamma}{B^2C^2} + \dfrac{a^2\beta\gamma^2}{B^2C^2} - \dfrac{a^2\beta\gamma}{B^2C^2} - \dfrac{2ab\alpha\beta\gamma}{ABC^2} - \dfrac{2ac\alpha\beta\gamma}{AB^2C} + \dfrac{b^2\alpha^2\gamma}{A^2C^2} \\ + \dfrac{b^2\alpha\gamma}{A^2C^2} - \dfrac{b^2\alpha\gamma}{A^2C^2} - \dfrac{2bc\alpha\beta\gamma}{A^2BC} + \dfrac{c^2\alpha^2\beta}{A^2B^2} + \dfrac{c^2\alpha\beta}{A^2B^2} - \dfrac{c^2\alpha\beta}{A^2B^2} \end{array} \right\}.$$

(17)

Now putting the values of $A$, $B$, and $C$ from (8a,b,c) in equation (17) we get,

$$|H| = K^2 \left(\frac{\alpha Z}{a\Delta}\right)^{2\alpha} \left(\frac{\beta Z}{b\Delta}\right)^{2\beta} \left(\frac{\gamma Z}{c\Delta}\right)^{2\gamma} \left\{ \begin{array}{l} a^2\beta^2\gamma\left(\frac{b\Delta}{\beta Z}\right)^2\left(\frac{c\Delta}{\gamma Z}\right)^2 + a^2\beta\gamma^2\left(\frac{b\Delta}{\beta Z}\right)^2\left(\frac{c\Delta}{\gamma Z}\right)^2 - a^2\beta\gamma\left(\frac{b\Delta}{\beta Z}\right)^2\left(\frac{c\Delta}{\gamma Z}\right)^2 \\ -2ab\alpha\beta\gamma\left(\frac{a\Delta}{\alpha Z}\right)\left(\frac{b\Delta}{\beta Z}\right)\left(\frac{c\Delta}{\gamma Z}\right)^2 - 2ac\alpha\beta\gamma\left(\frac{a\Delta}{\alpha Z}\right)\left(\frac{b\Delta}{\beta Z}\right)^2\left(\frac{c\Delta}{\gamma Z}\right) \\ +b^2\alpha^2\gamma\left(\frac{a\Delta}{\alpha Z}\right)^2\left(\frac{c\Delta}{\gamma Z}\right)^2 + b^2\alpha\gamma^2\left(\frac{a\Delta}{\alpha Z}\right)^2\left(\frac{c\Delta}{\gamma Z}\right)^2 - b^2\alpha\gamma\left(\frac{a\Delta}{\alpha Z}\right)^2\left(\frac{c\Delta}{\gamma Z}\right)^2 \\ -2bc\alpha\beta\gamma\left(\frac{a\Delta}{\alpha Z}\right)^2\left(\frac{b\Delta}{\beta Z}\right)\left(\frac{c\Delta}{\gamma Z}\right) + c^2\alpha^2\beta\left(\frac{a\Delta}{\alpha Z}\right)^2\left(\frac{b\Delta}{\beta Z}\right)^2 \\ +c^2\alpha\beta^2\left(\frac{b\Delta}{\alpha Z}\right)^2\left(\frac{b\Delta}{\beta Z}\right)^2 - c^2\alpha\beta\left(\frac{a\Delta}{\alpha Z}\right)^2\left(\frac{b\Delta}{\beta Z}\right)^2 \end{array} \right\}$$

$$= -K^2 \left(\frac{\alpha Z}{a\Delta}\right)^{2\alpha} \left(\frac{\beta Z}{b\Delta}\right)^{2\beta} \left(\frac{\gamma Z}{c\Delta}\right)^{2\gamma} \frac{a^2b^2c^2\Delta^4}{Z^4} \left(\frac{1}{\beta\gamma} + \frac{1}{\alpha\gamma} + \frac{1}{\alpha\beta}\right)$$

$$= -K^2 \left(\frac{\alpha Z}{a\Delta}\right)^{2\alpha} \left(\frac{\beta Z}{b\Delta}\right)^{2\beta} \left(\frac{\gamma Z}{c\Delta}\right)^{2\gamma} \frac{a^2b^2c^2\Delta^4}{Z^4} \times \frac{\Delta}{\alpha\beta\gamma}$$

$$= -K^2 \left(\frac{\alpha^{2\alpha}\beta^{2\beta}\gamma^{2\gamma}Z^{2\Delta}}{a^{2\alpha}b^{2\beta}c^{2\gamma}\Delta^{2\Delta}}\right)\left(\frac{a^2b^2c^2\Delta^5}{\alpha\beta\gamma Z^4}\right). \qquad (18)$$

Since $K > 0$, $\alpha, \beta, \gamma > 0$, and $a, b, c$ are the rates of inputs $A$, $B$, and $C$, respectively and hence all are positive; while $Z$ is budget, which will never be negative, therefore, $|H| < 0$. Q.E.D.

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**Arithmetic Analysis:** Let us consider, $\alpha = \beta = \gamma = \frac{1}{2}$ then, $\Delta = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2}$. We consider, $K = 0.05$, $Z = \$1{,}000$, $a = b = c = 4$, then (18) becomes [Mohajan, 2021a,b],

$$|H| = -(0.05)^2 \left( \frac{\left(\frac{1}{2}\right)^3 (1000)^3}{4^3 \left(\frac{3}{2}\right)^3} \right) \left( \frac{2^{12} \times \left(\frac{3}{2}\right)^5}{\frac{1}{8} \times (1000)^4} \right) = -0.0045 < 0 .$$

Since Hesian matrix is negative; hence, profit of the industry is of course maximum.

## Conclusion

In this study we have tried to discuss the profit function of a running competitive industry. We have realized that to gain maximum profit an industry must be careful in every steps of its operation.

Mathematical modeling in economics, for example, profit function plays an important role in modern economics for the development of global financial structure. Thinking for the common readers, throughout the paper, we have presented mathematical calculations in some details.

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# STANDARD COST EFFECT ON PERFORMANCE OF SELECTED LISTED FOOD AND BEVERAGE COMPANIES IN NIGERIA,WEST AFRICA

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**Abstract**

*The aim of this research was to determine whether or not a change in standard cost will improve the financial standing of a sample of Nigerian food and beverage manufacturers. This goal was reached by analyzing the relationship between the price of raw materials, the price of labor, and the price of manufacturing overhead on the bottom line of Nigerian food and*

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*beverage firms. Five manufacturing firms were chosen at random for the research. Nestle Plc, Cadbury Nig Plc, P.Z. Cussons Nig. Plc, and Presco Nig. Plc are the food and beverage companies that were included in the survey. In this case, we used secondary data that we had gathered over the previous decade (2010-2020). Panel estimation methods (pooled OLS, fixed effect estimation, and random effect) and a post estimation test were used to examine the compiled data. The results showed that a firm's performance in the manufacturing sector in Nigeria was significantly correlated with its manufacturing overhead costs, but negatively correlated with its raw material costs, and positively correlated with its labor costs. The research indicated that careful consideration of raw material costs and the maintenance of effective standard costing across all labor costs were necessary to obtain the desired results. Because of the significant savings in time and money that may be achieved via the use of standard costing principles and procedures, the research concludes that all food and beverage businesses in Nigeria should do so.*

**Keywords:** *Standard cost, Profit after tax, food and beverage companies, Nigeria*

**JEL Classification:** S20,P47 ,F13

## 1.0 Introduction

One of the most advanced and crucial cost-management tools in any facility, standard costing acts as a benchmark against which actual versus anticipated expenditures can be evaluated. This is achieved by first establishing standards for the cost of a given period of time in advance, and then using these standards as the basis for a scientifically based cost-benefit analysis (Appelbaum, 2017). Companies' upper echelons should use cutting-edge cost systems to help with product planning, management, and cost cutting (Abdullah & Mansour, 2015). Due to the shortcomings of the traditional cost-systems currently applied in food and beverage companies in Nigeria, which carry the total costs on the final product through methods that neglect innovation, industry companies and the industrial market face major challenges if they are to achieve profitability, maintain the continuity, and the level of high-quality production. Hence, the study examines the effect of standard cost on financial performance of food and beverage companies in Nigeria.

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## 2.0 Literature Review

### 2.1 Performance

An organization's performance is a reflection of the efficacy with which it allocates and exploits its financial and human resources to achieve its goals. In this view, performance is a measure of an activity's social legitimacy, and it's tied to the organization's ability to act and learn in ways that earn both social and economic respect (Gopalakrishnan, 2015). Activities are integrated with the performance process, creating a nested and interactive chain of processes: performance planning, performance management, performance monitoring, performance evaluation, performance improvement, empowerment, and compensation of performers, all with the goal of achieving the so-called "performance balance" within the organization. Organizations use performance management to work toward their stated goals, the most crucial of which is closing the performance gap (the "real problem of management"), which can be accomplished in two ways: positively, by raising actual performance to meet the target performance, and negatively, by lowering the target performance to bring it in line with actual performance (Chan, 2010).

To measure performance, one must look at how well an economic unit makes use of the resources it has at its disposal, how that use improves over time via research, and how one may compare the results of one period to those of another using a predetermined scale and set of predetermined criteria (Lin, 2010). Management at all levels must participate in the performance process, which includes reporting and evaluation of organizational actions against predetermined standards such as those outlined in strategic plans, annual budgets, and annual reviews (Gopalakrishnan, 2015).

Given the above, it is reasonable to conclude that a country's prosperity is mostly attributable to the success of its businesses. It's a metric used by CEOs and other high-ups to ensure the company is proceeding in the right way. The idea behind this term is that businesses all around the globe are always trying to become better at what they do. As a result, indicators of a company's performance include growth, prosperity, failure, plan execution, and the attainment of goals. In particular, an organization's performance is a major factor in determining its future, provided that the company use relevant, trustworthy, credible, and informative metrics to aid in forecasting the future and improving upon the past. Zheng et al. (2014) used the same metrics to find that businesses with properly aligned accounting Modern standard costing techniques had a higher chance of achieving successful outcomes.

When a standard costing system is used, it helps businesses save expenses, boost product quality, and better meet the needs of their consumers at each step of production. Using modern standard costing procedures may provide businesses a competitive edge by helping them cut costs without sacrificing quality. Companies may get an edge in the market and boost productivity by adopting these practices. In order to keep up with the ever-changing worldwide market and remain competitive, businesses have turned to cutting-edge management accounting tools and approaches (Drury, 2013).

### 2.2 Theoretical Underpinned

This research provides the backbone of the kaizen pricing idea. Yashuhiro Monden developed Kaizen Costing Theory in 2001 to serve as an economic analogue to the original Kaizen approach (Industrial and Financial Systems, 2001). The process of constant refinement is what this word refers to. Kaizen Costing is based on the principle of continual improvement via small, manageable changes made over time. According to (Ansari & Lockwod, 2004), Kaizen Costing ensures products are competitive by meeting or exceeding customer expectations for quality, functionality, and price. To achieve this goal, it may be necessary to systematically remove all processes from manufacturing that provide no value to the product (Rof, 2012).

### 2.3 Empirical Evidence

Syrian oil sector performance monitoring and evaluation was the focus of Jadid's (2015) research, which looked at the standard costs system. The study's overarching purpose was to familiarize readers with the significance and goals of standard costs, the function of transactions, and the potential function of control. The study's underlying tenets are that standard costing may be used to effectively manage oil production expenses, and that putting that capability to use would allow for objective performance targets to be set and measured. Costs of oil production can be kept under tighter control with the help of a system developed by the company's standard cost accountants, and the study found that the reality of the applicable system cost for the company's hi product lags behind the requirements of the modern manufacturing environment.

Hussein (2017) examined how the standard cost system influenced the management and fiscal choices of Sudanese manufacturing firms. The research set out to illuminate the significance of the standard costs approach by quantifying the impact of implementing it on the control process and its influence on rationalizing

financial choices in industrial firms. The research hypothesis is predicated on the idea that the degree to which industrial organizations exert control over their financial results increases in correlation with the extent to which they use the standard costing system. The research discovered that adopting the standard costs system aids in making logical judgments and decreasing indirect costs in the facility, and that these pre-set prices are based on studies with scientific foundations that assist to monitor the expected performance accurately.

Cost-controlling standard expenses have been the subject of research by Ahmad (2018). The study's objectives were to determine how widely implemented the standard cost system is in Sudanese flour mills, to identify the barriers to its implementation, to examine the grain industry's capacity to establish reliable benchmarks in accordance with the scientific principles of costs, and to provide an explanation of the impact that standard costing has on the effectiveness and precision of cost management. The research assumes that there exists a statistically significant connection between the use of the standard costs system and the efficacy of cost management in Sudanese grain mills. That there is a link that can be measured statistically The profitability of Sudanese grain mills has a statistically significant relationship to their use of the standard costing system. The research found a number of things, but the two most essential are that (1) using a standard costing system is a good predictor of how well costs are being controlled, and (2) using a standard costing system aids management in zeroing in on problems and pinpointing their sources.

To gauge the efficacy of lean and track its development, Raghavan (2019) contrasts two cost management strategies. There are two primary approaches to pricing: standard costs and activity-based costs. Product costs are calculated by recreating a manufacturing environment after adopting lean principles, factoring in things like overhead costs and throughput. While all expenditures had an effect on the final price, the analysis found that overhead had the most influence. Overall allocation was managed and adjusted by the lean main implementation. According to the results of this research, a portion of the total expenses may be attributed to the time it takes to complete the process cycle. Therefore, the primary goal of a lean implementation is to shorten the system's cycle time and thereby lower its overall cost. Just-in-time delivery, increased inventory turns, and the successful implementation of kaizen procedures are all key to the lean philosophy, which aims to maximize production while simultaneously decreasing waste and cycle time.

According to Iliemena (2019), researchers looked at how adopting standard costing practices affected the bottom lines of a sample of manufacturing firms in

the Nigerian state of Edo. This resulted from an analysis of standard costing's role in lowering costs, limiting waste, and increasing profits. After reviewing the relevant literature, we came up with three hypotheses to test. Companies in certain Benin City industries were chosen to participate in the research. Primary sources were used to gather data for this investigation. According to the results, standard costing has a strong beneficial impact on cost savings. Additional research showed that adopting conventional costing techniques increased profits.

According to Ekergil & Göde's (2020) research, hotels are using conventional costing methods and supply chain management to determine their performance. It takes four years of data for a five-star hotel to reach this level of excellence. The research first calculates and then updates total energy consumption and energy cost, as well as fixed and changing expenses, for the four-year data of the hotel, which indicates the active period of the hotel. This data collection includes customer and room information that may be used to calculate nightly performance. The second section of the report focuses on the amount of power used, the overall cost of using electricity, and the breakdown of that cost into fixed and variable components. Room-by-room and customer-by-customer analysis of performance is possible. Since this is the case, we may examine how the hotel as a whole is affected by the performance evaluations of its many departments.

Standard cost's effect on production costs in Nigerian factories was analyzed by Ologbenla (2021). The research is based on responses from 147 people at 26 different manufacturing companies. Analysis of the replies of the respondents to different questions about the value significance of standard cost in cost management in their respective originations is performed using both descriptive and inferential statistical methods. In the first place, the findings reveal that, contrary to popular belief, traditional cost approaches are still widely used by the majority of the manufacturing enterprises in the study's sample for cost management purposes. What's more, the research showed that the standard cost method was so successful at cutting down on raw material and administrative expenses that these manufacturing companies decided to stick with it.

Given the scant nature of the existing literature, it is the purpose of this research to examine the link between standard cost and financial performance among Nigerian food and beverage firms. This research differs from others since it covers a longer time period (from 2010 to 2020) and uses different metrics to assess financial success (profit after taxes) than are often used in similar studies.

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## 3.0 Methodology

### 3.1 Sample and Data Collection

Twenty-one (21) food and beverage companies listed on the Nigerian Exchange Group as of December 31, 2021 constitute the research population. Five publicly traded food and beverage firms were chosen at random from the research population using a purposive sampling approach. The availability of data is a major factor in the selection of these companies. Nestle Plc, Cadbury Nig Plc, P.Z. Cussons Nig. Plc, and Presco Nig. Plc are some of the food and beverage firms that were included in the survey. In this case, we used secondary data that we had gathered over the previous decade (2010-2020). Panel estimation methods (pooled OLS, fixed effect estimation, and random effect) and a post estimation test were used to examine the compiled data.

### 3.2 Research Model

The model of the study stated below was based on the functional relationship between standard cost and financial performance of food and beverage companies in Nigeria.

$PAT = \beta_0 + a_1\ CRM + a_2\ LC + a_3\ MOC + \mu$

Where:

PAT=Profit after tax, CRM= Cost of Raw Material, LC= Labour cost, MOC= Manufacturing Overhead cost.

$\beta_0$ = Constant, $a_1$, $a_2$, $a_3$= Slope Coefficient, **YEAR**= Dummy variable of the time under study,

$\boldsymbol{\mu}$ = Error Term.

## 4.0Results and Discussions

To access the effect of standard cost on the performance of food and beverage companies in Nigeria this section begins descriptive statistics; this is followed by the panel unit root test. The outcomes of these tests are reported as:

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### 4.1 Descriptive Statistics

**Table 4.1: Descriptive Statistics of Variables**

| | PAT | CRM | LC | MOC |
|---|---|---|---|---|
| Mean | 32.93650 | 36.58734 | 8.174154 | 18.27168 |
| Median | 6.023219 | 16.42504 | 4.303950 | 6.358556 |
| Maximum | 193.3743 | 128.8573 | 35.60231 | 77.69529 |
| Minimum | -5.966995 | 0.010813 | 0.300209 | 0.208826 |
| Std. Dev. | 49.95346 | 39.21662 | 9.105524 | 21.00351 |
| Skewness | 1.834303 | 0.878837 | 1.468892 | 1.268545 |
| Kurtosis | 5.449464 | 2.509705 | 3.791088 | 3.447084 |
| Jarque-Bera | 44.59251 | 7.630807 | 21.21256 | 15.20913 |
| Probability | 0.000000 | 0.022029 | 0.000025 | 0.000498 |
| Sum | 1811.507 | 2012.303 | 449.5785 | 1004.942 |
| Sum Sq. Dev. | 134748.8 | 83048.96 | 4477.170 | 23821.96 |
| Observations | 55 | 55 | 55 | 55 |

**Source: Author's Computation with E-views, Version 9 (2022)**

Table 4.1 displays descriptive data for the factors used to examine the effectiveness of standard cost and food and beverage companies. Profit after taxes, raw materials, labor, and manufacturing overhead averaged 32.93650, 0.010813, 0.300209, and 0.208826 from a low of -5.966995 and a high of 193.3743, 128.8573, 35.60231, and 77.69529. Standard deviation analysis revealed that after-tax earnings had the most dispersion of all of the variables studied, while labor expenses had the least. Conversely, all variables have a lengthy right tail because of their positive values, as demonstrated by the Skewness output. All variables except for the cost of raw materials are leptokurtic since their values are more than 3, whereas the cost of materials is platykurtic because its value is less than 3. The results of the Jarque-Bera test indicated that the variables did not follow a normal distribution.

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## 4.2 Panel Unit Root

**Table 4.2: Unit Root Test (Summary)**

| Variables | Panel Unit Root Test Method | | | |
|---|---|---|---|---|
| | Levin, Lin & Chu (LLC) | | ADF Fisher statistics | |
| | LLC statistics | Integration order | ADF Fisher statistics | Integration order |
| PAT | -5.30625 | I(1) | 25.4300 | I(1) |
| CRM | -3.93031 | I(1) | 25.4704 | I(1) |
| LC | -3.91369 | I(1) | 17.9176 | I(1) |
| MOC | -4.30594 | I(1) | 24.6703 | I(1) |

**Source: Author's Computation with E-views, Version 9 (2022)**

The unit root test results utilizing LLC and ADF test statistics are shown in Table 4.2. This table shows that all of the variables used to analyze the impact of standard cost on the profitability of Nigerian food and beverage firms were stationary following their transformation to first difference, opening the door for panel estimations with pooled least square, fixed, and random effect models.

## 4.3 Correlation Analysis

**Table 4.3 Correlation Analysis**

| | PAT | CRM | LC | MOC |
|---|---|---|---|---|
| PAT | 1 | 0.4516 | 0.2364 | 0.5067 |
| CRM | 0.4516 | 1 | 0.8422 | 0.9298 |
| LC | 0.2364 | 0.8422 | 1 | 0.8067 |
| MOC | 0.5067 | 0.9298 | 0.8067 | 1 |

**Source: Author's Computation with E-views, Version 9 (2022)**

Table 4.3 displayed the results of the correlation analysis performed on the study of how well food and drink firms in Nigeria performed in comparison to the norm about the cost of their products. The findings revealed a positive relationship between the price of raw materials and the success of the food and beverage

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industry (0.4516), as well as between the price of labor and the success of the food and beverage industry (0.2364 and 0.5067).

### 4.4 Estimates of Parameters for Panel Regression Model

**Table 4.4: Pooled LS (PLS) Random Effect (RE) and Fixed Effect (FE) Specification**

| | Dependent Variable PAT | | |
|---|---|---|---|
| Independent Var | Pooled OLS | Fixed Effects | Random Effects |
| Constant | 14.88371*<br>(7.778037) | 66.92475***<br>(23.62469) | 28.66118<br>(18.93434) |
| CRM | 0.297830<br>(0.432299) | -2.199649***<br>(0.509065) | -1.372632***<br>(0.296239) |
| LC | -3.046184**<br>(1.159169) | 0.575963<br>(1.303068) | 2.337029***<br>(0.796656) |
| MOC | 1.753816**<br>(0.736405) | 2.286175***<br>(0.328958) | 1.936454***<br>(0.273357) |
| No. observations | 55 | 55 | 55 |
| R-squared | 0.347931 | 0.932374 | 0.576095 |
| Adjusted $R^2$ | 0.309574 | 0.922302 | 0.551159 |
| F-statistics | 9.070872 | 92.57162 | 23.10332 |
| Prob. (F-Statistics) | 0.000065 | 0.000000 | 0.000000 |
| Dubin-Watson | 0.099233 | 1.090744 | 0.842382 |

Note: Standard errors are provided in parentheses. *, **, *** showed the significance at 10%, 5% and 1% level respectively.
**Source: Author's Computation with E-views, Version 9 (2022)**

This research used a panel regression analysis of pooled least square, fixed effect, and random effect model to investigate the impact of standard cost on the performance of selected food and beverage firms in Nigeria. The results of the pooled least square, fixed effect, and random effect analyses indicated that if the

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costs of raw materials, labor, and manufacturing overhead were held constant, the performance of the food and beverage companies would improve by 14.88371, 66.92475, and 28.66118 units, respectively. Like the cost of raw materials, the performance of Nigerian food and beverage enterprises was negatively correlated with its price, with a fixed effect value of -2.199649 and a random effect value of -1.372632. This indicated that a one-unit increase in raw material costs would result in a 2.199649-unit and a 1.372632-unit reduction, respectively, using fixed and random effect, but it indicated a weak positive association under the pooled least squares result.

Also, whereas the pooled least square result indicates that labor cost is a negative and significant factor in explaining food and beverage company performance in Nigeria, utilizing either the fixed or random effect yields a positive result (values of 0.575963 and 2.337029, respectively). Finally, manufacturing overhead cost has a considerable and beneficial influence on the performance of food and beverage enterprises, with a value of 1.753816 units for pooled least square, 2.286175 units for fixed effect, and 1.936454 units for random effect.

It was found, using a combination of F-statistics that indicate the statistical significance of a model, that the three variables used to explain the impact of standard cost on the performance of chosen food and beverage enterprises in Nigeria are statistically significant.

### 4.5 Hausman Test Result

**Table 4.5 Result of Hausman Test**

| Correlated Random Effects - Hausman Test | | | |
|---|---|---|---|
| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
| Cross-section random | 13.722710 | 3 | 0.0033 |

**Source: Author's Computation with E-views, Version 9 (2022)**

From Table 4.5, the Chi-square probability value is 0.0033 which is significant; hence the fixed effect model is accepted therefore used for forecasting and prediction in this study.

### 4.6 Discussion of Findings and Implications

The aim of this research was to determine whether or not a change in standard cost will improve the financial standing of a sample of Nigerian food and beverage manufacturers. To accomplish this, five different businesses were used between

2010 and 2020. Based on the results of the Husman test, it was determined that the fixed effect model was superior than the alternative random effect model, and this model was used in the analysis and discussion of the results. The findings showed that the raw material cost had a negative correlation with the profitability of Nigerian food and drink producers. The negative correlation suggested that food and beverage businesses should proceed with prudence about the prices of all raw ingredients. This results contradicts the opinions expressed by Ologbenla (2021) and Raghavan (2019), among others, who argue that there is a positive and substantial association between a company's performance and the cost of raw materials.

In addition, there was a weak positive correlation between labor costs and the success of Nigeria's food and drink manufacturers. This little positive correlation is consistent with the empirical results of Raghavan's (1995) and Ologbenla's (2021) research (2019) Lastly, a favorable correlation was found between manufacturing overhead costs and the success of Nigerian factories. These findings are in line with those found by Abdullahj, Oni, Ahmeb, and Shakur (2015), as well as those found by Iliemena and Amedu (2019). Manufacturing overhead cost was supposed to be an essential role in keeping food and drink prices at a constant level.

Each independent variable (the cost of raw materials, the cost of labor, and the cost of manufacturing overhead) was found to be a significant predictor of the performance of food and beverage companies in Nigeria, as indicated by the joint predictor of the whole model given by the F-statistics value. In a similar vein, R2's multiple determination coefficient indicated a value of 0.932374, while its adjusted value was 0.922302. When all of the independent variables are considered together, they explain about 93% of the variance in the performance of food and beverage companies in Nigeria. In the same vein, labor cost is negative and significant in explaining performance of food and beverage companies in Nigeria under the pooled least square result with a value of 3.046184 units, but positive when using either the fixed or random effect. Finally, manufacturing overhead cost has a considerable and beneficial influence on the performance of food and beverage enterprises, with a value of 1.753816 units for pooled least square, 2.286175 units for fixed effect, and 1.936454 units for random effect.

It was found, using a combination of F-statistics that indicate the statistical significance of a model, that the three variables used to explain the impact of standard cost on the performance of chosen food and beverage enterprises in Nigeria are statistically significant..

## 5.0 Conclusion and Recommendations

Standard cost's impact on the profitability of Nigeria's food and drink industry was analyzed in this research. This was done using a panel analysis using a pooled least squares result, fixed effect, and random effect models. The results of the Hausman test indicated that the fixed effect model yielded the most accurate findings. According to the findings, the manufacturing overhead cost was positively correlated with the performance of Nigerian food and beverage enterprises, whereas the cost of raw materials was significantly inversely correlated. The research indicated that careful consideration of raw material costs and the maintenance of effective standard costing across all labor costs were necessary to obtain the desired results. All food and beverage firms in Nigeria were urged to use the study's suggested procedures and standard costing principles in order to cut down on wasteful labor and raw material costs and to improve the firms' ability to make sound decisions.

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# INTERNATIONAL TRANSFER PRICING AND PERFORMANCE OF SUPRANATIONAL COMPANIES IN NIGERIA WEST AFRICA

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**Abstract**

*The study examined the relationship between international transfer pricing and the performance of supranational companies in Nigeria. The study used secondary data from the Central Bank of Nigeria (CBN) Statistical Bulletin, the Federal Inland Revenue Service (FIRS), the World Bank Statistical Bulletin, and annual reports and accounts of the sampled multinational companies. The study used panel regression analysis. The results of the study showed that interest rates and import duties have a significant and positive effect on the performance of supranational corporations in Nigeria. The study further found that corporate income tax and exchange rate have a significant and negative impact on the performance of supranational corporations in Nigeria. Based on the results, the study concluded that international transfer pricing has a significant impact on the performance of supranational companies in Nigeria, particularly when international transfer pricing is measured using interest rates, exchange rates, corporate income taxes and import duties; while performance is measured by*

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*profit after tax. The study therefore recommended that supranational companies should develop a system to defend themselves against exchange rate and corporate taxes caused by unforeseen exchange rate movements and double taxation.*

**Keywords:** I*nterest rate, Exchange Rate, Company Income Tax, Custom Import Duty, Performance*

**JEL Classification:** T22, P12

## 1.0 Introduction

There have been several academic and literary studies on international transfer pricing in supranational organizations, and no country, industry, or nation has escaped the good or bad externalities of globalization (Pryma, 2017). In a broad sense, transfer pricing refers to the process of determining internal prices (also known as "transfer prices") at which goods, services, money, and other assets are transferred from one business unit to another, as well as the subsequent calculation of each business unit's financial performance taking these transfer prices into account. Sometimes these transactions take place via specialized intermediate units (transfer centers), rather than directly between units (Jensen & Meckling, 2016).

At the same time, transfer pricing is often described in economic and legal literature as misrepresenting the contractual price or distributing earnings or losses to reduce taxes (Jensen et al., 2016; Danies, 2014). Due to their uncertain position in the process of globalization, multinational firms are important participants in the shifting economic landscape (Pryma, 2017). Multinational corporations and nations have a complicated relationship that is only becoming more so.

The impact of international transfer pricing on the performance of supranational companies in Nigeria is one of the aspects of current interest. Therefore, the research aims to determine the present state of the chosen six (6) transnational firms that operate in Nigeria.

## 2.0 Literature Review

### 2.1 Conceptual Review

#### 2.1.1 Transfer Pricing

Transfer pricing" refers to the process of determining internal prices (also known as "transfer prices") at which products, services, money, and other assets are

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moved from one business unit to another, as well as the subsequent measurement of each business unit's financial performance taking these transfer prices into account. Sometimes these transactions take place via specialized intermediate units (transfer centers), rather than directly between units (Fields & Mais, 2004)

Transfer pricing disputes between tax authorities in various nations will rise as a result of the inconsistent propagation of national legislation, creating the unfavorable condition of double taxation of multinational corporations, which may result in significant financial losses. The multinational corporations really identify where they produce value and what the right amount of taxes is for each of the nations involved via transfer pricing, which refers to prices utilized and charged across firms within the same multinational corporation. Therefore, the tax authorities constantly assess the appropriateness of these internal pricing arrangements (Kim & Lu, 2011).

### 2.1.2 Interest Rate

Interest rates, or more specifically, the cost of credit, are what you pay to borrow money. They are referred to as a fee on borrowed capital or the "rent" on borrowed capital. The risk that the lender assumes of not getting their money back affects the rates. In transactions involving borrowing, interest is charged. This is a straightforward example of the Arm's Length Principle where a willing buyer and seller are present; in order to make a loan, there must be a borrower who wants to use the principal and a lender who is willing to risk their capital. The opportunity costs, lender risks, and overall economic conditions make up the interest rate. The interest levied may be termed interest, or occasionally it is hidden as a fee (Hansen 1992). (Hansen 1992).

### 2.1.3 Exchange Rate

The price of a unit of foreign currency in relation to the local currency is known as the exchange rate (Nydahl, 1999). The fundamental connection between the domestic and international markets for a variety of goods, services, and financial assets is the exchange rate (Reid & Joshua, 2004). The price of a country's currency expressed in another currency is known as the exchange rate. It establishes the relative costs of domestic and imported goods as well as the degree of the external sector's involvement in world trade.

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### 2.1.4 Company Income Tax (CIT)

Companies in Nigeria are required to pay a tax on their net income, known as corporate income tax or corporation tax. Taxes paid as a percentage of a company's declared earnings were 45% in the 1980s but are currently just 30%. This is supported by Adereti (2016) and Fama and French (2014), who state that a 30% tax is due each year that a company's earnings are valued. The Company Income Tax Act (CITA) of 1979, as modified, applies to it. Simply said, the taxation of corporate earnings in Nigeria is now authorized under the Company Income Tax Act 1990. The government requires the submission of tax receipts in connection with any official management responsibility by corporations, making this tax easy to collect. This encourages subservience. Unfortunately, Nigeria's business income tax administration falls short of expectations. Nigeria would do badly on the traditional fairness, certainty, convenience, and management efficiency measures if they are implemented. Self-employed people and those who work for private companies that aren't publicly traded are more likely to avoid paying their fair share of taxes because of lax oversight. Therefore, corporate income tax is crucial to the Nigerian government's finances (Hanlon & Slemrod, 2009).

### 2.1.5 Custom Import Duties (CID)

Taxes on domestically produced goods are known as excise duties, whereas taxes on imports are known as customs duties. Cigarettes, tobacco, furniture, etc., are subject to excise duties, which are a kind of tax levied by the government to raise revenue and reduce demand for products seen as detrimental to the public's health. Defending domestic industry against competitive foreign industries is a legitimate application of customs tariffs. Value, size, and other factors that the government sets affect how much money must be paid in customs fees. Excise taxes and customs tariffs predate all other current taxing systems by decades. Those findings may be seen in (Anderson & Reeb, 2003).

### 2.1.6 Performance

The European Central Bank (2010) defined corporate financial performance as an organization's ability to achieve sustained profitability over a certain time frame.

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The ability to turn a profit strengthens a bank's buffer against losses by increasing its equity and allowing it to reinvest in the business for future growth. According to Alabede (2012), the profitability of banks is affected by both internal and external variables. External factors include macroeconomic variables like financial structure, currency rate, inflation rate, and economic growth, whereas internal aspects include things like liquidity, capital sufficiency, high operational expenditures, etc. As a consequence, these elements have a knock-on impact on business operations, and shareholders will choose to back a profitable firm.

### 2.1.7 Interest Rate and Performance

An organization's access to external sources of funding may be impacted by the interest rate, which influences the cost of debt and the availability of money and credit throughout the economy. A company's after-tax net cash flow, cost of capital, product demand, and even viability are all susceptible to changes in tax policy. Prior to interest rate liberalization, rates were managed centrally, but thereafter they are set by the market (Loto, 2012). Inflation expectations, real interest rate differentials, surplus liquidity, and domestic and international interest rate differentials (i.e., assuming there are no constraints on the movement of capital) are now driving interest rates. Cargill (1991) identifies two methods—the Liquidity Funds Approach and the Loanable Funds Approach—for calculating interest. These methods presume that the actual economy always provides a stable baseline for wages and employment. Investment and saving choices are heavily influenced by interest rates. In order to implement their monetary policies, central banks primarily use interest rates. Exchange rates may be affected by interest rates. Short-term financial investments tend to increase in response to a rise in the relative interest rate (), since higher rates are associated with the expectation of larger returns. Looking at the difference in bank interest rates between the two nations is the easiest method to see this in action. It makes sense for companies to move their bank accounts to UK banks if UK interest rates on deposits are 5%, compared to US deposit interest rates of 3%.

The result will be more demand for the pound and a larger supply of dollars. If the demand for the British pound rises, the value of the pound will rise against the US dollar, leading to an increase in the pound's exchange rate. However, exchange rates are also affected by people's anticipation of future shifts. Over the long term, increased interest rates () have a chilling impact on the willingness of multinational

corporations to make new investments. Bank deposits increase in response to a rise in interest rates, but the cost of capital rises because of the increased risk of losing money on investments (Barron's, 1994, referenced by Murphy, 1996).

Since companies around the world rely heavily on access to credit, it makes sense for them to put money into regions with a friendlier loan environment, where they can hopefully see a return on their investment.

### 2.1.8. Exchange Rate and Performance

A foreign currency unit's cost expressed in terms of the home currency is called the exchange rate (Nydahl, 1999). The exchange rate is the primary mechanism through which the domestic and global markets for commodities, services, and financial assets are connected (Reid & Joshua, 2004). To put it simply, an exchange rate is the cost of one currency in terms of another. It establishes how actively the external sector engages in international commerce and how much local products cost in comparison to their overseas counterparts. More and more nations are accepting trade liberalization as a precondition for economic progress, but the exchange rate regime and the interest rate remain key matters of contention in international finance and in emerging countries (Owolabi & Adegbite, 2017). The exchange rate may be used to make direct comparisons between the costs of the same commodities, services, or assets in other currencies. Both current inflation and anticipation of future price inflation are susceptible to variations in the exchange rate (Owolabi & Adegbite, 2017). It is common for fluctuations in the value of the currency to have an immediate impact on the cost of imported products and services in the domestic market. The foreign sector of a nation may be impacted by changes in the exchange rate because of the effect on exports and imports. The cost of a country's foreign debt service may be affected by the exchange rate (Oladipupo & Onotaniyohuwo, 2011).

Foreign currency's value in relation to the domestic currency under a floating exchange rate system is set by market forces of supply and demand, just like the value of any other product or service on the market. In a system with a fixed exchange rate, the central bank decides on an arbitrary value for the local currency relative to the foreign currency. There may be periodic adjustments to the nominal value (Guney, 2014).

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### 2.1.9. Company Income Tax and Performance

Companies in Nigeria are required to pay a tax on their net income, known as corporate income tax or corporation tax. Taxes paid as a percentage of a company's declared earnings were 45% in the 1980s but are currently just 30%. To bolster their case, Fama & French (2014) proposed a 30% tax on the annual profit value of each given corporation. The Company Income Tax Act (CITA) of 1979, as modified, applies to it. An increase in corporate income tax will decrease the company's profit after tax, a major key performance indicator used by the research on this work, because the objective of international Transfer Pricing is to: - reduce taxes, duties, and tariffs, and reduce foreign exchange risks.

### 2.1.10. Custom Duty and Performance

Taxes called customs duties are placed on foreign-made products entering the country, whereas taxes called excise duties are applied to the same products when they are produced in the home country. Value, size, and other government-mandated factors are often used to determine the amount of money to be paid in customs duties. The first examples of contemporary taxation may be found in customs and excise (Anderson & Reeb, 2003). Like corporate income tax, customs duty has a detrimental effect on the profitability of multinational corporations operating in Nigeria. Companies' bottom lines will be favourably influenced if the cost of importing and exchanging products and services between subsidiaries or divisions of MNCs is decreased due to a reduction in customs duties.

### 2.1.11. Impact of Taxation on Transfer Pricing and the Host Country

Numerous academics have examined how transfer pricing affects economies. According to Obaji (2005), global corporations may mitigate the consequences of inflation and currency fluctuations via the use of transfer pricing. As it pertains to numerous processes, including taxes, manufacturing, marketing, and fiscal policy, it also aids in the achievement of MNCs' long-term goals. According to research conducted by Pantzalis (2015), transfer pricing in France decreased export value by 0.7% while increasing import value by 0.5%; as a consequence, the national income tax was lowered by nearly $8 billion in 2008 and much more so in subsequent years. Because of this, the possibility of double taxation on stated

income that is less than real income is mitigated by the tax system. In order to minimize their taxable revenue, multinational corporation (MNC) subsidiaries often engage in transactions with one another or with their parent organization, taking advantage of favorable tax treatment and transfer pricing. Governments in a lot of places are OK with these deals, but that doesn't mean businesses can't keep their distance (ALP). The ALP is an OECD guideline for managing the relative costs of trading partners. The real worth of a firm may be understated due to transfer pricing. It is common practice for host governments to actively court multinational corporations as a means of economic growth and development, issuing regulations designed to welcome foreign investment while keeping negative impacts to a minimum.

However, many nations' tax authorities hold FDI firms responsible for tax losses that hurt the national budget. There are others who believe multinational corporations are to blame for the current macroeconomic crisis because of the way they have rearranged national capital. Unfair competition and inequality between similar businesses in the host country are the results of transfer pricing. Indeed, FDI firms, particularly multinationals, have adjusted their policies to meet the challenges of contemporary markets. When businesses have a clear idea of where they want to go, transfer pricing isn't a viable approach to get there.

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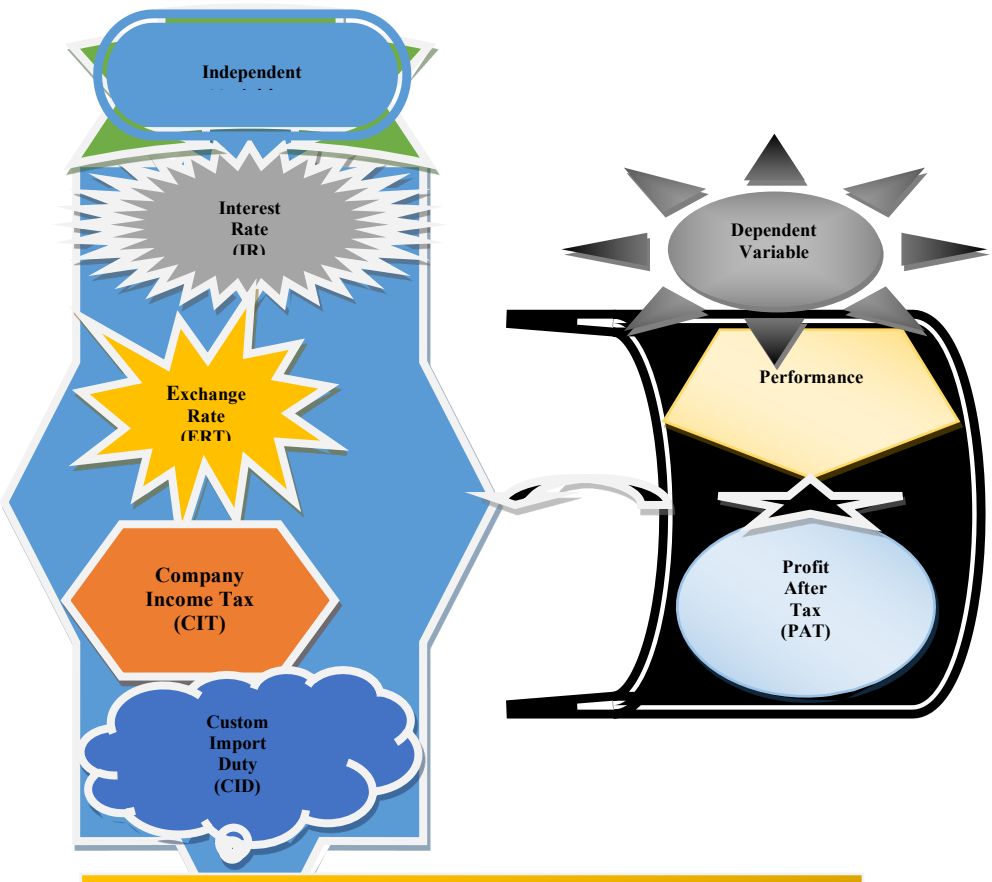
### 2.1.12. Conceptual Framework on International Transfer Pricing and Performance of Supranational Companies in Nigeria




Source: Researchers' International Transfer Pricing and Performance of Supranational Companies in Nigeria Model, (2022)

## 2.2 Theoretical Review

### 2.2.1. Resource Dependence Theory:

In their 1970 book The External Control of Organizations, Jeffrey Pfeffer and Gerald R. Salancik presented the concept of resource reliance for the first time. They claimed that resources were the driving force behind every successful business. The focus of Resource Dependence Theory (RDT) is on how different resources might influence the actions of a business. Because it does not always have complete control over the resources it need, a business must use methods to ensure continued access. This idea posits that persons in positions of authority over vital resources are in a position to have significant influence over the actions of others in those positions. Similarly, the actions of a company that is reliant on these essential resources will change.

Pfeffer and Salancik (1978) went on to argue that an organization's optimal departmental structure, board member and employee recruitment, production strategy, contract structure, external organizational links, and many other aspects of organizational strategy are all affected by its dependence on resources from the corporate environment. There are a number of additional organizations present in the environment. Therefore, it is frequently the case that the organizations who own the resources a given company need are not the ones that control those resources. An individual's ability to exert influence is based on their access to resources. Consequently, groups that are separate from one another legally might support one another.

Organizational power as resource dependence Organization B is equivalent to Organization A in that B relies on Organization A for resources. As a result, power is contextual, contextualizable, and possibly shared. In order to function, businesses need a wide variety of resources, such as people, money, supplies, etc. As a result of the wide variety of resources at their disposal, it's possible that organizations may struggle to oppose them all. Because of this, businesses should follow the criticality principle and the scarcity principle. In order to carry out its duties, an organization needs have access to a number of critical resources.

### 2.2.2.Empirical Review

Osho and Efuntade (2019) analyzed how changes in the value of the naira affected the profitability of multinational corporations operating in Nigeria. This research looked at how changes in the currency rate affected the profitability of MNCs operating in Nigeria. An OLS (ordinary least squares) linear regression analysis was performed on the data. The research indicated that MNCs' performance in Nig is significantly affected by changes in the currency rate. The

research found that the fluctuating value of the naira is having an effect on commercial activity in Nigeria. Williams (2018) analyzed how changes in the value of the naira affected the profitability of Nigerian businesses. Once the effects of currency fluctuations had been proven in the academic literature, it was crucial to investigate these effects in Nigeria.

In this investigation, we posed seven research questions and then tested seven hypotheses. The primary goal of the research was to analyze the effects of currency volatility on ROI using empirical data. The research makes use of simple least squares and descriptive statistics. The study looks at panel data from the years 2012-2016. Since most banks engage in foreign exchange transactions, the results show that currency exchange rates significantly affect investment returns. Based on the regression, it seems that the ROI is positively correlated with the 145.4265 USD/CHF exchange rate. As a result, a rise of 145.4265 basis points in the exchange rate will result in a rise of 145.4265 percentage points in the rate of return. We reject the null and accept the alternative hypothesis that the exchange rate has a substantial association with the return on investment since the T value obtained in the research is 0.287, which is larger than 0.05, i.e. H. 287 > 0.05. (firm performance). Other research characteristics also correlate well with ROI. In the regression analysis, the coefficient of determination is high. It demonstrates that the model's independent variables account for around 67% of the overall variance in ROI.

The effects of the exchange rate on the Nigerian economy were experimentally evaluated by Ayodele (2014). Changes in Nigeria's GDP were analyzed in relation to macroeconomic variables including the currency rate and inflation rate. Secondary data were evaluated using multiple regression analysis using Ordinary Least Squares (OLS), and the sources included reports from the Central Bank of Nigeria (CBN), the Nigerian Stock Exchange (NSE), and the Nigeria Securities and Exchange Commission (SEC). Method. This study's findings demonstrated that the exchange rate and inflation rate have a vital role in determining Nigeria's GDP and economic development. In contrast to inflation, which has a positive effect on GDP because businesses are more likely to create in response to higher prices, the exchange rate has a negative effect on GDP because it slows economic growth when it increases. The study's findings suggested that if the government took steps to improve the investment climate in Nigeria—such as increasing public safety, expanding the country's physical infrastructure, and bolstering its domestic manufacturing – it may help reduce the dollar's hold on the economy.

The relationship between real exchange rate discrepancies and economic performance in Sudan was studied by Ebaidalla (2014). The paper looks at the dynamics of the equilibrium exchange rate and actual exchange rate misalignment in Sudan from 1979 to 2009. The effects of real exchange rate misalignment on economic output4 are also analyzed. The empirical findings demonstrated that trade liberalization, government expenditure, and taxation had considerable impacts on the equilibrium exchange rate. The findings also indicate that there was an overvaluation of the Sudanese currency over the analyzed time frame.

The impact of the currency rate on Nigerian bank performance was studied by Owoeye and Ogunmakin (2013). Using the ratio of loan losses to total loans and the ratio of capital deposits, this research analyzed the effect of a fluctuating exchange rate on the profitability of Nigerian banks. The variables of government expenditure, interest rate, and real GDP were added to the original set of factors used to determine the value of the currency exchange rate. The influence of the exchange rate on the bank's performance is model-specific, as shown by the two proxies utilized in the models. There is no correlation between the capital contribution ratio and the exchange rate, but the ratio of loan losses to total advances demonstrates that fluctuations in exchange rates may influence the capacity of lenders to manage loans, resulting to high levels of non-performing loans. This research emphasizes the need of a stable exchange rate to increase the efficiency with which banks can distribute loans across the economy.

Nnamani and David (2012) conducted their own research on the weekly swings in exchange rates of the naira and eight other currencies using symmetric and asymmetric volatility models. Volatility was found to be rather persistent in seven of the series, whereas it was explosive in one series, with a normal distribution of the residual being observed. In the asymmetric model, there was no indication that any currency was being leveraged. Bala and Asemota (2013) compared the Nigerian naira's exchange rate with that of three major currencies using monthly data (US dollar, European Union euro and British pound). The researchers set up the standard model with a dummy variable for the variance equation and a constant and a dummy variable for the mean equation. Overall, the fitted models' results indicated a decrease in persistence.

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### 3.0 Methodology

Descriptive and ex post facto research methods were selected for this investigation. The order integration and long-run connection between the variables were calculated using the econometric tools of the Augmented Dickey-Fuller (ADF) Unit Root Test and the Johansen co-integration method. The availability of data pertinent to the research justified the selection of the chosen time period as being sufficient to demonstrate a correlation between the studied variables. Exchange rate, interest rate, corporation tax, and import tariff statistics were gathered from secondary sources. The World Bank Statistical Bulletin, the Federal Inland Revenue Service of Nigeria, and the annual reports and accounts of the representative multinational firms serve as additional data sources ( 10-k). This information may be trusted as accurate and trustworthy.

### 3.1 Model Specification

Exchange rate (ERT), Company Income Tax (CIT), Interest rate (IT), and Custom Import Duty (IMD) were used as independent variables in a regression against the dependent variable Profit after tax in an economic model adapted from Osho & Efuntade (2019) to examine the correlation between international transfer pricing and the performance of Supranational companies in Nigeria (PAT) Often used as a stand-in for actual earnings results This study employed the model specified below.

$Ylt = \alpha it + \beta 1ERTlt + \beta 2CITrlt + \beta 3ITlt + \beta 4IMDlt + \varepsilon it$.....3.1

Where Y represents the financial performance of firms in Nigeria measured by PAT

$\alpha$ = the constant term

ERT = Exchange Rate

CIT = Company income tax

IMD = Custom Import Duty

IT = Interest Rate

$\varepsilon$ = Error Term

In this study, the model will be modified as follows:

PATit = f(ERTit, CITit, IMDit, ITit).....3.2

**PATit =** $\alpha it + \beta 1ERTlt + \beta 2CITrlt + \beta 3ITlt + \beta 4IMDlt + \varepsilon it$ .....3.3

Performance was proxied with Profit after Tax, whereas international transfer pricing was proxied using Exchange Rate (ERT), Interest Rate (IR),

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Company Income Tax (CIT), and Import Duty (IMD) (PAT). With the use of a linear regression model, we looked at how the variables of interest rate, exchange rate, company tax, import duty, and the firm performance indicator profit after tax interacted with one another and with the performance of the firms themselves. E-Views was used to get the results of the regressions.

## 4.0 Results

The impact of international transfer pricing on the profitability of multinational corporations in Nigeria is investigated, and the results of a preliminary test, based on descriptive data, are shown in table 4.1.

### 4.1 Descriptive Statistics

**$H0_1$:** The interest rate has no significant influence on the performance of SNC in Nigeria

**Table 1: Relationship between interest rate and performance of SNC in Nigeria**

| Variable | N | Mean | Std Dev. | Df | Sig. Value |
|---|---|---|---|---|---|
| **Interest Rate** | 30 | 15.21 | 6.43 | | |
| | | | | 28 | 0.030 |
| **Performance of SNC** | 30 | 12442.60 | 6553.44 | | |

P<0.05

**Source: Authors' Computation, (2022)**

At the 0.05 level of significance, the numbers in Table 1 add up to 0.30. The null hypothesis that interest rate has no significant effect on the performance of SNC in Nigeria was rejected due to a significance value of 0.030, which is less than the significance level of 0.05. This indicates that interest rates significantly impacted SNC's performance in Nigeria.

**$H0_2$:** The exchange rate has no significant influence on the performance of SNC in Nigeria.

**Table 2: Relationship between interest rate and performance of SNC in Nigeria**

| Variable | N | Mean | Std Dev. | df | Sig. Value |
|---|---|---|---|---|---|
| **Exchange Rate** | 30 | 361.22 | 361.22 | | |
| | | | | 28 | 0.019 |
| **Performance of SNC** | 30 | 12442.60 | 6553.44 | | |

P>0.05 **Source: Authors' Computation, (2022)**

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At the 0.05 level of significance, the results shown in Table 2 are 0.019. The null hypothesis that exchange rate has no significant effect on the performance of SNC in Nigeria was rejected due to a significance value of 0.019, which is less than the significance level of 0.05. Thus, the performance of SNC in Nigeria is favorably and considerably influenced by the currency rate.**$H0_3$:** The company income tax rate has no significant influence on the performance of SNC in Nigeria

**Table 3: Relationship between Company Income Tax and Performance of SNC in Nigeria**

| Variable | N | Mean | Std Dev. | df | Sig. Value |
|---|---|---|---|---|---|
| **Company Income Tax** | 30 | 28.75 | 1.27 | | |
| | | | | 28 | 0.046 |
| **Performance of SNC** | 30 | 12442.60 | 6553.44 | | |

P>0.05

**Source: Authors' Computation, (2022)**

Table 3 revealed that significance value of 0.046 was calculated at alpha of 0.05. The calculated significance value (0.046) is less that than the significance value (0.05) hence the null hypothesis which states that company income tax has no significant influence on the performance of SNC in Nigeria was rejected. This implies that company income tax had significant and positive influence on the performance of SNC in Nigeria.

**$H0_4$:** The custom import duty rate has no significant influence on the performance of SNC in Nigeria

**Table 4: Relationship between Custom Import Duty Rate and Performance of SNC in Nigeria**

| Variable | N | Mean | Std Dev. | df | Sig. Value |
|---|---|---|---|---|---|
| **Custom Import Duty** | 30 | 15.05 | 2.38 | | |
| | | | | 28 | 0.023 |
| **Performance of SNC** | 30 | 12442.60 | 6553.44 | | |

*P<0.05

**Source: Authors' Computation, (2022)**

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Table 4 revealed that significance value of 0.023 was calculated at alpha of 0.05. The calculated significance value (0.023) is less that than the significance value (0.05) therefore the null hypothesis which states that custom import duty rate has no significant influence on the performance of SNC in Nigeria was rejected. This implies that custom import duty rate had significant and positive influence on the performance of SNC in Nigeria.

### 4.2 Panel Least Square Analysis

**Table 5**: Panel Least Square of joint influence of independent variables (interest rate, exchange rate, company income tax and custom import duty rate) on dependent variable (performance of SNC)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| INTR | 159509.8 | 48510.50 | 3.288150 | 0.0030 |
| CIT | -111889.9 | 131591.7 | -0.850281 | 0.4032 |
| IMD | 441654.1 | 98106.86 | 4.501766 | 0.0001 |
| EXHR | -0.701204 | 84.15708 | -0.008332 | 0.9934 |
| C | -50089.69 | 48613.04 | -1.030375 | 0.3127 |

| | | | |
|---|---|---|---|
| R-squared | 0.488639 | Mean dependent var | 8212.667 |
| Adjusted R-squared | 0.406821 | S.D. dependent var | 11546.89 |
| S.E. of regression | 8893.200 | Akaike info criterion | 21.17497 |
| Sum squared resid | 1.98E+09 | Schwarz criterion | 21.40851 |
| Log likelihood | -312.6246 | Hannan-Quinn criter. | 21.24968 |
| F-statistic | 5.972277 | Durbin-Watson stat | 2.704067 |
| Prob(F-statistic) | 0.001625 | | |

**Source: Authors' Computation, (2022)**

Table 5, presented the joint influence of interest rate, exchange rate, company income tax and custom import duty rate on performance of SNC in Nigeria. Conversely, interest rate and custom duty has a significant and positive effect on the performance of multilateral companies in Nigeria with coefficient value of 15.95098and 44.16541 units respectively. This implied that a unit rise in interest rate and custom import duty will lead to an increase of 15.9509 and 44.1654 units in the performance of multilateral companies respectively. Table 5, also revealed that company income tax and exchange rate has a significant and negative effect on

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the performance of multilateral companies in Nigeria, with coefficient value of 111889.9 and -0.701204units respectively. This implied that a unit rise in company income tax and exchange rate will lead to a decrease of -111889.9 and -0.701204units in the performance of multilateral companies.

As shown in the results in table 5, R-Squared is about 0.49 and adjusted R square is 0.41 indicating that all the independent variables (interest rate, exchange rate, company income tax and custom import duty rate) explain about 41% variation in the dependent variable (performance of SNC in Nigeria).

### 4.2 Discussions of Findings

The research found that interest rates significantly affected the success of SNC in Nigeria. According to the results, interest rates positively impacted SNC's performance in Nigeria. This conclusion is consistent with the findings of Osho and Efuntade and suggests that a higher interest rate, introduced and properly maintained, might improve the performance of SNC in Nigeria (2019). The research also found that a rising currency rate is positively related to the success of SNC in Nigeria. Thus, the performance of SNC in Nigeria is favorably and considerably influenced by the currency rate. The result is consistent with what Ebaidalla found (2014).

Moreover, the research showed that the ideal performance of SNC in Nigeria's income tax was positively correlated with the company's optimal performance overall. This study suggests that the success of SNC in Nigeria may be affected by the degree to which corporation income tax is properly managed. This conclusion was in line with that of Owoeye and Ogunmakin (2013). The research found that customs import duty rates were positively related to SNC performance in Nigeria. A favorable and statistically significant relationship was shown between the custom import duty rate and SNC's performance in Nigeria.

Findings from an analysis of the impact of Nigeria's interest rate, currency exchange rate, corporate income tax, and customs import duty rate on the success of SNC in that country. On the other side, interest rates and customs duties have a large and constructive impact on the success of MNCs in Nigeria. That meant that the performance of multinational corporations would improve with each unit increase in interest rate and customs charge. Similar to what Osho and Efuntade have found (2019). The research also found that the exchange rate and corporate income tax had a negative and considerable impact on the success of MNCs in

Nigeria. Thus, it was deduced that multinational corporations would perform worse if income tax rates and exchange rates were increased by one percentage point.

## Conclusion

The study's findings suggest that international transfer pricing has a sizeable impact on the financial success of Nigeria's multinational corporations, particularly when the international transfer pricing is compared against interest rate, exchange rate, company income tax, and customs import duty, and when the financial success of these multinationals is measured against profit after tax.

The research concluded that multinational corporations should implement policies to protect themselves against the adverse effects of unexpected fluctuations in the foreign currency rate and double taxation on their corporate revenue.

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## Appendix:

**Data**

| | Interest Rate | C.I.T | Import Duty | Exchange Rate $ |
|---|---|---|---|---|
| 2017 | 10.45% | 27.5% | 16.96% | 304.58 |
| 2018 | 11% | 30% | 16.96% | 363.98 |
| 2019 | 14% | 27.5% | 16.96% | 363.93 |
| 2020 | 13% | 27.5% | 12.37% | 362.06 |
| 2021 | 27.58% | 30% | 12% | 411.57 |

**Performance PAT**

| Year | P & G ($) | Chevron ($) | Shell ($) | EXXON MOBIL ($) | Coca-Cola ($) | Unilever ($) |
|---|---|---|---|---|---|---|
| 2017 | 10,194 | 9,269 | 13,435 | 19,848 | 1,283 | 7,331.126 |
| 2018 | 9,861 | 14,860 | 23,906 | 21,421 | 6,476 | 11,583.12 |
| 2019 | 3,966 | 2,845 | 16,432 | 14,774 | 8,985 | 6,749.12 |
| 2020 | 13,103 | 5,561 | 21,534 | 23,251 | 7,768 | 6,937.188 |
| 2021 | 14,352 | 15,689 | 20,630 | 23,598 | 9,804 | 7,833.305 |

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# COST MINIMIZATION ANALYSIS OF A RUNNING FIRM WITH ECONOMIC POLICY

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**Abstract**

*In this paper the Cobb-Douglas production function is operated in a firm for the analysis of the cost minimization policies. In an economic world, gain of profit depends on the efficient use of raw materials and use of various techniques of the cost minimization. A firm's main target is to make maximum profit. Scientific based and efficient but minimum cost procedures will favor in this regard. To increase local and global demands, a firm of course develop production sector. An attempt has been taken in this study to minimize cost by considering four inputs, such as capital, labor, raw material, and other inputs to form the economic model subject to a production constraint within the budget.*

**Keywords:** *Lagrange multiplier, minimum cost, Cobb-Douglas production function*

**JEL Classification:** C02, C15, C51, C61, C67, D11

## 1.Introduction

Cost minimization is a fundamental concept in business, economics, and some other related fields [Samuelson, 1947]. It is a financial strategy and an economic tool that tries to reduce costs of products in a firm. Consequently, the firm can move to maximum profit during its total operations. It does not support of reducing

quality of products by using low cost raw materials, but tries continually to meet the customer needs [Carter, 2001; Mohajan et al., 2012; Wiese, 2021].

Cobb-Douglas production function is one of the most widely used production function in economics. In 1928, it is given by the two American scholars, mathematician and economist Charles W. Cobb (1875-1949) and economist Paul H. Douglas (1892-1976) [Cobb & Douglas, 1928]. The method of Lagrange multiplier is a very useful and powerful technique in multivariable calculus. It is a mathematical device that transfers a lower dimensional constrained problem to a higher dimensional unconstrained problem [Islam et al. 2010a, b; Mohajan, 2017a]. A firm takes rational decision to use various raw materials for minimizing the production cost [Roy at al., 2021].

We have tried to discuss sensitivity analysis of the inputs through the production of the firm with minimum cost. In a global competitive economy, sustainability of the firm is necessary and minimum cost is one the best two policies. Sensitivity analysis will help the firm to take correct decision for estimating appropriate quantity of inputs, such as capital, labor, principal raw materials, and other inputs [Mohajan, 2018b, 2021a].

In the study every step of calculation is given elaborately so that even a novice researcher can understand the economic concepts easily, and we hope that s/he can take the procedures of the paper interestingly. This study also obeys the basic economic laws that help to interpret Cobb-Douglas production function [Mohajan, 2021b].

## 2.Literature Review

The literature review section is an introductory portion, which highlights the contributions of other scholars in the same field within the existing knowledge [Polit & Hungler, 2013]. Cobb-Douglas production function helps any firm to make rational decision on the quantity of each factor inputs to employ so as to minimize the production cost for its profit maximization [Cobb & Douglas, 1928]. John V. Baxley and John C. Moorhouse have discussed aspects of production functions by considering implicit functions with sufficient mathematical techniques [Baxley & Moorhouse, 1984].

In an economic article, Pahlaj Moolio and his coauthors have analytically discussed the optimization policy of output by using three variables as an explicit form of production function [Moolio et al., 2009]. Expert mathematician Jamal Nazrul Islam and his coworkers are very careful in their seminal works on

multivariable calculus. They have applied necessary and sufficient conditions to analyze the maximum utility. They have worked in their paper with the light of famous paper "*Lagrange Multiplier Problems in Economics*" of John V. Baxley and John C. Moorhouse [Baxley & Moorhouse, 1984; Islam et al., 2010a, b]. Haradhan Kumar Mohajan and his coauthors have tried to work on the optimization for global social welfare [Mohajan et al., 2013]. In another paper he stresses on scientific method for sustainable production [Mohajan, 2021a]. He also applies statistical analysis in various returns scale [Mohajan, 2021b, c]. Earlier he has works on three optimization mathematical models with necessary and sufficient conditions [Mohajan, 2017a, b]. Lia Roy and her coauthors have also discussed the cost minimization policy and show that it is essential for the sustainable development of an industry [Roy et al., 2021].

## 3.Methodology of the Study

Methodology is the guideline of a research work. In any research it is an organized procedure that follows scientific methods efficiently [Kothari, 2008]. It tries to give a strategy for planning, arranging, designing and conducting a fruitful research confidently [Legesse, 2014]. In this study we have tried to discuss cost minimization with the help of Cobb-Douglas production function by showing mathematical calculations in some detail [Mohajan, 2021b]. We have started the model with four inputs, such as $\alpha$ amount of capital, $\beta$ quantity of labor, $\gamma$ quantity of principal raw materials, and $\delta$ quantity of other inputs. Here mathematical calculations provided that the Lagrange multiplier can be represented as the marginal cost function. Then the model is operated with the Cobb-Douglas production function. Here we have obtained the optimum values of $\alpha$, $\beta$, $\gamma$, and $\delta$. We have also found the optimum values of Lagrange multiplier $\theta$ and capital *K*. In the sensitivity analysis we have used Hessian matrix to obtain minimum cost. Reliability and validity are wealth of a good research and in our study we have tried to preserve them as per as possible [Mohajan, 2017b, 2022a,b].

In this study we have confined ourselves on the secondary data and mathematical analysis. The valuable data are collected from various published research papers, books of well-known authors, research reports, internet, etc. [Ferdous & Mohajan, 2022, Mohajan, 2018a; Mohajan, 2020]. Throughout the article we have tried to provide the mathematical calculations with some details. [Mohajan, 2018a, 2020; Mohajan & Mohajan, 2022a,b].

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**4.Objective of the Study**

The principle objective of this research study is to analyze minimum cost of a firm. Other subsidiary objectives are as follows:

- to show a detail mathematical calculation elaborately,
- to analyze Cobb-Douglas production function, and
- to provide sensitivity analysis for optimization.

**5.Mathematical Discussion of the Model**

Let us consider that a firm continually produces and sells $X$ units of commodities. During the production period, it uses $\alpha$ amount of capital, $\beta$ quantity of labor, $\gamma$ quantity of principal raw materials, and $\delta$ quantity of other inputs [Mohajan et al., 2013; Mohajan, 2018b]. The firm maintains the optimum policy in every process and sector, such as in production, selling, assignment, and transformation to gain maximum profit for the sustainability in the global economic world. The firm wants to adjust minimize cost in $\alpha$, $\beta$, $\gamma$, and $\delta$ to minimize the cost function $K$ as [Chiang, 1984; Mohajan et al., 2013; Roy et al., 2021];

$$K(\alpha,\beta,\gamma,\delta)=w\alpha+x\beta+y\gamma+z\delta, \tag{1}$$

subject to the constrain of production function $X$ with a suitable production function $F$ as;

$$X=F(\alpha,\beta,\gamma,\delta), \tag{2}$$

where $w$ is the services of capital $\alpha$; $x$ is the wage rate per unit of labor $\beta$; $y$ is the cost of per unit of principal raw materials $\gamma$; and $z$ is the cost of per unit of other inputs $\delta$. Now we use Lagrange multiplier $\theta$ to combine economic constrained relations (1) and (2) with the Lagrangian function $L$, to produce a five-dimensional unconstrained relation as [Mohajan, 2015; Lia et al., 2021]:

$$L(\alpha,\beta,\gamma,\delta)=K(\alpha,\beta,\gamma,\delta)+\theta(X-F(\alpha,\beta,\gamma,\delta)). \tag{3}$$

We have considered that the firm minimizes costs in every step of production, so that it must minimize its total cost. In this study we will use asterisk to indicate the optimal values, i.e., we use $\alpha^*$, $\beta^*$, $\gamma^*$, $\delta^*$, and $\theta^*$ to indicate the optimal values of $\alpha$, $\beta$, $\gamma$, $\delta$, and $\theta$ respectively. We assume that these quantities must satisfy first order conditions, i.e., we can find desirable results with applying partial

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differentiation of the Lagrangian function (3) with respect to five variables, $\alpha$, $\beta$, $\gamma$, $\delta$, and $\theta$, and considering them equal to zero we get [Mohajan, 2018b, 2021a],

$$L_\theta = X - F(\alpha, \beta, \gamma, \delta) = 0, \quad (4a)$$

$$L_\alpha = K_\alpha - \theta F_\alpha = 0, \quad (4b)$$

$$L_\beta = K_\beta - \theta F_\beta = 0, \quad (4c)$$

$$L_\gamma = K_\gamma - \theta F_\gamma = 0, \quad (4d)$$

$$L_\delta = K_\delta - \theta F_\delta = 0, \quad (4e)$$

where $L_\delta = \frac{\partial L}{\partial \delta}$, etc. indicates the partial derivatives. Now incorporating the relations (4b-e) we can write the Lagrange multiplier $\theta$ as,

$$\theta = \frac{K_\alpha}{F_\alpha} = \frac{K_\beta}{F_\beta} = \frac{K_\gamma}{F_\gamma} = \frac{K_\delta}{F_\delta}. \quad (5)$$

Now we assume that the firm wants to increase quantities in all sectors for the continuous demand of the consumers. Let the firm increases its existing materials from $\alpha$, $\beta$, $\gamma$, and $\delta$ to $\alpha + d\alpha$, $\beta + d\beta$, $\gamma + d\gamma$, and $\delta + d\delta$ respectively. Consequently, the corresponding changes of $dX$ and $dK$ can be found as,

$$dK = K_\alpha d\alpha + K_\beta d\beta + K_\gamma d\gamma + K_\delta d\delta, \quad (6)$$

$$dX = F_\alpha d\alpha + F_\beta d\beta + F_\gamma d\gamma + F_\delta d\delta. \quad (7)$$

Relations (6) and (7) provide,

$$\frac{dK}{dX} = \frac{K_\alpha d\alpha + K_\beta d\beta + K_\gamma d\gamma + K_\delta d\delta}{F_\alpha d\alpha + F_\beta d\beta + F_\gamma d\gamma + F_\delta d\delta} \quad (8)$$

From (5) we get,

$$\theta = \frac{K_\alpha d\alpha}{F_\alpha d\alpha} = \frac{K_\beta d\beta}{F_\beta d\beta} = \frac{K_\gamma d\gamma}{F_\gamma d\gamma} = \frac{K_\delta d\delta}{F_\delta d\delta}$$

$$= \frac{K_\alpha d\alpha + K_\beta d\beta + K_\gamma d\gamma + K_\delta d\delta}{F_\alpha d\alpha + F_\beta d\beta + F_\gamma d\gamma + F_\delta d\delta}. \quad (9)$$

Combining (8) and (9) we get,

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$$\frac{dK}{dX} = \theta \,. \tag{10}$$

Hence, the Lagrange multiplier can be represented as the marginal cost function of the entire production process. The result displays that the total cost of the firm will be increased from the production of an additional unit of *X*. Equivalently, we can say that the total cost will be decreased similarly as the decreasing the production of one unit of *X* [Islam et al., 2011 a, b; Mohajan et al., 2013; Mohajan, 2021a].

**6. Analysis with Cobb-Douglas Production Function**

Now we introduce the Cobb-Douglas production function *F* as [Humphery, 1997; Roy et al., 2021; Mohajan, 2021b],

$$X = F(\alpha, \beta, \gamma, \delta) = A\alpha^p \beta^q \gamma^r \delta^s \,, \tag{11}$$

where *A* is the efficiency parameter, which reflects the level of technology. Here *p*, *q*, *r*, and *s* are constants; *p* represents the elasticity of capital that measures the percentage change in *X* for 1% change in $\alpha$ when $\beta$, $\gamma$, and $\delta$ remain constants. Also *q*, *r*, and *s* represent similar properties. The constants *p*, *q*, *r*, and *s* must lie in the following intervals:

$$0 < p < 1, 0 < q < 1,\ 0 < r < 1, \text{ and } 0 < s < 1. \tag{12}$$

Further, if $\Sigma = p + q + r + s = 1$, then Cobb-Douglas production function will provide constant returns to scale; $\Sigma = p + q + r + s > 1$ displays increasing returns to scale, and $\Sigma = p + q + r + s < 1$ indicates decreasing returns to scale. Hence, using (11) relation (3) can be written as [Mohajan, 2018b],

$$L(\alpha, \beta, \gamma, \delta) = w\alpha + x\beta + y\gamma + z\delta + \theta\left(X - A\alpha^p \beta^q \gamma^r \delta^s\right) \tag{13}$$

For optimization we can exhibit (13) as;

$$L_\theta = X - A\alpha^p \beta^q \gamma^r \delta^s = 0, \tag{14a}$$

$$L_\alpha = w - \theta A p \alpha^{p-1} \beta^q \gamma^r \delta^s = 0, \tag{14b}$$

$$L_\beta = x - \theta A q \alpha^p \beta^{q-1} \gamma^r \delta^s = 0, \tag{14c}$$

$$L_\gamma = y - \theta A r \alpha^p \beta^q \gamma^{r-1} \delta^s = 0, \tag{14d}$$

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$$L_\delta = z - \theta A s \alpha^p \beta^q \gamma^r \delta^{s-1} = 0 . \tag{14e}$$

From (14a) we can write,

$$\alpha^p \beta^q \gamma^r \delta^s = \frac{X}{A} . \tag{15}$$

Combining (14b) to (14e) we get,

$$\theta = \frac{w\alpha}{Ap\alpha^p \beta^q \gamma^r \delta^s} = \frac{x\beta}{Aq\alpha^p \beta^q \gamma^r \delta^s} = \frac{y\gamma}{Ar\alpha^p \beta^q \gamma^r \delta^s} = \frac{z\delta}{As\alpha^p \beta^q \gamma^r \delta^s} \tag{16}$$

$$\frac{w\alpha}{p} = \frac{x\beta}{q} = \frac{y\gamma}{r} = \frac{z\delta}{s} . \tag{17}$$

Again from (16) we can write,

$$\alpha = \frac{X^{\frac{1}{p}}}{A^{\frac{1}{p}} \beta^{\frac{q}{p}} \gamma^{\frac{r}{p}} \delta^{\frac{s}{p}}} \tag{18a}$$

$$\beta = \frac{X^{\frac{1}{q}}}{A^{\frac{1}{q}} \alpha^{\frac{p}{q}} \gamma^{\frac{r}{q}} \delta^{\frac{s}{q}}} \tag{18b}$$

$$\gamma = \frac{X^{\frac{1}{r}}}{A^{\frac{1}{r}} \alpha^{\frac{p}{r}} \beta^{\frac{q}{r}} \delta^{\frac{s}{r}}} \tag{18c}$$

$$\delta = \frac{X^{\frac{1}{s}}}{A^{\frac{1}{s}} \alpha^{\frac{p}{s}} \beta^{\frac{q}{s}} \delta^{\frac{r}{s}}} . \tag{18d}$$

From (17) and (18d) we get,

$$\alpha = \frac{zp\delta}{ws} = \frac{zpX^{\frac{1}{s}}}{wsA^{\frac{1}{s}} \alpha^{\frac{p}{s}} \beta^{\frac{q}{s}} \delta^{\frac{r}{s}}} \Rightarrow \alpha^{\left(\frac{s+p}{s}\right)} = \frac{zpX^{\frac{1}{s}}}{wsA^{\frac{1}{s}} \beta^{\frac{q}{s}} \delta^{\frac{r}{s}}}$$

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$$\alpha=\left(\frac{zpX^{\frac{1}{s}}}{wsA^{\frac{1}{s}}\beta^{\frac{q}{s}}\delta^{\frac{r}{s}}}\right)^{\frac{s}{s+p}}=\frac{z^{\frac{s}{s+p}}p^{\frac{s}{s+p}}X^{\frac{1}{s+p}}}{w^{\frac{s}{s+p}}s^{\frac{s}{s+p}}A^{\frac{1}{s+p}}\beta^{\frac{q}{s+p}}\delta^{\frac{r}{s+p}}}. \tag{19}$$

Similarly, from (17) we get,

$$\delta=\frac{ws\alpha}{pz}\Rightarrow\frac{1}{\delta^{\frac{r}{s+q}}}=\frac{z^{\frac{r}{s+q}}p^{\frac{r}{s+q}}}{w^{\frac{r}{s+q}}s^{\frac{r}{s+q}}\alpha^{\frac{r}{s+q}}}. \tag{20}$$

Also from (17) we get,

$$\delta=\frac{xs\beta}{zq}\Rightarrow\frac{1}{\delta^{\frac{r}{s+p}}}=\frac{z^{\frac{r}{s+p}}q^{\frac{r}{s+p}}}{x^{\frac{r}{s+p}}s^{\frac{r}{s+p}}\beta^{\frac{r}{s+p}}}. \tag{21}$$

Similarly from (17) and (18d) we get,

$$\beta=\frac{qz\delta}{sx}=\frac{qzX^{\frac{1}{s}}}{sxA^{\frac{1}{s}}\alpha^{\frac{p}{s}}\beta^{\frac{q}{s}}\delta^{\frac{r}{s}}}\Rightarrow\beta^{\frac{s+q}{s}}=\frac{qzX^{\frac{1}{s}}}{sxA^{\frac{1}{s}}\alpha^{\frac{p}{s}}\delta^{\frac{r}{s}}}$$

$$\beta=\frac{z^{\frac{s}{s+q}}q^{\frac{s}{s+q}}X^{\frac{1}{s+q}}}{x^{\frac{s}{s+q}}s^{\frac{s}{s+q}}A^{\frac{1}{s+q}}\alpha^{\frac{p}{s+q}}\delta^{\frac{r}{s+q}}}. \tag{22}$$

From (19) and (20) we get,

$$\alpha=\frac{z^{\frac{s}{s+p}}p^{\frac{s}{s+p}}X^{\frac{1}{s+p}}}{w^{\frac{s}{s+p}}s^{\frac{s}{s+p}}A^{\frac{1}{s+p}}\beta^{\frac{q}{s+p}}\delta^{\frac{r}{s+p}}}.\frac{q^{\frac{r}{s+p}}z^{\frac{r}{s+p}}}{x^{\frac{r}{s+p}}s^{\frac{r}{s+p}}\beta^{\frac{r}{s+p}}}=\frac{z^{\frac{s+r}{s+p}}p^{\frac{s}{s+p}}q^{\frac{r}{s+q}}X^{\frac{1}{s+p}}}{w^{\frac{s}{s+p}}x^{\frac{r}{s+p}}s^{\frac{s+r}{s+p}}A^{\frac{1}{s+p}}\beta^{\frac{q+r}{s+p}}\delta^{\frac{r}{s+p}}}. \tag{23}$$

From (20) and (22) we get,

$$\beta=\frac{q^{\frac{s}{s+q}}z^{\frac{s}{s+q}}X^{\frac{1}{s+q}}}{s^{\frac{s}{s+q}}x^{\frac{s}{s+q}}A^{\frac{1}{s+q}}\alpha^{\frac{p}{s+q}}\delta^{\frac{r}{s+q}}}.\frac{q^{\frac{r}{s+q}}z^{\frac{r}{s+q}}}{x^{\frac{r}{s+q}}s^{\frac{r}{s+q}}\alpha^{\frac{r}{s+q}}}=\frac{z^{\frac{s+r}{s+q}}q^{\frac{s+r}{s+q}}X^{\frac{1}{s+q}}}{x^{\frac{s+r}{s+q}}s^{\frac{s+r}{s+q}}A^{\frac{1}{s+q}}\alpha^{\frac{p+r}{s+q}}\delta^{\frac{r}{s+q}}}. \tag{24}$$

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$$\frac{1}{\beta^{\frac{q+r}{s+p}}}=\left(\frac{x^{\frac{s+r}{s+q}}s^{\frac{s+r}{s+q}}A^{\frac{1}{s+q}}\alpha^{\frac{p+r}{s+q}}\delta^{\frac{r}{s+q}}}{z^{\frac{s+r}{s+q}}q^{\frac{s+r}{s+q}}X^{\frac{1}{s+q}}}\right)^{\frac{q+r}{s+p}}$$

$$=\frac{x^{\frac{(s+r)(q+r)}{(s+p)(s+q)}}s^{\frac{(s+r)(q+r)}{(s+p)(s+q)}}A^{\frac{(q+r)}{(s+p)(s+q)}}\alpha^{\frac{(p+r)(q+r)}{(s+p)(s+q)}}\delta^{\frac{r(q+r)}{(s+p)(s+q)}}}{z^{\frac{(s+r)(q+r)}{(s+p)(s+q)}}q^{\frac{(s+r)(q+r)}{(s+p)(s+q)}}X^{\frac{(q+r)}{(s+p)(s+q)}}}$$

$$\frac{1}{\beta^{\frac{q+r}{s+p}}}=\frac{x^{\frac{b}{a}}s^{\frac{b}{a}}A^{\frac{d}{a}}\alpha^{\frac{c}{a}}\delta^{\frac{dr}{a}}}{z^{\frac{b}{a}}q^{\frac{b}{a}}X^{\frac{d}{a}}}, \tag{25}$$

where $(s+p)(s+q)=a$, $(s+r)(q+r)=b$, $(p+r)(q+r)=c$, $(q+r)=d$, $(s+p)=e$, and $(s+q)=f$. Therefore, $a=ef$, $s+r=b/q$, $p+r=c/d$. (26)

From (23) and (25) we get,

$$\alpha=\frac{z^{\frac{s+r}{s+p}}p^{\frac{s}{s+p}}q^{\frac{r}{s+p}}X^{\frac{1}{s+p}}}{w^{\frac{s}{s+p}}x^{\frac{r}{s+p}}s^{\frac{s+r}{s+p}}A^{\frac{1}{s+p}}\delta^{\frac{r}{s+p}}}\cdot\frac{x^{\frac{b}{a}}s^{\frac{b}{a}}A^{\frac{(q+r)}{a}}\alpha^{\frac{c}{a}}\delta^{\frac{r(q+r)}{a}}}{z^{\frac{b}{a}}q^{\frac{b}{a}}X^{\frac{(q+r)}{a}}}$$

$$\alpha=\left[\frac{x^{\frac{b-rf}{a}}z^{\frac{b(e-s)/d}{a}}p^{\frac{sf}{a}}q^{\frac{rf-b}{a}}X^{\frac{f-q-r}{a}}}{w^{\frac{sf}{a}}s^{\frac{b(f/a-1)}{a}}A^{\frac{f-q-r}{a}}\delta^{\frac{r(f-d)}{a}}}\right]^{\frac{a}{a-c}}. \tag{27}$$

From (19) we get

$$\frac{1}{\alpha^{\frac{s+r}{s+q}}}=\left[\frac{w^{\frac{s}{s+p}}s^{\frac{s}{s+p}}A^{\frac{1}{s+p}}\beta^{\frac{q}{s+p}}\delta^{\frac{r}{s+p}}}{z^{\frac{s}{s+p}}p^{\frac{s}{s+p}}X^{\frac{1}{s+p}}}\right]^{\frac{s+r}{s+q}}$$

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$$=\frac{w^{\frac{s(s+r)}{(s+p)(s+q)}}s^{\frac{s(s+r)}{(s+p)(s+q)}}A^{\frac{(s+r)}{(s+p)(s+q)}}\beta^{\frac{q(s+r)}{(s+p)(s+q)}}\delta^{\frac{r(s+r)}{(s+p)(s+q)}}}{z^{\frac{s(s+r)}{(s+p)(s+q)}}p^{\frac{s(s+r)}{(s+p)(s+q)}}X^{\frac{(s+r)}{(s+p)(s+q)}}}$$

$$\frac{1}{\alpha^{\frac{s+r}{s+q}}}=\frac{w^{\frac{sb/d}{a}}s^{\frac{sb/d}{a}}A^{\frac{b/d}{a}}\beta^{\frac{qb/d}{a}}\delta^{\frac{rb/d}{a}}}{z^{\frac{sb/d}{a}}p^{\frac{sb/d}{a}}X^{\frac{b/d}{a}}}. \tag{28}$$

Using (28) in (24)

$$\beta=\frac{z^{\frac{s+r}{s+q}}q^{\frac{s+r}{s+q}}X^{\frac{1}{s+q}}}{x^{\frac{s+r}{s+q}}s^{\frac{s+r}{s+q}}A^{\frac{1}{s+q}}\delta^{\frac{r}{s+q}}}.\frac{w^{\frac{sb/d}{a}}s^{\frac{sb/d}{a}}A^{\frac{b/d}{a}}\beta^{\frac{qb/d}{a}}\delta^{\frac{rb/d}{a}}}{z^{\frac{sb/d}{a}}p^{\frac{sb/d}{a}}X^{\frac{b/d}{a}}}$$

$$\beta^{\frac{a-qd/b}{a}}=\frac{w^{\frac{sb/d}{a}}z^{\frac{pb/d}{a}}q^{\frac{eb/d}{a}}X^{\frac{e-b/d}{a}}}{x^{\frac{be/d}{a}}p^{\frac{sb/d}{a}}s^{\frac{pb/d}{a}}A^{\frac{e-b/d}{a}}\delta^{\frac{r(e-b/d)}{a}}}$$

$$\beta=\left[\frac{w^{\frac{sb/d}{a}}z^{\frac{pb/d}{a}}q^{\frac{eb/d}{a}}X^{\frac{e-b/d}{a}}}{x^{\frac{be/d}{a}}p^{\frac{sb/d}{a}}s^{\frac{pb/d}{a}}A^{\frac{e-b/d}{a}}\delta^{\frac{r(e-b/d)}{a}}}\right]^{\frac{a}{a-qd/b}}. \tag{29}$$

Using (27) in (22)

$$\alpha=\left[\frac{x^{\frac{b-rf}{a}}z^{\frac{b(e-s)/d}{a}}p^{\frac{sf}{a}}q^{\frac{rf-b}{a}}X^{\frac{f-d}{a}}}{w^{\frac{sf}{a}}s^{\frac{b(f/a-1)}{a}}A^{\frac{f-d}{a}}\delta^{\frac{r(f-d)}{a}}}\right]^{\frac{a}{a-c}} \tag{30}$$

$$\frac{1}{\alpha^{\frac{p}{s}}}=\left[\frac{w^{\frac{sf}{a}}s^{\frac{b(f/a-1)}{a}}A^{\frac{f-d}{a}}\delta^{\frac{r(f-d)}{a}}}{x^{\frac{b-rf}{a}}z^{\frac{b(e-s)/d}{a}}p^{\frac{sf}{a}}q^{\frac{rf-b}{a}}X^{\frac{f-d}{a}}}\right]^{\frac{ap}{s(a-c)}}. \tag{31}$$

Using (29) in (23)

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$$\frac{1}{\beta^{\frac{q}{s}}}=\left[\frac{x^{\frac{be/d}{a}}p^{\frac{sb/d}{a}}s^{\frac{pb/d}{a}}A^{\frac{e-b/d}{a}}\delta^{\frac{r(e-b/d)}{a}}}{w^{\frac{sb/d}{a}}z^{\frac{pb/d}{a}}q^{\frac{eb/d}{a}}X^{\frac{e-b/d}{a}}}\right]^{\frac{aq}{s(a-qd/b)}}. \qquad (32)$$

Using in (31) and (32) in (18d)

$$\delta=\frac{X^{\frac{1}{s}}}{A^{\frac{1}{s}}\delta^{\frac{r}{s}}}\left[\frac{w^{\frac{sf}{a}}s^{\frac{b(f/a-1)}{a}}A^{\frac{f-d}{a}}\delta^{\frac{r(f-d)}{a}}}{x^{\frac{b-rf}{a}}z^{\frac{b(e-s)/d}{a}}p^{\frac{sf}{a}}q^{\frac{rf-b}{a}}X^{\frac{f-d}{a}}}\right]^{\frac{ap}{s(a-c)}}$$

$$\left[\frac{x^{\frac{be/d}{a}}p^{\frac{sb/d}{a}}s^{\frac{pb/d}{a}}A^{\frac{e-b/d}{a}}\delta^{\frac{r(e-b/d)}{a}}}{w^{\frac{sb/d}{a}}z^{\frac{pb/d}{a}}q^{\frac{eb/d}{a}}X^{\frac{e-b/d}{a}}}\right]^{\frac{aq}{s(a-qd/b)}}$$

$$\delta^{\Gamma}=\frac{X^{\frac{1}{s}}}{A^{\frac{1}{s}}}\left[\frac{w^{\frac{sf}{a}}s^{\frac{b(f/a-1)}{a}}A^{\frac{f-d}{a}}}{x^{\frac{b-rf}{a}}z^{\frac{b(e-s)/d}{a}}p^{\frac{sf}{a}}q^{\frac{rf-b}{a}}X^{\frac{f-d}{a}}}\right]^{\frac{ap}{s(a-c)}}$$

$$\left[\frac{x^{\frac{be/d}{a}}p^{\frac{sb/d}{a}}s^{\frac{pb/d}{a}}A^{\frac{e-b/d}{a}}}{w^{\frac{sb/d}{a}}z^{\frac{pb/d}{a}}q^{\frac{eb/d}{a}}X^{\frac{e-b/d}{a}}}\right]^{\frac{aq}{s(a-qd/b)}}$$

where $$\Gamma=\frac{(s+r)(a-c)(a-qd/b)+rp(f-d)+rq(e-b/d)}{s(a-c)(a-qd/b)}. \qquad (33)$$

$$\delta=\left\{\frac{X^{\frac{1}{s}}}{A^{\frac{1}{s}}}\left[\frac{w^{\frac{sf}{a}}s^{\frac{b(f/a-1)}{a}}A^{\frac{f-d}{a}}}{x^{\frac{b-rf}{a}}z^{\frac{b(e-s)/d}{a}}p^{\frac{sf}{a}}q^{\frac{rf-b}{a}}X^{\frac{f-d}{a}}}\right]^{\frac{ap}{s(a-c)}}\left[\frac{x^{\frac{be/d}{a}}p^{\frac{sb/d}{a}}s^{\frac{pb/d}{a}}A^{\frac{e-b/d}{a}}}{w^{\frac{sb/d}{a}}z^{\frac{pb/d}{a}}q^{\frac{eb/d}{a}}X^{\frac{e-b/d}{a}}}\right]^{\frac{aq}{s(a-qd/b)}}\right\}^{\frac{1}{\Gamma}}$$

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$$\delta = \Omega^{\Psi} \tag{34}$$

where

$$\frac{X^{\frac{1}{s}}}{A^{\frac{1}{s}}}\left[\frac{w^{\frac{sf}{a}} s^{\frac{b(f/a-1)}{a}} A^{\frac{f-d}{a}}}{x^{\frac{b-rf}{a}} z^{\frac{b(e-s)/d}{a}} p^{\frac{sf}{a}} q^{\frac{rf-b}{a}} X^{\frac{f-d}{a}}}\right]^{\frac{ap}{s(a-c)}}\left[\frac{x^{\frac{be/d}{a}} p^{\frac{sb/d}{a}} s^{\frac{pb/d}{a}} A^{\frac{e-b/d}{a}}}{w^{\frac{sb/d}{a}} z^{\frac{pb/d}{a}} q^{\frac{eb/d}{a}} X^{\frac{e-b/d}{a}}}\right]^{\frac{aq}{s(a-qd/b)}} = \Omega$$

and $\Psi = \dfrac{1}{\Gamma}$.

From (23) we get,

$$\alpha = \left[\frac{x^{\frac{b-rf}{a}} z^{\frac{b(e-s)/d}{a}} p^{\frac{sf}{a}} q^{\frac{rf-b}{a}} X^{\frac{f-d}{a}}}{w^{\frac{sf}{a}} s^{\frac{b(f/a-1)}{a}} A^{\frac{f-d}{a}}}\right]^{\frac{a}{a-c}} \delta^{-\frac{r(f-d)}{a-c}}$$

$$\alpha = \Lambda\Omega^{\frac{r\Psi(d-f)}{a-c}} \tag{35}$$

where
$$\left[\frac{x^{\frac{b-rf}{a}} z^{\frac{b(e-s)/d}{a}} p^{\frac{sf}{a}} q^{\frac{rf-b}{a}} X^{\frac{f-d}{a}}}{w^{\frac{sf}{a}} s^{\frac{b(f/a-1)}{a}} A^{\frac{f-d}{a}}}\right]^{\frac{a}{a-c}} = \Lambda. \tag{36}$$

From (24) we get,

$$\beta = \Phi\Omega^{\frac{r\Psi(b/d-e)}{a-qd/b}} \tag{37}$$

where
$$\left[\frac{w^{\frac{sb/d}{a}} z^{\frac{pb/d}{a}} q^{\frac{eb/d}{a}} X^{\frac{e-b/d}{a}}}{x^{\frac{be/d}{a}} p^{\frac{sb/d}{a}} s^{\frac{pb/d}{a}} A^{\frac{e-b/d}{a}}}\right]^{\frac{a}{a-qd/b}} = \Phi. \tag{38}$$

From (18c) we get,

$$\gamma = \frac{X^{\frac{1}{r}}}{A^{\frac{1}{r}}}\alpha^{-\frac{p}{r}}\beta^{-\frac{q}{r}}\delta^{-\frac{s}{r}} = \frac{X^{\frac{1}{r}}}{A^{\frac{1}{r}}}\left\{\Lambda\Omega^{\frac{r\Psi(d-f)}{a-c}}\right\}^{-\frac{p}{r}}\left\{\Phi\Omega^{\frac{r\Psi(b/d-e)}{a-qd/b}}\right\}^{-\frac{q}{r}}\left\{\Omega^{\Psi}\right\}^{-\frac{s}{r}} = \Pi, \text{ (say).}$$

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(39)

$$\gamma^* = \gamma = \Pi . \tag{40}$$

$$\theta = \frac{w}{Ap\alpha^{p-1}\beta^q\gamma^r\delta^s} = \frac{w}{Ap}\alpha^{1-p}\beta^{-q}\gamma^{-r}\delta^{-s}$$

$$\theta = \frac{w}{Ap}\left\{\Lambda\Omega^{\frac{r\Psi(d-f)}{a-c}}\right\}^{1-p}\left\{\Phi\Omega^{\frac{r\Psi(b/d-e)}{a-qd/b}}\right\}^{-q}\Pi^{-r}\left\{\Omega^{\Psi}\right\}^{-s} = \Xi \text{, (say).} \tag{41}$$

$$\theta^* = \theta = \Xi . \tag{42}$$

Now we can write minimum cost of the firm by using (34) (36) (38) and (40) in (1) as,

$$K^* = K = w\Lambda\Omega^{\frac{r\Psi(d-f)}{a-c}} + x\Phi\Omega^{\frac{r\Psi(b/d-e)}{a-qd/b}} + y\Pi + z\Omega^{\Psi} .$$

(43)

**7. Sensitivity Analysis**

Sensitivity analysis examines about the change of economic predictions. It is used within specific boundaries that depend on more input variables, such as capital, labor, principal raw materials, and other inputs. It deals with uncertainty, but tries to reduce the bad schemes [Herstein, 1953; Gowland, 1983; Dixit, 1990]. To minimize cost we consider the determinant of the Hessian matrix [Mohajan, 2021a, b],

$$|H| = \begin{vmatrix} 0 & -X_\alpha & -X_\beta & -X_\gamma & -X_\delta \\ -X_\alpha & L_{\alpha\alpha} & L_{\alpha\beta} & L_{\alpha\gamma} & L_{\alpha\delta} \\ -X_\beta & L_{\beta\alpha} & L_{\beta\beta} & L_{\beta\gamma} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\alpha} & L_{\gamma\beta} & L_{\gamma\gamma} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\alpha} & L_{\delta\beta} & L_{\delta\gamma} & L_{\delta\delta} \end{vmatrix} . \tag{44}$$

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$$= X_\alpha \begin{vmatrix} -X_\alpha & L_{\alpha\beta} & L_{\alpha\gamma} & L_{\alpha\delta} \\ -X_\beta & L_{\beta\beta} & L_{\beta\gamma} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\beta} & L_{\gamma\gamma} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\beta} & L_{\delta\gamma} & L_{\delta\delta} \end{vmatrix}$$

$$- X_\beta \begin{vmatrix} -X_\alpha & L_{\alpha\alpha} & L_{\alpha\gamma} & L_{\alpha\delta} \\ -X_\beta & L_{\beta\alpha} & L_{\beta\gamma} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\alpha} & L_{\gamma\gamma} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\alpha} & L_{\delta\gamma} & L_{\delta\delta} \end{vmatrix}$$

$$+ X_\gamma \begin{vmatrix} -X_\alpha & L_{\alpha\alpha} & L_{\alpha\beta} & L_{\alpha\delta} \\ -X_\beta & L_{\beta\alpha} & L_{\beta\beta} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\alpha} & L_{\gamma\beta} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\alpha} & L_{\delta\beta} & L_{\delta\delta} \end{vmatrix}$$

$$- X_\delta \begin{vmatrix} -X_\alpha & L_{\alpha\alpha} & L_{\alpha\beta} & L_{\alpha\gamma} \\ -X_\beta & L_{\beta\alpha} & L_{\beta\beta} & L_{\beta\gamma} \\ -X_\gamma & L_{\gamma\alpha} & L_{\gamma\beta} & L_{\gamma\gamma} \\ -X_\delta & L_{\delta\alpha} & L_{\delta\beta} & L_{\delta\gamma} \end{vmatrix}$$

$$= X_\alpha \left\{ -X_\alpha \begin{vmatrix} L_{\beta\beta} & L_{\beta\gamma} & L_{\beta\delta} \\ L_{\gamma\beta} & L_{\gamma\gamma} & L_{\gamma\delta} \\ L_{\delta\beta} & L_{\delta\gamma} & L_{\delta\delta} \end{vmatrix} - L_{\alpha\beta} \begin{vmatrix} -X_\beta & L_{\beta\gamma} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\gamma} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\gamma} & L_{\delta\delta} \end{vmatrix} + L_{\alpha\gamma} \begin{vmatrix} -X_\beta & L_{\beta\beta} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\beta} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\beta} & L_{\delta\delta} \end{vmatrix} - L_{\alpha\delta} \begin{vmatrix} -X_\beta & L_{\beta\beta} & L_{\beta\gamma} \\ -X_\gamma & L_{\gamma\beta} & L_{\gamma\gamma} \\ -X_\delta & L_{\delta\beta} & L_{\delta\gamma} \end{vmatrix} \right\}$$

$$- X_\beta \left\{ -X_\alpha \begin{vmatrix} L_{\beta\alpha} & L_{\beta\gamma} & L_{\beta\delta} \\ L_{\gamma\alpha} & L_{\gamma\gamma} & L_{\gamma\delta} \\ L_{\delta\alpha} & L_{\delta\gamma} & L_{\delta\delta} \end{vmatrix} - L_{\alpha\alpha} \begin{vmatrix} -X_\beta & L_{\beta\gamma} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\gamma} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\gamma} & L_{\delta\delta} \end{vmatrix} + L_{\alpha\gamma} \begin{vmatrix} -X_\beta & L_{\beta\alpha} & L_{\beta\delta} \\ -X_\gamma & L_{\gamma\alpha} & L_{\gamma\delta} \\ -X_\delta & L_{\delta\alpha} & L_{\delta\delta} \end{vmatrix} - L_{\alpha\delta} \begin{vmatrix} -X_\beta & L_{\beta\alpha} & L_{\beta\gamma} \\ -X_\gamma & L_{\gamma\alpha} & L_{\gamma\gamma} \\ -X_\delta & L_{\delta\alpha} & L_{\delta\gamma} \end{vmatrix} \right\}$$

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$$+X_{\gamma}\left\{-X_{\alpha}\begin{vmatrix} L_{\beta\alpha} & L_{\beta\beta} & L_{\beta\delta} \\ L_{\gamma\alpha} & L_{\gamma\beta} & L_{\gamma\delta} \\ L_{\delta\alpha} & L_{\delta\beta} & L_{\delta\delta} \end{vmatrix} - L_{\alpha\alpha}\begin{vmatrix} -X_{\beta} & L_{\beta\beta} & L_{\beta\delta} \\ -X_{\gamma} & L_{\gamma\beta} & L_{\gamma\delta} \\ -X_{\delta} & L_{\delta\beta} & L_{\delta\delta} \end{vmatrix} + L_{\alpha\beta}\begin{vmatrix} -X_{\beta} & L_{\beta\alpha} & L_{\beta\delta} \\ -X_{\gamma} & L_{\gamma\alpha} & L_{\gamma\delta} \\ -X_{\delta} & L_{\delta\alpha} & L_{\delta\delta} \end{vmatrix} - L_{\alpha\delta}\begin{vmatrix} -X_{\beta} & L_{\beta\alpha} & L_{\beta\beta} \\ -X_{\gamma} & L_{\gamma\alpha} & L_{\gamma\beta} \\ -X_{\delta} & L_{\delta\alpha} & L_{\delta\beta} \end{vmatrix}\right\}$$

$$-X_{\delta}\left\{-X_{\alpha}\begin{vmatrix} L_{\beta\alpha} & L_{\beta\beta} & L_{\beta\gamma} \\ L_{\gamma\alpha} & L_{\gamma\beta} & L_{\gamma\gamma} \\ L_{\delta\alpha} & L_{\delta\beta} & L_{\delta\gamma} \end{vmatrix} - L_{\alpha\alpha}\begin{vmatrix} -X_{\beta} & L_{\beta\beta} & L_{\beta\gamma} \\ -X_{\gamma} & L_{\gamma\beta} & L_{\gamma\gamma} \\ -X_{\delta} & L_{\delta\beta} & L_{\delta\gamma} \end{vmatrix} + L_{\alpha\beta}\begin{vmatrix} -X_{\beta} & L_{\beta\alpha} & L_{\beta\gamma} \\ -X_{\gamma} & L_{\gamma\alpha} & L_{\gamma\gamma} \\ -X_{\delta} & L_{\delta\alpha} & L_{\delta\gamma} \end{vmatrix} - L_{\alpha\gamma}\begin{vmatrix} -X_{\beta} & L_{\beta\alpha} & L_{\beta\beta} \\ -X_{\gamma} & L_{\gamma\alpha} & L_{\gamma\beta} \\ -X_{\delta} & L_{\delta\alpha} & L_{\delta\beta} \end{vmatrix}\right\}$$

$$\begin{aligned}
&= -X_{\alpha}^{2}\left\{L_{\beta\beta}\left(L_{\gamma\gamma}L_{\delta\delta} - L_{\delta\gamma}L_{\gamma\delta}\right) + L_{\beta\gamma}\left(L_{\delta\beta}L_{\gamma\delta} - L_{\gamma\beta}L_{\delta\delta}\right) + L_{\beta\delta}\left(L_{\gamma\beta}L_{\delta\gamma} - L_{\delta\beta}L_{\gamma\gamma}\right)\right\} \\
&- X_{\alpha}L_{\alpha\beta}\left\{-X_{\beta}\left(L_{\gamma\gamma}L_{\delta\delta} - L_{\delta\gamma}L_{\gamma\delta}\right) + L_{\beta\gamma}\left(-X_{\delta}\,L_{\gamma\delta} + X_{\gamma}L_{\delta\delta}\right) + L_{\beta\delta}\left(-X_{\gamma}L_{\delta\gamma} + X_{\delta}L_{\gamma\gamma}\right)\right\} \\
&+ X_{\alpha}L_{\alpha\gamma}\left\{-X_{\beta}\left(L_{\gamma\beta}L_{\delta\delta} - L_{\delta\beta}L_{\gamma\delta}\right) + L_{\beta\beta}\left(-X_{\delta}L_{\gamma\delta} + X_{\gamma}L_{\delta\delta}\right) + L_{\beta\delta}\left(-X_{\gamma}L_{\delta\beta} + X_{\delta}L_{\gamma\beta}\right)\right\} \\
&- X_{\alpha}L_{\alpha\delta}\left\{-X_{\beta}\left(L_{\gamma\beta}L_{\delta\gamma} - L_{\delta\beta}L_{\gamma\gamma}\right) + L_{\beta\beta}\left(-X_{\delta}L_{\gamma\gamma} + X_{\gamma}L_{\delta\gamma}\right) + L_{\beta\gamma}\left(-X_{\gamma}L_{\delta\beta} + X_{\delta}L_{\gamma\beta}\right)\right\} \\
&+ X_{\alpha}X_{\beta}\left\{L_{\beta\alpha}\left(L_{\gamma\gamma}L_{\delta\delta} - L_{\delta\gamma}L_{\gamma\delta}\right) + L_{\beta\gamma}\left(L_{\delta\alpha}L_{\gamma\delta} - L_{\gamma\alpha}L_{\delta\delta}\right) + L_{\beta\delta}\left(L_{\gamma\alpha}L_{\delta\gamma} - L_{\delta\alpha}L_{\gamma\gamma}\right)\right\} \\
&+ X_{\beta}L_{\alpha\alpha}\left\{-X_{\beta}\left(L_{\gamma\gamma}L_{\delta\delta} - L_{\delta\gamma}L_{\gamma\delta}\right) + L_{\beta\gamma}\left(-X_{\delta}L_{\gamma\delta} + X_{\gamma}L_{\delta\delta}\right) + L_{\beta\delta}\left(-X_{\gamma}L_{\delta\gamma} + X_{\delta}L_{\gamma\gamma}\right)\right\} \\
&- X_{\beta}L_{\alpha\gamma}\left\{-X_{\beta}\left(L_{\gamma\alpha}L_{\delta\delta} - L_{\delta\alpha}L_{\gamma\delta}\right) + L_{\beta\alpha}\left(-X_{\delta}L_{\gamma\delta} + X_{\gamma}L_{\delta\delta}\right) + L_{\beta\delta}\left(-X_{\gamma}L_{\delta\alpha} + X_{\delta}L_{\gamma\alpha}\right)\right\} \\
&+ X_{\beta}L_{\alpha\delta}\left\{-X_{\beta}\left(L_{\gamma\alpha}L_{\delta\gamma} - L_{\delta\alpha}L_{\gamma\gamma}\right) + L_{\beta\alpha}\left(-X_{\delta}L_{\gamma\gamma} + X_{\gamma}L_{\delta\gamma}\right) + L_{\beta\gamma}\left(-X_{\gamma}L_{\delta\alpha} + X_{\delta}L_{\gamma\alpha}\right)\right\} \\
&- X_{\gamma}X_{\alpha}\left\{L_{\beta\alpha}\left(L_{\gamma\beta}L_{\delta\delta} - L_{\delta\beta}L_{\gamma\delta}\right) + L_{\beta\beta}\left(L_{\delta\alpha}L_{\gamma\delta} - L_{\gamma\alpha}L_{\delta\delta}\right) + L_{\beta\delta}\left(L_{\gamma\alpha}L_{\delta\beta} - L_{\delta\alpha}L_{\gamma\beta}\right)\right\} \\
&- X_{\gamma}L_{\alpha\alpha}\left\{-X_{\beta}\left(L_{\gamma\beta}L_{\delta\delta} - L_{\delta\beta}L_{\gamma\delta}\right) + L_{\beta\beta}\left(-X_{\delta}L_{\gamma\delta} + X_{\gamma}L_{\delta\delta}\right) + L_{\beta\delta}\left(-X_{\gamma}L_{\delta\beta} + X_{\delta}L_{\gamma\beta}\right)\right\} \\
&+ X_{\gamma}L_{\alpha\beta}\left\{-X_{\beta}\left(L_{\gamma\alpha}L_{\delta\delta} - L_{\delta\alpha}L_{\gamma\delta}\right) + L_{\beta\alpha}\left(-X_{\delta}L_{\gamma\delta} + X_{\gamma}L_{\delta\delta}\right) + L_{\beta\delta}\left(-X_{\gamma}L_{\delta\alpha} + X_{\delta}L_{\gamma\alpha}\right)\right\} \\
&- X_{\gamma}L_{\alpha\delta}\left\{-X_{\beta}\left(L_{\gamma\alpha}L_{\delta\beta} - L_{\delta\alpha}L_{\gamma\beta}\right) + L_{\beta\alpha}\left(-X_{\delta}L_{\gamma\beta} + X_{\gamma}L_{\delta\beta}\right) + L_{\beta\beta}\left(-X_{\gamma}L_{\delta\alpha} + X_{\delta}L_{\gamma\alpha}\right)\right\} \\
&+ X_{\alpha}X_{\delta}\left\{L_{\beta\alpha}\left(L_{\gamma\beta}L_{\delta\gamma} - L_{\delta\beta}L_{\gamma\gamma}\right) + L_{\beta\beta}\left(L_{\delta\alpha}L_{\gamma\gamma} - L_{\gamma\alpha}L_{\delta\gamma}\right) + L_{\beta\gamma}\left(L_{\gamma\alpha}L_{\delta\beta} - L_{\delta\alpha}L_{\gamma\beta}\right)\right\} \\
&+ X_{\delta}L_{\alpha\alpha}\left\{-X_{\beta}\left(L_{\gamma\beta}L_{\delta\gamma} - L_{\delta\beta}L_{\gamma\gamma}\right) + L_{\beta\beta}\left(-X_{\delta}L_{\gamma\gamma} + X_{\gamma}L_{\delta\gamma}\right) + L_{\beta\gamma}\left(-X_{\gamma}L_{\delta\beta} + X_{\delta}L_{\gamma\beta}\right)\right\} \\
&- X_{\delta}L_{\alpha\beta}\left\{-X_{\beta}\left(L_{\gamma\alpha}L_{\delta\gamma} - L_{\delta\alpha}L_{\gamma\gamma}\right) + L_{\beta\alpha}\left(-X_{\delta}L_{\gamma\gamma} + X_{\gamma}L_{\delta\gamma}\right) + L_{\beta\gamma}\left(-X_{\gamma}L_{\delta\alpha} + X_{\delta}L_{\gamma\alpha}\right)\right\}
\end{aligned}$$

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$$+X_{\delta}L_{\alpha\gamma}\left\{-X_{\beta}\left(L_{\gamma\alpha}L_{\delta\beta}-L_{\delta\alpha}L_{\gamma\beta}\right)+L_{\beta\alpha}\left(-X_{\delta}L_{\gamma\beta}+X_{\gamma}L_{\delta\beta}\right)+L_{\beta\beta}\left(-X_{\gamma}L_{\delta\alpha}+X_{\delta}L_{\gamma\alpha}\right)\right\}$$

$$\begin{aligned}
&=-X_{\alpha}^{2}L_{\beta\beta}L_{\gamma\gamma}L_{\delta\delta}+X_{\alpha}^{2}L_{\beta\beta}L_{\delta\gamma}L_{\gamma\delta}-X_{\alpha}^{2}L_{\beta\gamma}L_{\delta\beta}L_{\gamma\delta}+X_{\alpha}^{2}L_{\beta\gamma}L_{\gamma\beta}L_{\delta\delta}-X_{\alpha}^{2}L_{\beta\delta}L_{\gamma\beta}L_{\delta\gamma}+X_{\alpha}^{2}L_{\beta\delta}L_{\delta\beta}L_{\gamma\gamma}\\
&+X_{\alpha}X_{\beta}L_{\alpha\beta}L_{\gamma\gamma}L_{\delta\delta}-X_{\alpha}X_{\beta}L_{\alpha\beta}L_{\delta\gamma}L_{\gamma\delta}+X_{\alpha}X_{\delta}\,L_{\alpha\beta}L_{\beta\gamma}L_{\gamma\delta}-X_{\alpha}X_{\gamma}\,L_{\alpha\beta}L_{\beta\gamma}L_{\delta\delta}+X_{\alpha}X_{\gamma}\,L_{\alpha\beta}L_{\beta\delta}L_{\delta\gamma}\\
&-X_{\alpha}X_{\delta}\,L_{\alpha\beta}L_{\beta\delta}L_{\gamma\gamma}\\
&-X_{\alpha}X_{\beta}L_{\alpha\gamma}L_{\gamma\beta}L_{\delta\delta}+X_{\alpha}X_{\beta}L_{\alpha\gamma}L_{\delta\beta}L_{\gamma\delta}-X_{\alpha}X_{\delta}L_{\alpha\gamma}L_{\beta\beta}L_{\gamma\delta}+X_{\alpha}X_{\gamma}L_{\alpha\gamma}L_{\beta\beta}L_{\delta\delta}\\
&-X_{\alpha}X_{\gamma}L_{\alpha\gamma}L_{\beta\delta}L_{\delta\beta}+X_{\alpha}X_{\delta}L_{\alpha\gamma}L_{\beta\delta}L_{\gamma\beta}\\
&+X_{\alpha}X_{\beta}L_{\alpha\delta}L_{\gamma\beta}L_{\delta\gamma}-X_{\alpha}X_{\beta}L_{\alpha\delta}L_{\delta\beta}L_{\gamma\gamma}+X_{\alpha}X_{\delta}L_{\alpha\delta}L_{\beta\beta}L_{\gamma\gamma}\\
&-X_{\alpha}X_{\gamma}L_{\alpha\delta}L_{\beta\beta}L_{\delta\gamma}+X_{\alpha}X_{\gamma}L_{\alpha\delta}L_{\beta\gamma}L_{\delta\beta}-X_{\alpha}X_{\gamma}L_{\alpha\delta}L_{\beta\gamma}L_{\gamma\beta}\\
&+X_{\alpha}X_{\beta}L_{\beta\alpha}L_{\gamma\gamma}L_{\delta\delta}-X_{\alpha}X_{\beta}L_{\beta\alpha}L_{\delta\gamma}L_{\gamma\delta}\\
&+X_{\alpha}X_{\beta}L_{\beta\gamma}L_{\delta\alpha}L_{\gamma\delta}-X_{\alpha}X_{\beta}L_{\beta\gamma}L_{\gamma\alpha}L_{\delta\delta}+X_{\alpha}X_{\beta}L_{\beta\delta}L_{\gamma\alpha}L_{\delta\gamma}-X_{\alpha}X_{\beta}L_{\beta\delta}L_{\delta\alpha}L_{\gamma\gamma}\\
&-X_{\beta}^{2}L_{\alpha\alpha}L_{\gamma\gamma}L_{\delta\delta}\\
&+X_{\beta}^{2}L_{\alpha\alpha}L_{\delta\gamma}L_{\gamma\delta}-X_{\beta}X_{\delta}L_{\alpha\alpha}L_{\beta\gamma}L_{\gamma\delta}+X_{\beta}X_{\gamma}L_{\alpha\alpha}L_{\beta\gamma}L_{\delta\delta}-X_{\beta}X_{\gamma}L_{\alpha\alpha}L_{\beta\delta}L_{\delta\gamma}+X_{\beta}X_{\delta}L_{\alpha\alpha}L_{\beta\delta}L_{\gamma\gamma}\\
&+X_{\beta}^{2}L_{\alpha\gamma}L_{\gamma\alpha}L_{\delta\delta}-X_{\beta}^{2}L_{\alpha\gamma}L_{\delta\alpha}L_{\gamma\delta}+X_{\beta}X_{\delta}L_{\alpha\gamma}L_{\beta\alpha}L_{\gamma\delta}-X_{\beta}X_{\gamma}L_{\alpha\gamma}L_{\beta\alpha}L_{\delta\delta}+X_{\beta}X_{\delta}L_{\alpha\gamma}L_{\beta\delta}L_{\delta\alpha}
\end{aligned}\tag{45}$$

$$\begin{aligned}
&-X_{\beta}X_{\delta}L_{\alpha\gamma}L_{\beta\delta}L_{\gamma\alpha}\\
&-X_{\beta}^{2}L_{\alpha\delta}L_{\gamma\alpha}L_{\delta\gamma}+X_{\beta}^{2}L_{\alpha\delta}L_{\delta\alpha}L_{\gamma\gamma}-X_{\beta}X_{\delta}L_{\alpha\delta}L_{\beta\alpha}L_{\gamma\gamma}+X_{\beta}X_{\gamma}L_{\alpha\delta}L_{\beta\alpha}L_{\delta\gamma}\\
&-X_{\beta}X_{\gamma}L_{\alpha\delta}L_{\beta\gamma}L_{\delta\alpha}+X_{\beta}X_{\delta}L_{\alpha\delta}L_{\beta\gamma}L_{\gamma\alpha}\\
&-X_{\gamma}X_{\alpha}L_{\beta\alpha}L_{\gamma\beta}L_{\delta\delta}+X_{\gamma}X_{\alpha}L_{\beta\alpha}L_{\delta\beta}L_{\gamma\delta}-X_{\gamma}X_{\alpha}L_{\beta\beta}L_{\delta\alpha}L_{\gamma\delta}\\
&+X_{\gamma}X_{\alpha}L_{\beta\beta}L_{\gamma\alpha}L_{\delta\delta}-X_{\gamma}X_{\alpha}L_{\beta\delta}L_{\gamma\alpha}L_{\delta\beta}+X_{\gamma}X_{\alpha}L_{\beta\delta}L_{\delta\alpha}L_{\gamma\beta}\\
&+X_{\beta}X_{\gamma}L_{\alpha\alpha}L_{\gamma\beta}L_{\delta\delta}-X_{\beta}X_{\gamma}L_{\alpha\alpha}L_{\delta\beta}L_{\gamma\delta}\\
&+X_{\gamma}X_{\delta}L_{\alpha\alpha}L_{\beta\beta}L_{\gamma\delta}-X_{\gamma}^{2}L_{\alpha\alpha}L_{\beta\beta}L_{\delta\delta}+X_{\gamma}^{2}L_{\alpha\alpha}L_{\beta\delta}L_{\delta\beta}-X_{\gamma}X_{\delta}L_{\alpha\alpha}L_{\beta\delta}L_{\gamma\beta}\\
&-X_{\beta}X_{\gamma}L_{\alpha\beta}L_{\gamma\alpha}L_{\delta\delta}\\
&+X_{\beta}X_{\gamma}L_{\alpha\beta}L_{\delta\alpha}L_{\gamma\delta}-X_{\gamma}X_{\delta}L_{\alpha\beta}L_{\beta\alpha}L_{\gamma\delta}+X_{\gamma}X_{\delta}L_{\alpha\beta}L_{\beta\alpha}L_{\delta\delta}-X_{\gamma}^{2}L_{\alpha\beta}L_{\beta\delta}L_{\delta\alpha}+X_{\gamma}X_{\delta}L_{\alpha\beta}L_{\beta\delta}L_{\gamma\alpha}\\
&+X_{\gamma}X_{\beta}L_{\alpha\delta}L_{\gamma\alpha}L_{\delta\beta}-X_{\gamma}X_{\beta}L_{\alpha\delta}L_{\delta\alpha}L_{\gamma\beta}+X_{\gamma}X_{\delta}L_{\alpha\delta}L_{\beta\alpha}L_{\gamma\beta}-X_{\gamma}^{2}L_{\alpha\delta}L_{\beta\alpha}L_{\delta\beta}+X_{\gamma}^{2}L_{\alpha\delta}L_{\beta\beta}L_{\delta\alpha}
\end{aligned}$$

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$$
\begin{aligned}
&- X_\gamma X_\delta L_{\alpha\delta} L_{\beta\beta} L_{\gamma\alpha} \\
&+ X_\alpha X_\delta L_{\beta\alpha} L_{\gamma\beta} L_{\delta\gamma} - X_\alpha X_\delta L_{\beta\alpha} L_{\delta\beta} L_{\gamma\gamma} + X_\alpha X_\delta L_{\beta\beta} L_{\delta\alpha} L_{\gamma\gamma} - X_\alpha X_\delta L_{\beta\beta} L_{\gamma\alpha} L_{\delta\gamma} \\
&+ X_\alpha X_\delta L_{\beta\gamma} L_{\gamma\alpha} L_{\delta\beta} - X_\alpha X_\delta L_{\beta\gamma} L_{\delta\alpha} L_{\gamma\beta} \\
&- X_\delta X_\beta L_{\alpha\alpha} L_{\gamma\beta} L_{\delta\gamma} + X_\delta X_\beta L_{\alpha\alpha} L_{\delta\beta} L_{\gamma\gamma} - X_\delta^{\,2} L_{\alpha\alpha} L_{\beta\beta} L_{\gamma\gamma} \\
&+ X_\delta X_\gamma L_{\alpha\alpha} L_{\beta\beta} L_{\delta\gamma} - X_\delta X_\gamma L_{\alpha\alpha} L_{\beta\gamma} L_{\delta\beta} + X_\delta^{\,2} L_{\alpha\alpha} L_{\beta\gamma} L_{\gamma\beta} \\
&+ X_\delta X_\beta L_{\alpha\beta} L_{\gamma\alpha} L_{\delta\gamma} - X_\delta X_\beta L_{\alpha\beta} L_{\delta\alpha} L_{\gamma\gamma} \\
&+ X_\delta^{\,2} L_{\alpha\beta} L_{\beta\alpha} L_{\gamma\gamma} - X_\delta X_\gamma L_{\alpha\beta} L_{\beta\alpha} L_{\delta\gamma} + X_\delta X_\gamma L_{\alpha\beta} L_{\beta\gamma} L_{\delta\alpha} - X_\delta^{\,2} L_{\alpha\beta} L_{\beta\gamma} L_{\gamma\alpha} \\
&- X_\delta X_\beta L_{\alpha\gamma} L_{\gamma\alpha} L_{\delta\beta} \\
&+ X_\delta X_\beta L_{\alpha\gamma} L_{\delta\alpha} L_{\gamma\beta} - X_\delta^{\,2} L_{\alpha\gamma} L_{\beta\alpha} L_{\gamma\beta} + X_\delta X_\gamma L_{\alpha\gamma} L_{\beta\alpha} L_{\delta\beta} - X_\delta X_\gamma L_{\alpha\gamma} L_{\beta\beta} L_{\delta\alpha} + X_\delta^{\,2} L_{\alpha\gamma} L_{\beta\beta} L_{\gamma\alpha}
\end{aligned}
$$

.

Taking first order partial derivatives of (11) we get,

$$
X_\alpha = pA\alpha^{p-1}\beta^q\gamma^r\delta^s, \qquad X_\beta = qA\alpha^p\beta^{q-1}\gamma^r\delta^s, \qquad X_\gamma = rA\alpha^p\beta^q\gamma^{r-1}\delta^s,
$$

$$
X_\delta = sA\alpha^p\beta^q\gamma^r\delta^{s-1}. \tag{46}
$$

Taking second order partial derivatives of (13) we get,

$$
\begin{aligned}
&L_{\alpha\alpha} = \theta Ap(p-1)\alpha^{p-2}\beta^q\gamma^r\delta^s, && L_{\alpha\beta} = L_{\beta\alpha} = \theta Apq\alpha^{p-1}\beta^{q-1}\gamma^r\delta^s, \\
&L_{\alpha\gamma} = L_{\gamma\alpha} = \theta Apr\alpha^{p-1}\beta^q\gamma^{r-1}\delta^s, \\
&L_{\alpha\delta} = L_{\delta\alpha} = \theta Aps\alpha^{p-1}\beta^q\gamma^r\delta^{s-1}, && L_{\beta\beta} = \theta Aq(q-1)\alpha^p\beta^{q-2}\gamma^r\delta^s, \\
&L_{\beta\gamma} = L_{\gamma\beta} = \theta Aqr\alpha^p\beta^{q-1}\gamma^{r-1}\delta^s, && L_{\beta\delta} = L_{\delta\beta} = \theta Aqs\alpha^p\beta^{q-1}\gamma^r\delta^{s-1}, \\
&L_{\gamma\gamma} = \theta Ar(r-1)\alpha^p\beta^q\gamma^{r-2}\delta^s, \\
&L_{\gamma\delta} = L_{\delta\gamma} = \theta Ars\alpha^p\beta^q\gamma^{r-1}\delta^{s-1}, L_{\delta\delta} = \theta As(s-1)\alpha^p\beta^q\gamma^r\delta^{s-2}.
\end{aligned} \tag{47}
$$

Using (41) and (42) in (40) we get,

$$
\begin{aligned}
|H| = \theta^3 A^5 \alpha^{5p-2}\beta^{5q-2}\gamma^{5r-2}\delta^{5s-2}\{&- p^2q(q-1)r(r-1)s(s-1) + p^2q(q-1)r^2s^2 \\
&- p^2q^2r^2s^2 + p^2q^2r^2s(s-1) - p^2q^2r^2s^2 + p^2q^2r(r-1)s^2 + p^2q^2r(r-1)s(s-1) \\
&- p^2q^2r^2s^2 + p^2q^2r^2s^2 - p^2q^2r^2s(s-1) + p^2q^2r^2s^2 - p^2q^2r(r-1)s^2
\end{aligned}
$$

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$$
\begin{aligned}
&- p^2q^2r^2s(s-1) + p^2q^2r^2s^2 - p^2q(q-1)r^2s^2 + p^2q(q-1)r^2s(s-1) - p^2q^2r^2s^2 \\
&+ p^2q^2r^2s^2 + p^2q^2r^2s^2 - p^2q^2r(r-1)s^2 + p^2q(q-1)r(r-1)s^2 - p^2q(q-1)r^2s^2 \\
&+ p^2q^2r^2s^2 - p^2q^2r^2s^2 + p^2q^2r(r-1)s(s-1) - p^2q^2r^2s^2 + p^2q^2r^2s^2 \\
&- p^2q^2r^2s(s-1) + p^2q^2r^2s^2 - p^2q^2r(r-1)s^2 - p(p-1)q^2r(r-1)s(s-1) \\
&+ p(p-1)q^2r^2s^2 - p(p-1)q^2r^2s^2 + p(p-1)q^2r^2s(s-1) - p(p-1)q^2r^2s^2 \\
&+ p(p-1)q^2r^2s(s-1) + p^2q^2r^2s(s-1) - p^2q^2r^2s^2 + p^2q^2r^2s^2 \\
&- p^2q^2r^2s(s-1) + p^2q^2r^2s^2 - p^2q^2r^2s^2 - p^2q^2r^2s^2 + p^2q^2r(r-1)s^2 \\
&- p^2q^2r(r-1)s^2 + p^2q^2r^2s^2 - p^2q^2r^2s^2 + p^2q^2r^2s^2 - p^2q^2r^2s(s-1) \\
&+ p^2q^2r^2s^2 - p^2q(q-1)r^2s^2 + p^2q(q-1)r^2s(s-1) - p^2q^2r^2s^2 + p^2q^2r^2s^2 \\
&+ p(p-1)q^2r^2s(s-1) - p(p-1)q^2r^2s^2 + p(p-1)q(q-1)r^2s^2 \\
&- p(p-1)q(q-1)r^2s(s-1) + p(p-1)q^2r^2s^2 - p(p-1)q^2r^2s^2 - p^2q^2r^2s(s-1) \\
&+ p^2q^2r^2s^2 - p^2q^2r^2s^2 + p^2q^2r^2s(s-1) - p^2q^2r^2s^2 + p^2q^2r^2s^2 + p^2q^2r^2s^2 \\
&- p^2q^2r^2s^2 + p^2q^2r^2s^2 - p^2q^2r^2s^2 + p^2q(q-1)r^2s^2 - p^2q(q-1)r^2s^2 \\
&+ p^2q^2r^2s^2 - p^2q^2r(r-1)s^2 + p^2q(q-1)r(r-1)s^2 - p^2q(q-1)r^2s^2 + p^2q^2r^2s^2 \\
&- p^2q^2r^2s^2 - p(p-1)q^2r^2s^2 + p(p-1)q^2r(r-1)s^2 - p(p-1)q(q-1)r(r-1)s^2 \\
&+ p(p-1)q(q-1)r^2s^2 - p(p-1)q^2r^2s^2 + p(p-1)q^2r^2s^2 + p^2q^2r^2s^2 \\
&- p^2q^2r(r-1)s^2 + p^2q^2r(r-1)s^2 - p^2q^2r^2s^2 + p^2q^2r^2s^2 - p^2q^2r^2s^2 \\
&- p^2q^2r^2s^2 + p^2q^2r^2s^2 - p^2q^2r^2s^2 + p^2q^2r^2s^2 - p^2q(q-1)r^2s^2 \\
&+ p^2q(q-1)r^2s^2\}. \\
&= pqrs\theta^3A^5\alpha^{5p-2}\beta^{5q-2}\gamma^{5r-2}\delta^{5s-2}\{pqrs + 3pqr - 3p(q-1)rs - 3(p-1)qrs \\
&+ 2(p-1)(q-1)rs - 3pq(r-1)s + 2p(q-1)(r-1)s + (p-1)q(r-1)s \\
&- (p-1)(q-1)(r-1)s + 2pq(r-1)(s-1) - p(q-1)(r-1)(s-1) \\
&- (p-1)q(r-1)(s-1) + 3(p-1)qr(s-1) + 2p(q-1)r(s-1) \\
&- (p-1)(q-1)r(s-1)\}.
\end{aligned}
$$

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$$= pqrs\theta^3 A^5 \alpha^{5p-2}\beta^{5q-2}\gamma^{5r-2}\delta^{5s-2}\{pqrs + 3pqr + rs(-4pq + p + q + 2)$$
$$+ rs(-pq - p - 1) + s(pq + p + 1) + rs(p + q) - r(p + q) - s(p + q) + (p + q)$$
$$+ rs(4pq - p - 2q - 1) + r(-4pq + p + 2q + 1)\}$$
$$= pqrs\theta^3 A^5 \alpha^{5p-2}\beta^{5q-2}\gamma^{5r-2}\delta^{5s-2}\{s(pq - q + 1) - r(pq - q - 1) + p + q\}$$
$$= pqrs\theta^3 A^5 \alpha^{5p-2}\beta^{5q-2}\gamma^{5r-2}\delta^{5s-2}\{q(s - r)(p - 1) + \Sigma\}. \quad (48)$$

In this model, $A > 0$, $\alpha, \beta, \gamma, \delta > 0$; and *p*, *q*, *r*, and *s* are the rate of inputs and hence these will never be negative. Here $|H|$ is a determinant of 5×5 Hessian matrix. Hence, for the correct economic analysis, $|H| > 0$, as required, for cost to be minimized [Moolio et al., 2009]. From (12) we have, $0 < p < 1$, so that, $p - 1 < 0$; and hence, equation (38) provides $|H| > 0$ only if, $s > r$, so that, $\Sigma > p(r - s)(q - 1)$. Let, $\{q(s - r)(p - 1) + \Sigma\} = \Delta > 0$, then (38) becomes,

$$|H| = pqrs\theta^3 A^5 \alpha^{5p-2}\beta^{5q-2}\gamma^{5r-2}\delta^{5s-2}\Delta. \quad (39)$$

Now using the values of $\alpha, \beta, \gamma, \delta$, and $\theta$ in (39) we get,

$$|H| = pqrsA^5\Delta\left[\frac{w^{2a-2c-pe+3f}x^{3f+i}r^{a-c+4re}s^{a-c+4se}A^{c-a+3e}}{y^{a-c+4re}z^{a-c+4se}p^{2a-2c-pe+3f}q^{a-c+3g+j}X^{3e}}\right]^{\frac{3}{a-c}}$$
$$\left[\frac{w^f x^f r^{re} s^{se} A^e}{y^{re} z^{se} p^f q^g X^e}\right]^{\frac{5p-2}{a-c}} \left[\frac{x^i r^{re} s^{se} p^{pe} A^e}{y^{re} z^{se} w^{pe} q^j X^e}\right]^{\frac{2q-2}{a-c}} \left[\frac{w^{a-c+f} x^f r^{a-c+re} s^{se} A^e}{y^{a-c+re} z^{se} p^{a-c+f} q^g X^e}\right]^{\frac{5r-2}{a-c}}$$
$$\left[\frac{w^{a-c+f} x^f r^{re} s^{a-c+se} A^e}{y^{re} z^{a-c+se} p^{a-c+f} q^g X^e}\right]^{\frac{5s-2}{a-c}}. \quad (40)$$

Equation (40) indicates that $|H| > 0$ and consequently, cost is in minimization.

## Conclusion and Recommendation

In this study we have used Lagrange multiplier method to demonstrate cost minimization analysis of a running firm. We have also used Cobb-Douglas production function to show more clearly the economic analysis of the firm. In this

study we have applied Lagrange multipliers method to minimize cost function subject to constraint of production. Sensitivity analysis is given for the prediction of future production of the firm and in the analysis we have obtained that cost of the running firm is of course minimum. Throughout the article we have tried to show mathematical calculations in some details.

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# DETERMINANTS OF FORENSIC ACCOUNTING TECHNIQUES AND THEORIES: AN EMPIRICAL INVESTIGATION

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**Abstract**

*This study sought and investigated the determinants of forensic accounting techniques. The data analysed in this study were gathered from both primary and secondary sources. The 120 respondents were purposively selected, which includes forensic accountants, fraud auditors, bankers, forensic investigators, finance enthusiasts, fraud investigators, and those in academia. The data for this study were gathered electronically using an online questionnaire through Google Form. The Google Form analysis was adopted. Secondary data were the existing data, established by seasoned professionals and academics. The data were presented through pie charts, bar chats, and descriptions. The study shows that the nature of fraud under investigation which includes the level of crime perpetrated, how much involved, stages, complexity, and who is involved are the determinant of techniques to be applied to fraud examination. Also, other factors such as criminal evidence, the expertise and experience of the examiner, organisational policies, and the risks involved determine what techniques to be applied to forensic investigations. Data mining emerged as the most appropriate technique for fraud investigation, however, the combination of two or more techniques is advised for forensic accountants, forensic legal practitioners, and all other similar parties. This study recommends the need for stakeholders to engage, recruit, and employ the*

*services of a forensic accountant to review, strengthen, reappraise records and internal control systems on a routine basis. Organizations should train employees on the dynamics and scope of financial crimes, the legal environment, fraud prevention, and ethical issues.*

**Keywords:** *forensic accounting, forensic engagement, forensic accounting techniques, forensic theories*
**JEL Classification:** M41

## Introduction

Issues relating to the efficacy of forensic accounting and its techniques in curbing fraudulent and other criminal activities across the globe and what determines such techniques have gained the attention of scholars and practitioners in the field of forensic accounting over time. Notwithstanding the huge number of research conducted so far, there have not been any convergence as to a sufficient coverage in the meaning and what techniques of forensic accounting should be.

The difficulty in having an agreed definition of forensic accounting has afforded the researchers in this field to come up with various definitions that best suited their direction of research which are not wholistic and most often, such definitions are not well representing the intention and capacities of the roles of forensic accounting as most of the meanings adduced to the concept of forensic accounting are skewed to some aspects of the concepts that interest the scholars. Hence, it is difficult to generalise such definitions.

Furthermore, various attempts by scholars to enumerate the techniques in forensic accounting have left the researchers in doubt about the mixed results available. Mostly, what is said to be the techniques in this specialised area of endeavor are not the known true representation of what can be called techniques.

It is with this that this current research south to interrogate what exists as forensic accounting and what truly are the techniques in forensic accounting that the skill sets of the forensic accounting should be directed.

The rest of this study is divided into five which have to do with the conceptual clarifications of the meaning of forensic account, the review of the empirical literature and theoretical framework, the methodology of conducting this research, and the discussion of evidence in the extant literature, and conclusion with recommendations.

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## Literature Review

### Conceptual Clarification of the Meaning of Forensic Accounting

Forensic accounting uses accounting, auditing, and investigative skills to conduct investigations into theft and fraud. It encompasses litigation support investigative accounting. Forensic accounting, forensic accountancy, or financial forensics is the specialty practice area of accounting that describes engagements that result from actual or anticipated disputes or ligation. "Forensic means "suitable for use in a court of law", and it is to that standard and potential outcome that forensic accountants generally have to work. Forensic accountants, also referred to as forensic auditors or investigative auditors, often have to give expert evidence at the eventual trial (ICMAI, 2014).

The Association of Certified Fraud Examiners defined the practice of forensic accounting as the application of skills in potential or actual civil or criminal disputes, including commonly accepted accounting and auditing principles in establishing losses of profit, income, property, or damage, estimations of internal controls, frauds, and other such things that involve the inclusion of accounting expertise into the legal system (ACFE, 2021). Forensic accounting is a broad category of professional practice that provides fraud investigation services. In reality, a forensic accountant plays an important role in finding, preventing, and prosecuting persons involved in criminal activities such as financial misrepresentation, money laundering, and identity fraud (Honigsberg, 2020). It is also defined as accounting principles and procedures used to legal challenges (Abdulrahman, 2019).

Forensic accounting refers to the application of analytical and investigative skills to resolve financial issues in a manner that meets the standards required by a court of law. Accounting, auditing, and investigation skills are used in forensic accounting to give expert support in legal cases (Kolawole, Salman, Durodola, Babatunde, Igbekoyi, 2018). Jugurnath, Bissessur, Ramjattan, Soondrum, and According to Seedoyal (2017), forensic accounting is a branch of accounting that deals with current, ongoing, or anticipated problems, making it suited for legal evaluation and ensuring the effective reduction of financial malpractices. To Ozumba, Ofor, and Okoye (2016), forensic accounting is the application of accounting, auditing, and investigative skills to assist in legal matters, as well as the application of a specialised body of knowledge to the evidence of economic transactions and reporting suitable for court proceedings and accountability. It is the process of applying any fraud investigation to the creation of accounting

records once it has been discovered that they have been falsified. Forensic accountants with the necessary training, education, and experience may help agencies and departments in charge of enforcement, recovery, audit committees, regulation, and financial statement audit teams to improve their performance (Popoola, Che-Ahmad, Samsudin, & Yussof, 2013). Okoye and Gbedi (2013) see forensic accounting as a technique for fraud detection and prevention, using financial expertise and an investigative mindset to unsolved financial difficulties within the context of evidentiary rules. Okoye and Gbegi further described forensic accounting as a branch of accounting that discusses engagements that arise as a result of existing or expected conflicts or litigation. Modugu and Anyaduba (2013) also defined forensic accounting as a particular investigation technique that uses accounting, auditing, and investigative abilities to evaluate the level of financial crime in legal situations.

As a profession, forensic accounting combines financial knowledge with investigative skills and works within a legal framework that offers adequate evidence to limit fraud and maintain the trustworthiness of financial statements (Al-Jalili, 2012). Forensic accounting involves gathering information and presenting it in a way that will be accepted by a court of law against perpetrators of economic crime (Stanbury & Paley-Menzies, 2010). The America Institute of Certified Public Accountants (AICPA) describes forensic accounting as a service that requires the use of specialised knowledge and investigative abilities possessed by Certified Public Accountants (AICPA, 2010).

Forensic accounting is the art of compiling and presenting financial facts in a format that will be accepted by a court of law against perpetrators of monetary offenses (Manning, 2010). Forensic accounting is a type of thorough fraud investigation and anti-fraud control analysis that involves auditing accounting records in search of proof of fraud (Singleton & Singleton, 2010). Financial accounting, as a profession, combines financial skill, fraud awareness, and solid knowledge and grasp of business realities and the legal system's operation. According to Arokiasamy and Cristal (2009), forensic accounting is a science that deals with the application of accounting facts and concepts derived from auditing methods, techniques, and procedures to resolve legal problems, which necessitates the synthesis of investigative, accounting, and auditing skills. Forensic accounting is a valuable investigative technique for detecting fraud. In certain circumstances, it gives an accounting analysis to the court for dispute settlement, and it also provides the court with an explanation for the fraud that has been perpetrated. As a result,

forensic accounting may be crucial in discovering and decreasing accounting fraud in the corporate sector (Baird & Zelin, 2009).

Forensic accounting is a relatively new concept. Oworojori and Asaolu (2009) described it as a method by which forensic accountants provide litigation support services, which is the provision of accounting assistance in the areas of quantification of economic damages and calculating economic loss resulting from a breach of contract in existing or pending litigations. Because forensic accountants assist to win lawsuits and gain settlements, litigation support services provide substantial value to the client-attorney relationship. According to Okoye and Akamobi (2009), forensic accounting is a combination of two fundamental words: "forensic" and "accounting." While the word "forensic" refers to being fit for use in a court of law, "accounting" refers to the method of documenting, summarising, analysing, and verifying business and financial activities, as well as documenting the results.

Akintoye (2008) added that forensic accounting is a discipline appropriate for legal examination, giving the highest degree of assurance and includes the new commonly recognised connotation of having been arrived at scientifically and providing the necessary results in resolving disputes. "Forensic" means "suitable for use in a court of law," and forensic accountants must typically work to that standard and potential outcome (Crumbley, Heitger & Smith, 2007). To detect and investigate financial crimes and associated economic transgressions, forensic accounting combines the use of criminality methodologies with the integration of accounting investigation operations and legal procedures. Forensic accounting is a highly technical and specialised field of practice within the accounting profession's principles and ethics. Not every forensic accounting engagement concludes in a court of law (Damilola & Olofinsola, 2007). According to Degboro and Olofinsola (2007), forensic accounting uses criminalist methodologies and the integration of accounting investigation operations and legal procedures to detect and investigate financial crimes and associated accounting infractions.

Forensic accounting involves the application of accounting concepts and techniques (Coenen, 2005). “The application of accounting principles, theories, and discipline to facts or hypotheses at issue in a legal dispute and encompasses every branch of accounting knowledge” (AICPA, 2005). The AICPA (2005) further classifies forensic accounting into two broad categories: investigative services and litigation services. According to the AICPA, forensic accounting services usually include the use of specialist knowledge and investigation skills, Gathering,

analysing, and assessing evidence, interpretation, and communication of findings in the courtroom, boardroom, or another legal/administrative venue.

Joshi (2003) expresses forensic accounting as the application of specialised knowledge and specific skills to stumble up on the evidence of economic transactions. Accounting, auditing, and investigation abilities are all combined in forensic accounting. Simply put, forensic accounting is accounting that is appropriate for legal scrutiny and has the now widely recognised connotation of having been arrived at in a scientific manner (Zysman, 2004). Forensic accounting is recognised as a separate type of professional knowledge with different characteristics; the recognition stems from holding a formal certification in forensic accounting, which offers symbolic significance (Williams, 2002). Bologna and Linquist (1995) understand forensic accounting as the use of financial skills and an investigative mindset to unsolved issues within the context of evidentiary rules.

Forensic auditing applies accounting processes and procedures to a problem that can or should be litigated (Appah & Inini, 2021). According to Okoye, Nwoye, Akudu, and Onyema (2020) forensic investigation is the use of forensic science on criminal or civil law issues. The study noted that it involves the use of investigative and analytical skills to investigate fraudulent practices. It involves the application of scientific methods to prove facts and evidence that would be used in criminal proceedings. Al Samara, Al-Afeef, and Al Ali (2017) viewed forensic accounting as the use of criminal methods and the inclusion of investigative accounting issues and legal processes to investigate and detect financial crime and other economic misconduct. Abdullahi and Mansor (2015) described forensic bookkeeping as the use of accounting and analytical skills at a level satisfactory by the competent court to handle disputes in terms of both criminal and civil litigation. Coenen (2005) also states that forensic accounting involves the application of accounting concepts and techniques. It requires a report if accountability or fraud is found, and the report is considered evidence in court or administrative proceedings (Joshi, 2003). Oyedokun (2013) also described forensic accounting as a scientific accounting method for the detection, resolution, analysis, and presentation of fraud cases that can be used in court. However, Oyedokun (2018) further opined that forensic accounting "is a scientific method of uncovering, analyzing, resolving and preventing fraud and white-collar crimes matters in a manner that produces admissible evidence which is capable of proving or disproving facts in issue and suitable in the court of law.

Stemming from various definitions given by various scholars, it is clear that forensic accounting scholars have divergent views as to the meaning of forensic

accounting, but it can be submitted that the scholars all agreed that it is a field of endeavour that is capable of helping in the litigation and to unravel the mystery behind hidden figures and criminal activities. It is, therefore, safe to state that, forensic accounting is not only meant to resolve an allegation of financial fraudulent activities, the techniques in forensic accounting have made it to be capable of being utilized in other walks of life.

**Forensic Accounting and Techniques**

Forensic accounting investigation involves things wherever there are unit prospects that dishonest accounting and reportage have occurred, and there is unit misappropriation of assets (Ranallo, 2006). Forensic accounting investigation tries to spot dishonest transactions by reviewing transactions mistreatment document reviews, interviews, and examination of electronic media. The forensic accounting investigation area unit is typically timed intense and since the results could also be employed in court reviews, there's a high proof commonplace that has to be maintained once the forensic accounting investigations area unit is created.

Forensic accounting investigation typically uses interview techniques designed to get associate degree admission of guilt by the person(s) involved in the fraud theme. The investigations additionally involve elaborate document reviews (Golden, Skalak & Clayton, 2006). It's vital that forensic accountants properly structure the interview method as a result the results of the interview could also be employed in court and judgment processes.

**Forensic Accounting Techniques**

The following among others are techniques available in forensic accounting:

**Data Mining**

Data mining is the use of specialised software to search for anomalies, trends, and correlations in datasets to anticipate outcomes. It makes it easier to extract hidden predictive information from massive databases and can help companies spot patterns, abnormalities, and other odd actions, allowing businesses to make proactive knowledge-driven decisions. Data mining software, which has scripting capabilities and can scan businesses' datasets for abnormalities and suspicious patterns that are indications of fraud, is particularly useful in identifying fraud. This technique depends on trying to mine a large amount of data in search of any new hidden or unexpected patterns or information, and this technique is implemented

through computer programs designed for this purpose. There are three main activities of the data mining technique:

i. Discovery: it is the links, trends, and differences of data that are discovered logically or legally without any prior assumption about what the pattern is, that is, without prior knowledge of the fraud.
ii. Forecasting models: used to estimate the outputs that should be obtained from new values.
iii. Distinctiveness analysis: we extract the variance or difference by first identifying the rule or standard, and then we find the items that depart from the standard or rule, which are called anomalies and require additional examination. The data mining technology assists the forensic accountant in the inquiry; nevertheless, the investigation process does not end with the computer screen; it also includes document analysis, interviewing, and other investigative work. In addition to the requirement to check the accuracy and completeness of the data acquired.

**Continuous Control**

Continuous Control is regarded as one of the forensic accounting approaches used to gather evidence of fraud. Processes for continuous control are centred on audit departments, branches, customers, and agency owners.

**Ratio analysis**

As a forensic accounting approach, ratio analysis is performed to evaluate data on a historical, industry, or benchmark basis. It detects fraud by studying data patterns to identify potentially deceptive transactions. Ratio analysis is the process of determining the links between various financial statement items as well as these items and nonfinancial data. The vertical analysis compares aspects of a financial statement to a common base item, whereas horizontal analysis is used to analyse the ratio of change in distinct financial statement items over a specific period. Vertical analysis, on the other hand, converts financial statements into percentages. Because percentages are clearly understood by anyone, the approach is particularly effective for fraud detection. When using vertical analysis to examine changes in the income statement, gross sales are set to 100% and all other values are transformed to a percentage of sales. The horizontal analysis is concerned with changes throughout time. While ratios and vertical analysis translate statements to numbers that are simpler to understand and compare the figures from period to period, horizontal analysis converts changes in quantities from period to period to percentages.

A technique like this is involved in assessing digital data ratios to uncover indications of fraud operations (Jamil, 2012).

**Benford's Law**

One of the strategies accessible to fraud investigators is Benford's Law and it assists greatly to achieve success in the field of forensic accounting. Benford's Law describes the sequence in which multiple numbers from real-life sources can be distributed in a specific, non-uniform way (Wells, 2012). It has been established that this technique is applied in the summarization after the classification of the first digit field and the calculation of the observed count percentage (Wadhwa & Pal, 2012; Wells, 2012). This technique, which was named after Frank Benford (1883-1948) is useful to determine if the variables under study were a result of fraud or unintentional error (Yadav & Yadav, 2013). It is one of the forensic accounting approaches, as well as one of the major rules in mathematics and statistics that have been used in auditing operations. When this law is used, it is feasible to check the quality and dependability of accounting figures or data and detect abnormalities to utilise forensic accounting techniques in revealing accounting irregularities.

**Computer-Assisted Auditing Software**

These are computer programs that forensic accountants could make use of, in the audit procedure to process data of audit significance in the client's information system and at the same time not depend on that client (Wadhwa & Pal, 2012; Yadav & Yadav, 2013). This technique assists experts in investigative and forensic accounting assignments to perform auditing procedures such as Testing transactions and balances in detail; the identification of any inconsistencies or significant fluctuations; general testing in addition to computer systems application; sampling programs in extracting data for audit testing; and the recording of the calculations performed by accounting systems (Yadav & Yadav, 2013). Technology is used and employed to perform certain auditing job that assists the forensic accountant in completing his assignment more efficiently, quickly, and at a reduced cost. The use of this technology requires the availability of all the necessary information for the process of auditing computer systems (Al-Khalidi, 2012).

**Relative Size Factor (RSF)**

This approach is the ratio of the greatest numbers in a given set to the second-largest number, and when applied to figures, the unusual deviations may be traced

back to fraud or actual errors (Wadhwa & Pal, 2012; Yadav & Yadav, 2013). The authors also said that if any stray case is discovered outside of the typical range, more examination may be necessary to aid in the discovery of abnormalities or patterns.

**Net Worth Approach (NWA)**

According to Biber (2010), there are two techniques for assessing and confirming taxpayers' income: which are the Direct Method and the Indirect Method. The direct method is the specific item relied upon in verifying income and expenses by referring to the books and records used in the preparation of the relevant tax computations while the indirect method involves the determination of tax liabilities through an analysis of a taxpayer's financial affairs accumulating information beyond the taxpayer's declaration and formal books and records (Biber, 2010).

**Net Worth Comparative Method**

Net Worth Comparative Method is like the Net Worth Approach, but in its application, the current net worth of the taxpayer will be compared with the value of the cumulative years in identifying the difference and treat as income not disclosed for the current year.

**Expenditure Approach**

The expenditure approach involves the use of the expenditure of the taxpayer to determine the undisclosed income. This approach assumes that every expenditure must have its respective source and if this has not been included in the income disclosed by the taxpayer, then the forensic accountants and the tax authorities will treat it as undisclosed income and will be adequately taxed. Biber (2010) asserted that the purchasing of capital items by cash, personal and business loan repayments through cash, personal expenses paid with cash, in addition to increases in cash on hand should be determined through an in-depth examination of taxpayer's financial affairs.

**Trend Analysis**

Trend Analysis is one of the most significant forensic accounting approaches for detecting fraud is trend analysis. The emphasis is on unusual transactions. Certain transactions may be difficult to recognise from current data, but when the transactions' current records are compared to past year's data entries, they can

readily be identified as fraudulent. It is simple to determine if the level of sales rises at the same pace as the level of bad debts increases in a business by comparing sales and bad debts data over time. In such a case, it is reasonable to believe that such bad debts are the result of fraudulent sales transactions or manipulations made into the system to improve turnover. Such fraudulent changes could not be detected without the use of trend analysis during a certain period.

**Beneish Model**

The Beneish model is one of the most amazing instruments in rhetorical accounting research. Messod Daniel Beneish, an accounting professor at Indiana University, developed the Beneish model. The variables used in this model are obtained from the business entity's record and profit and loss statement (Beneish, 1999). The Beneish Model enables rhetorical accountants to evaluate corporate financial accounts from several perspectives.

According to the Beneish Model, the following variables have a high potential for detecting monetary data manipulation by business entities: days' sales in assets index; quality index; total accruals to total assets index; leverage index; sales; general and body expenses index; sales growth index; depreciation index; and margin of profit index. Beneish Model reveals that, higher days' sales in assets, higher accruals, higher declines in gross margins, and higher quality indicators of economic data manipulation (Mbasiti, Gyang & Ojaide, 2021).

**Anonymous Communication**

Anonymous Communication denotes the sending of information, tips, and ideas that could aid the prosecution of fraudsters without the revelation of identity. Anonymous tips come in a wide variety of forms and quite several channels and are addressed to various individuals and groups within or outside the entity. Anonymous communication tip includes comments from suggestion box; email messages; anonymous phone calls and letters; posts on bulletin boards, written confirmation from debtors or/and creditors; fax messages (Ezenwafor & Udukeke, 2019).

Henderson and Greaves (2015) stated that recipients of anonymous communications within a business organisation include legal counsel, audit committee members, senior management, departmental supervisors, and the compliance or ethics, officer. The authors further added that a tip may take the form of a typical business letter addressed to the company, an e-mail usually from a non-traceable account, or an official internal complaint. Agbawe (2012)

maintained that tips may also be duplicated from news agencies, competitors, internet website postings, chat rooms, or government agencies. Or they may also be messages to an internal ethics hotline number.

**Theoretical Framework**

**White-Collar Crime Theory**

The study is anchored on the White-collar crime theory propounded by Sutherland in 1939. White-collar criminals are opportunists, who over time take advantage of their circumstances and position to accumulate financial gain (Eze & Okoye, 2019). Sutherland was the first to coin the term and hypothesis "white-collar criminals". The study defined his idea as a "crime committed by a person with respectability and high social status in the course of his occupation (Sutherland 1949, cited in Gbegi & Okoye, 2013). They are educated, intelligent, affluent, individuals who are qualified enough to get a job that allows them the unmonitored access to an often large sum of money. Fredrichs (2007) (cited in Mbasiti, et al. 2021) noted that a crime differs only in the backgrounds and characteristics of the perpetrators. Most, if not all, white-collar criminals are distinguished by a privileged life, a large proportion of them stemming from class inequality. It is estimated that much of white-collar crime goes undetected or, if discovered, goes undetected. Due to the high status of the perpetrators of these crimes, a highly skilled and experienced investigator or investigator like the Professional Forensic Accountant is required to prevent such high-profile fraud from occurring (Obiora, Onuora & Manafa, 2021).

Hence, the study is anchored on white-collar crime theory as the theory explains the rudiments and expectancies of forensic audit and assurance services about public funds and fraud.

**Review of Previous Empirical Studies**

Okoye, Adeniyi, and James (2019) conducted a study on the effects of forensic accounting on fraud management in selected firms in Nigeria. The study shows the significant influences of forensic accounting on fraud detection and prevention and also, that forensic litigation has no significant positive effect on the recovery of funds lost to fraud. The study recommended that companies in Nigeria step up their forensic accounting practices to deter fraud and also concluded that fraud investigation practices are very important for the prevention of fraud in manufacturing companies. Sule, Ibrahim, and Sani (2019) investigated the role of forensic accounting investigations in the detection of financial fraud in Nigeria. The study discovered that forensic accounting services have a substantial influence

on identifying financial crime and that forensic accounting investigations are a step forward in the finding of financial fraud and other fraudulent activities in Nigeria. According to the study, professional accounting authorities such as the Association of National Accountants of Nigeria (ANAN) and the Institutes of Chartered Accountants of Nigeria (ICAN) should encourage specialisation in forensic accounting services among the professional accountants in practice.

Eze and Okoye (2019) studied the effects of forensic accounting and fraud detection and prevention in Imo State's public sector in Nigeria The study provided a correlation between forensic accounting and fraud detection and prevention in the public sector and advised that forensic accounting be strengthened in the public sector and that the top-level management should be committed to the program while the anti-graft agencies like the EFCC and ICPC should be repositioned to adopt forensic accounting techniques and also concluded that forensic accounting is important in the public sector given the huge amount of public fund that is rampantly embezzled or swindled. The findings and recommendations of Eze and Okoye (2019) are synonymous with that of Ibrahim and Yussuf (2019) who concluded that there is an observed influence of organisational resources and top management attitude toward change in the modern fraud investigation process and recommended that adequate budgetary allocation should be provided to the EFCC to employ competent forensic accountants, with leadership having the diverse background to lead the EFCC.

Ezenwafor and Udukeke (2019) examined the utilisation of data mining and anonymous communication techniques for fraud detection in large-scale business organisations in Delta State due to the growing incidence of frauds that are crippling businesses and socio-economic development of the state. The results showed that the accounting staff lowly utilised data mining and anonymous techniques for fraud detection. Furthermore, it was found that the types and status of organization in NSE significantly influenced respondents' ratings on the utilization of data mining but did not influence their ratings on the utilisation of anonymous communications for fraud detection. From the findings of the study, it was concluded that the accounting staff did not utilize forensic auditing investigation techniques for fraud detection in large-scale business organisations as required. Based on the findings, the researcher recommended among others, that shareholders and directors of large-scale business organisations should provide regular training on data mining techniques to equip their accounting staff with the relevant and up-to-date skills, abilities, attitudes, and competencies for fraud detection.

Hashem (2020) investigated the role of forensic accounting approaches in detecting non-numerical fraud risk variables in Amman Stock Exchange manufacturing businesses. The study recommended enhancing awareness of applying forensic accounting techniques' importance among chartered accountants. And, motivating them to use the forensic accounting techniques to detect any fraud practice and concluded that all independent variables of forensics have a high role in detecting fraud risk factors. Okoye, Nwoye, Akuchi, and Onyema (2020) examined forensic accounting techniques used to detect labor fraud in the state of Anambra, Nigeria. The result of the study suggests that there are no generally accepted forensic investigation techniques to detect fraud in the public sector and that there is a positive and significant association between forensic accounting methods and fraud detection in the public sector. The research found that data mining techniques should be fully applied in public sector fraud detection in Nigeria.

Eko, Adesola, and Eseneyen (2020) examined the use of forensic accounting techniques in preventing and identifying fraudulent activities in Nigerian commercial banks, especially evaluating the influence of commercial data mining, ratio analysis, and trend analysis approach in fraud tracking and prevention The author recommends that commercial banks be obliged to acquire comprehensive data mining software facilities, as well as advanced training on the application of data mining and its usefulness in the banking sector. Bangura (2020) conducted a similar study in Sierra Leone, by examining forensic accounting techniques and fraud prevention in Sierra Leonean money deposit banks. The study shows the impact of forensic accounting techniques on corporate governance, internal control, and whistleblowing. which indicates that the forensic accounting techniques have a positive significant effect on corporate governance, internal control, and also on whistle blowing respectively of the surveyed Sierra Leonean deposit money banks. The study recommended that the management of Sierra Leonean deposit money banks should consider electing those with knowledge of forensic accounting techniques as members of the board and concluded that forensic accounting techniques have a significant positive effect on fraud prevention in Sierra Leone deposit money banks.

Ojukwu, Ubi, Olugbemi, Olugbemi, and Emefiele (2020) also conducted a study titled, “Forensic Accounting and Fraud Detection in Nigerian Universities (A Study of Cross River University of Technology).” This study discovered a substantial association between forensic accounting and financial fraud detection, as well as a large relationship between forensic accounting and financial reporting

quality. There was also a significant relationship between forensic accounting and internal control. The study concluded that forensic accounting services provide tertiary institutions with the necessary tools to deter fraudulent activities but do not curb fraudulent activities and recommended that the eradication of economic and financial crime through the incorporation of forensic accounting into the system will enhance the image of the universities under consideration. Another study by Mbasiti, Gyang, and Ojaide (2021) examined the extent to which forensic accounting techniques serve as a panacea for preventing revenue leakages in federal universities in Nigeria. The study revealed that forensic the use of data analysis tools has a positive impact on income leakages in Nigerian federal institutions. The study advised that forensic accounting data analysis techniques be used at Nigerian federal universities to help reduce income leakages in the system and that relevant authorities assist in ensuring that this is done. Also, forensic accounting technologies should be deployed and applied to prevent revenue leakages.

Dada and Jimoh (2020) investigated the impact of forensic accounting on the decrease of financial crimes in the Lagos State public sector. According to the findings of the study, litigation support services had a considerable but unfavourable impact (decrease) on financial crimes in the Nigerian public sector. The study advised that forensic accounting professionals be hired to provide additional litigation support services, such as serving as expert witnesses to help the court decide on problems that the court may not typically have the information to resolve. whereas more forensic accountants are engaged to reduce the rate of fraudulent cases in the Nigerian public sector and concluded that litigation support service (as a proxy for forensic accounting) is an anti-financial crime strategy that will help bring financial prudence and sanity to the Nigerian public sector's ministries, departments, and agencies The recommendations of Dada and Jimoh (2020) is in-line with that of Manhonlen, Otakefe and Osikhenaogiedu (2020) in a study which examined the role of the forensic accountants in combating economic and financial crimes in Nigeria. The study noted that forensic accounting serves as the basis for investigation, expert witness testimony, and the opinion of an expert in a lawsuit to unravel crimes and reach a resolution for recovery. The report recommends that the public and private sectors engage, recruit, and employ forensic accountants regularly to review, strengthen, and reappraise records and internal controls and also to check incidences of crime perception, as well as anti-corruption agencies saddled with the responsibility of fighting economic and

financial crimes to employ and adopt engagement of forensic accountants regularly, among others for all-inclusiveness works.

Akinadewo and Akinkoye (2020) also investigated the unique forensic accounting procedures utilised in Nigeria to discover tax evasion. The study noted that there is no agreement as to the specific tools to be adopted for tax evasion detection and no record of it is included in the government reports. The study concluded that the techniques of forensic accounting, when applied, will reduce the rate of tax evasion, and improve the tax revenue of governments for economic development and growth. It was then recommended that the practitioners should include in the report of their tax evasion engagement to the government, the forensic accounting techniques, or the combination thereof, used along with the respective results.

Suleiman and Othman (2021) explored how forensic accounting investigations are done by authorities may aid the government in its anti-corruption measures in Nigeria. The study's findings suggested that forensic accounting techniques may be used to combat corruption in Nigeria and that technology-centric investigation is essential and that the frustration of the key players in the judiciary, such as the judges and the lawyers, is one of the causes of persistent corruption. Obiora, Onuora, and Manafa (2021) conducted an empirical analysis of forensic audit and assurance services to the Nigerian public sector. The study portrays the extent to which forensic audit & assurance services ensure performance and accountability in the Nigerian public sector organisation. The empirical analysis of the study indicates that there is a significant and positive relationship between forensic audit & assurance services and Nigerian public sector performance & accountability at a 1% significant level. Thus, the study concludes that forensic audit & assurance services do not only ensure Performance in the Nigerian public sector but also accountability in the financial records. The study recommended that the Association of National Accountants of Nigeria (ANAN) and the Institute of Chartered Accountants of Nigeria (ICAN) should promote forensic accounting formalisation and specialisation in their curricula, and academia should emphasize forensic accounting skills development through learning in a higher educational institution. Furthermore, the government should create a Public Recovery Fund (PRF) where money recovered through forensic accounting is saved and appropriately utilised to improve efficient and effective performance in the public sector.

Aminian and Tahriri (2021) intended to find out the elements affecting the quality of forensic accounting in a paper titled "creating an interpretative structural

model of the factors affecting the quality of forensic accounting in Iran." The study found that the goals and missions of forensic accounting, forensic accounting standards, professional skills, academic training, enactment of forensic accounting, and the need for a forensic accountant in organisations improve the quality of forensic accounting. The study recommended that a specialised institution related to forensic accounting be established in Iran and, based on the model presented in this research, implement the quality framework of forensic accounting in Iran in a desirable manner and also that a wide range of experts be used in future research to find factors affecting the quality of forensic accounting.

Alshurafat, Al Shbail, and Mansour (2021) evaluated the benefits and drawbacks of forensic accounting and their implications for socio-economic growth. According to the study, the strengths of forensic accounting include the benefits to students and accounting professionals, the significant need and increasing demand, the new career channels, and the reduction of fraud, while the weaknesses include a lack of regulation, inadequate control over the profession's entry, a lack of agreement on how to teach forensic accounting, and a lack of specialised research journals. The research advised raising the degree of professionalism in forensic accounting by forming ad hoc forensic accounting groups and ensuring the high quality of forensic accounting services by limiting access to the field. Sagir, et al. (2021) in a study on the impact of educational, legal, and behavioral factors on the applicability of forensic accounting in the public sector in Nigeria revealed that behavioral, educational, and legal factors are positively related to the applicability of forensic accounting in the states. The study noted that to successfully apply forensic accounting services, the educational, legal, and behavioral factors must be given special consideration. It was then recommended that all state and federal educational institutions (universities, colleges of education, and polytechnics) offering accounting and related courses should be compelled by their respective regulatory bodies to introduce courses related to forensic accounting into their curricula.

**Discussion on Determinants of Forensic Accounting Techniques**

Drawing from the experience of the researcher and existing literature on forensics, the above conceptual model depicts the various available techniques of forensic accounting which includes the widely adopted techniques and the ones that are yet to be explored. The Data Mining technique makes use of application software in detecting fraud as it has scripting capabilities and can search organizations' databases for anomalies and suspicious patterns that are symptoms

of fraud. Ratio analysis is the act of measuring the relationships among different financial statement items as well as between these items and nonfinancial data. Continuous control processes are concentrated in audit departments, branches, customers, and agency owners. It is considered one of the forensic accounting techniques that are used to obtain evidence related to fraud. The Beneish Model enables rhetorical accountants to evaluate corporate financial accounts from several perspectives. Beneish Model reveals that, higher days' sales in assets, higher accruals, higher declines in gross margins, and higher quality indicators of economic data manipulation (Mbasiti, Gyang & Ojaide, 2021).

The relative Size Factor (RSF) technique is the ratio of the largest numbers to the second largest number of a given set and when applied to figures, the unusual variations may be routed from fraud or genuine errors (Wadhwa & Pal, 2012; Yadav & Yadav, 2013). The scholars further asserted that if any stray instance is observed beyond the normal range, further investigation may be required which will assist in the detection of anomalies or routines. The Net Worth Approach (NWA) according to Biber (2010) has two methods of determining and verifying taxpayers' income. The direct method is specific, referring to the books and records used in the preparation of the relevant tax computations while the indirect method involves the determination of tax liabilities through an analysis of a taxpayer's financial affairs accumulating information beyond the taxpayer's declaration and formal books and records. Net Worth Comparative Method is like NWA, but in its application, the current net worth of the taxpayer will be compared with the value of the cumulative years in identifying the difference and treat as income not disclosed for the current year.

Benford's Law describes the sequence in which multiple numbers from real-life sources can be distributed in a specific, non-uniform way (Wells, 2012). It has been established that this technique is applied in the summarization after the classification of the first digit field and the calculation of the observed count percentage (Wadhwa & Pal, 2012). Computer-assisted auditing tools are computer programs that forensic accountants could make use of, in the audit procedure to process data of audit significance in the client's information system Trend analysis is one of the important forensic accounting techniques that can be deployed to identify frauds. Emphasis is on focusing on exceptional transactions. The expenditure approach involves the use of the expenditure of the taxpayer to determine the undisclosed income. Biber (2010) asserted that the purchasing of capital items by cash, personal and business loan repayments through cash, personal expenses paid with cash, in addition to increases in cash on hand should

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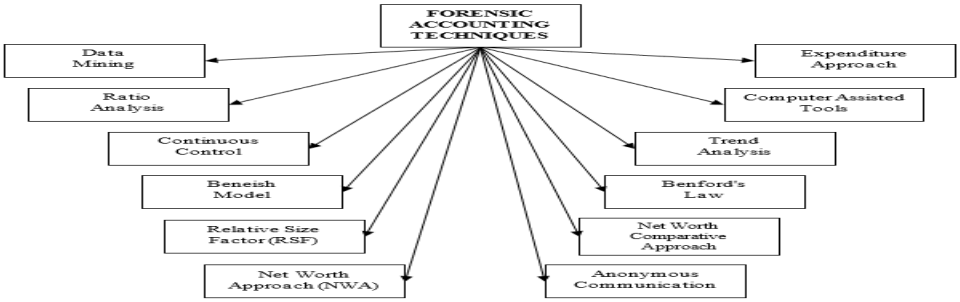
be determined through an in-depth examination of taxpayer's financial affairs. Anonymous communication denotes the sending of information, tips, and ideas that could aid the prosecution of fraudsters without the revelation of identity. Anonymous tips come in a wide variety of forms such as email messages; anonymous phone calls; posts on bulletin boards, written confirmation from debtors or/and creditors, and so on (Ezenwafor & Udukeke, 2019).

**Conceptual Model of Forensic Accounting Techniques**




Source: Author 2022

## Methodology

This study adopted both *ex-post facto* research design and descriptive survey research design. The descriptive survey research design is predicated on virtually collected primary data directly from respondents while *ex-post facto* examines already existing data to arrive at new findings. The respondents for this study were purposively selected and they include forensic accountants, fraud auditors, bankers, forensic investigators, finance enthusiasts, fraud investigators, and those in academia. The data for this study were gathered electronically using an online questionnaire through Google Forms. The researcher received 120 responses which were analysed using Google Form response analysis output and Microsoft Excel. Secondary data were also gathered from existing data, established by seasoned academics on the issue under evaluation. The literature for this study was obtained from journals, published books, reports, and articles that dealt with issues on forensic accounting, fraud examinations/investigation, forensic accounting techniques, and the roles of anti-corruption agencies in reducing fraudulent practices, both in Nigeria and abroad. The data are then presented using pie charts and bar charts. Through this approach, the researcher was able to arrive at the *Determinants of Forensic Accounting Techniques.*

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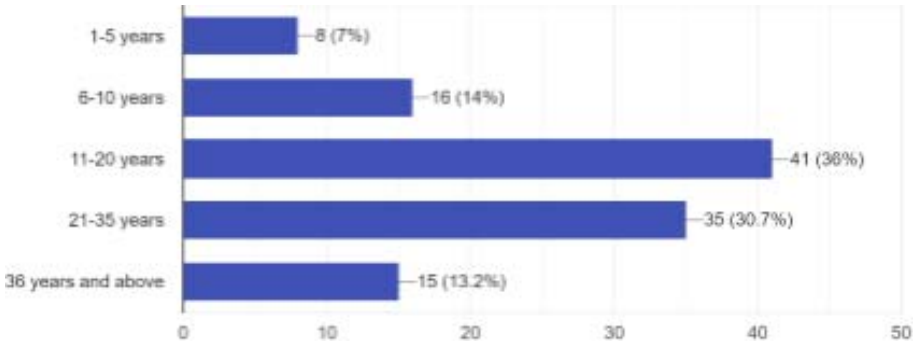
## Data Analysis and Presentation

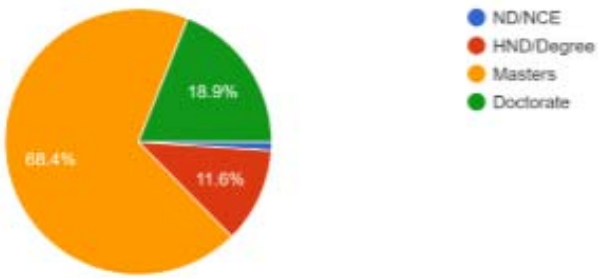
**Figure 1: Years of Experience**




Source: Field Report, 2022

Analysis from Figure 1 shows that 7% of the respondent has 1-5 years of work experience, 14% has 6-10 years of work experience, 36% has 11-20 years of work experience, 30.7% has 21-35 years of work experience, and 13.2% has work experience of 36 years and above.

**Figure 2: The highest level of Education?**




Source: Field Report, 2022

Analysis from Figure 2 shows that 18.9% of the respondents are Doctorate holders, 68.4% of the respondents have Master's degree, 11.6% holds HND/Bachelor's degree and 1.1% of the respondents have ND/NCE as their highest level of education.

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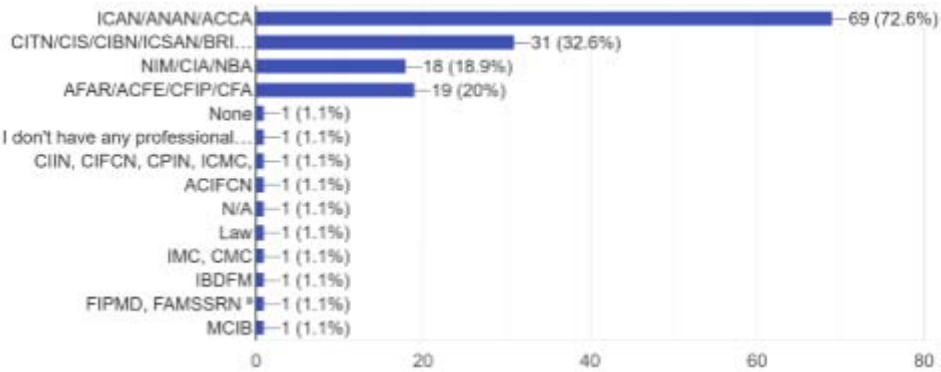
**Figure 3: Professional Qualification?**




Source: Field Report, 2022

Analysis from Figure 3 shows that 72.6% of the respondents have professional accounting qualifications of ICAN/ANAN/ACCA, 32.6% has professional accounting qualifications of CITN/CIS/CIBN/ICSAN/BRIPAN as a professional qualification, 18.9% have NIM/CIA/NBA as a professional qualification, 20% has AFAR/ACFE/CFIP/CFA as a professional qualification, 1.1% has CIIN, CIFCN, CPIN, ICMC as a professional qualification, 1.1% has IMC, CMC as a professional qualification, 1.1% has IBDFM as a professional qualification, 1.1% has FIPMD, FAMSSRN as a professional qualification, 1.1% has ACIFCN as a professional qualification, 1.1% has MCIB as a professional qualification, 1.1% has Law as a professional qualification.

**Research Question One**

**What determines the technique(s) to be used during fraud investigation?**

The respondents have varying answers to this question, but the majority agreed that the main factor that determines the technique(s) to be adopted while investigating fraud is the nature of fraud under investigation. What makes up the nature of fraud includes the level of crime perpetrated, how much involved, the stages and complexity of the fraud, and who is involved.

According to the data gathered, the crime evidence such as documents and proof available may also determine the techniques to be adopted during the investigation. Criminal evidence may come in two different formats, verbal or/and physical. Although, this evidence can also be faked by the defendants to

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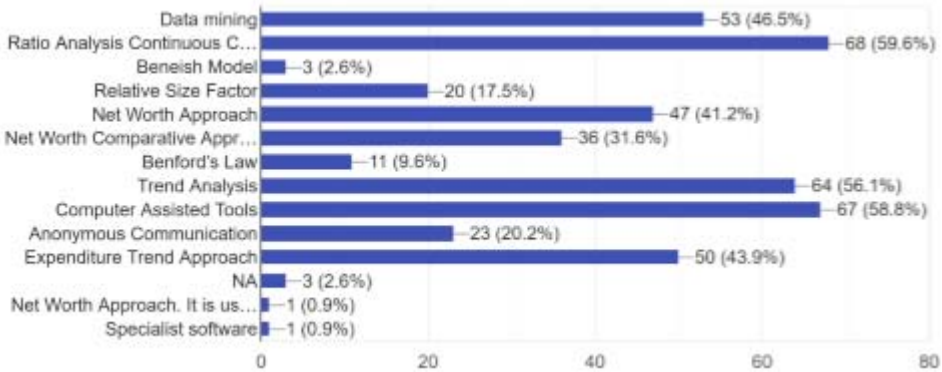
demonstrate their innocence. The experience or expertise of the fraud examiner is involved also vital. The expertise of the examiner can be measured in terms of qualifications and certification required, while experience connotes the number of similar cases the examiner has handled and how successful the operation was.

The organisation where the fraud is committed also determines what technique(s) an examiner is to apply. An organisation could have policies/protocols stated regarding fraud. Some organisations have in-house fraud examiners, while many outsource only when a crime has been committed. Also, who committed the fraud matters (whether an insider or outsider). In situations whereby an examiner is outsourced, he/she maybe be provided with the organisation's preferred procedure of fraud investigation.

**Research Question Two**

**Figure 4: Which of the following forensic accounting techniques are you familiar with?**




Source: Field Report, 2022

Analysis from figure 4 shows that 46.5% of the respondents are familiar with Datamining as a forensic accounting technique, 59.6 are familiar with Ratio Analysis Continuous, 2.6% are familiar with Beneish Model, 17.5% are familiar with Relative Size Factor, 41.2% are familiar with net Worth Approach, 31.6% are familiar with Net Worth Comparative Approach, 9.6% are familiar with Benford's Law, 56.1% are familiar with Trend Analysis, 58.8% are familiar with Computer Assisted Tools, 20.2% are familiar with Anonymous Communication, 43.9% are

familiar with Expenditure Trend Approach, 0.9% are familiar with Net Worth Approach and 0.9% are familiar with Specialist software.

**Which of the above-listed techniques is the most suitable for forensic/fraud examination and why?**

In supplying an answer to this research question, the majority chose Data mining as the most suitable for forensic examination. This technique facilitates the extraction of hidden predictive information from large databases and has great potential to assist organizations to identify trends, anomalies, and other unusual activities thus allowing businesses to make proactive knowledge-driven decisions. Data mining includes the utilization of refined data analysis tools to find previously unknown, valid patterns and relationships in huge data sets. The respondents believe data mining is the most applicable because It leaves no stone unturned; it involves the inference from data that can serve as evidence; It enables the forensic auditor to get more information than what is presented; it involves most use of IT software; it can incorporate statistical models, machine learning techniques, neural networks, and mathematical algorithms; and It helps to dig out untampered information from sources.

Also, a significant number of responders see computer-assisted tools as the most suitable forensic investigation technique because it is efficient and transparent; and fact and figure can be gotten within a reasonable period. Other respondents chose computer-assisted tools because they provided more analytical reports; it is reliable and accurate; it generates reliable evidence needed for litigation; it is ICT driven, and it is easy to operate.

Trend Analysis according to a few respondents is the most suitable tool for forensic/fraud examination because it takes advantage of the periodic stamp attached to the transaction to systemize the collection of required data to prove or disprove cases. That is, it considers the use years in analysis. Trend analysis also gives broad knowledge of what happened in the previous year before the investigation by providing comparative figures. Because the Net Worth Approach is useful in determining net worth increase by considering the assets and liabilities, income, and expenses; and it takes care of both sources of funds and utilization of funds of all persons under investigation, some respondents find it appropriate.

A minority of the respondents will consider the Expenditure Trend Approach while examining fraud because it solves two things: it reviews the trend and identify abnormalities and probe further, and provides details of how funds were applied. The expenditure trend approach provides the magnitude and patterns of

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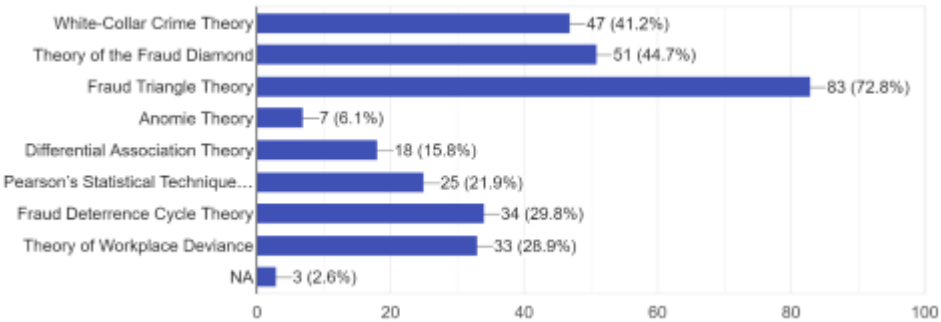
expenses involved such that further queries can be raised to substantiate historical facts behind every expenditure incurred. Also, few respondents prefer Ratio Analysis and Continuous Control because it is the only technique that everyone or venture stakeholders will easily understand for decision making as it simplifies the identification of abnormal trends.

Also, very few numbers of respondents believe the Anonymous Communication approach can work because the investigation gives adequate information which is carried out under disguise. Using this method, facts or truth can easily gather without the element of fear. However, 1 out of the entire 114 (1.1%) respondents suggested a combination of different approaches will be better while handling fraud cases, especially when the crime committed is very complicated.

### Research Question Three

**Figure 5: Which of the following theories or models of forensic accounting/fraud examination are you conversant with?**




Source: Field Report, 2022

Analysis from figure 5 shows that 41.2% of the respondent are conversant with White-Collar Crime Theory, 44.7% are conversant with the Theory of the Fraud Diamond, 72.8% are conversant with Fraud Triangle Theory, 6.1% are conversant with Anomie Theory, 15.8% are conversant with Differential Association Theory, 21.9% are conversant with Pearson's Statistical Technique, 29.8% are conversant with Fraud Deterrence Cycle Theory and 28.9% are conversant with Theory of Workplace Deviance.

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**Which of the above theories best explain forensic accounting and why?**

Responses gathered for this research question show that the Theory of Fraud Diamond is most appropriate in forensic accounting because it guides forensic accountants on factors to watch out for while investigating fraud. The theory, assesses the four elements that influence a person to commit fraud, namely pressure, opportunity, rationalization, and capability. That is, it encompasses all the factors that make people involved in fraudulent practices. The Fraud Diamond Theory takes into consideration both accounting and non-accounting events that could lead to the conclusion that fraud has been committed and by who. Generally, records show the occurrence of the event, however, to ascertain who the perpetrators are, the principle of capability, opportunity, rationalization, and pressure comes into play.

A good number of respondents considered the Fraud Triangle Theory as the cyclical cause-effect approach to forensic accounting because it encompasses the core areas of fraud. The theory emphasizes more the three basic elements that characterise the perpetration of fraud which are opportunity, pressure, and rationalization. According to a responder, the individual who commits fraud follows a triangular sequence: a need that must be met; an opportunity to meet the need; and the ability to rationalize the fraud

Fraud Deterrence Cycle Theory according to some respondents best encapsulates forensic investigation because the best way to fight fraud is to deter its occurrence. It is when deterrence is not possible that you go to fraud prevention and then to fraud detection. Fraud deterrence. Beyond investigating fraud, forensic accounting aims at preventing its occurrence by examining processes and investigation and remediation of suspected or alleged problems. Fewer responders chose White-Collar Crime Theory as the universal foundational theory because fraud is easily being perpetuated in blue-chip companies without any early detection

Other respondents chose Pearson's Statistical Technique Theory because it measures the strength of the relationship between two variables and their association; Anomie Theory because most people attempt to achieve culturally acceptable goals; Expenditure Theory since fraud is mostly expenses or payable and trend analysis over a period will determine the further investigation; and finally, Theory of Workplace Deviance because it analyzed any significant violation of organisational norms

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**Discussion of Findings**

This study discussed various scholarly definitions of forensic accounting, forensic accounting techniques, and fraud investigation. The study also highlighted the various techniques which can be applied in fraud investigation. From the empirics, forensic accounting was found to be the application of analytical and investigative skills to resolve financial issues in a manner that meets standards required by a court of law. Forensic accounting is a scientific accounting method for the detection, resolution, analysis, and presentation of fraud cases that can be used in court. (Oyedokun, 2013; Oyedokun, 2018; Kolawole, et al. 2018).

Analysis from this study shows that 36% of the respondents have between 11 and 20 years of work experience in their various fields. This shows that the respondents have enough experience which makes them suitable for this research and their responses can be assumed to be valid. The analysis also shows that 31.6% of the respondent have attended training or/and hold a certificate in Forensic and Fraud Examination while 68.4% of the respondent does not. It can then be concluded that the majority of the respondents have not been trained in forensic accounting and fraud investigation. The majority of the respondents are master's degree holders and are a member of relevant professional institutes/associations such as ICAN, ANAN, ACCA, CITN, CIS, CIBN, NIM, CIA, NBA, AFAR, ACFE, CFA, and so on.

Research question 1 sought to find the determinants of forensic accounting and fraud investigation techniques. The data gathered shows the nature of fraud under investigation which includes the level of crime perpetrated, how much involved, the stages and complexity of the fraud, and who is involved as the major determinant of techniques to be applied to fraud examination. Also, other factors such as criminal evidence, the expertise and experience of the examiner, organisational policies, and the risks involved.

Research question 2 was set to ascertain the various techniques with which forensic examiners are familiar and find out the most suitable for forensic/fraud examination. According to the data gathered, Data mining, Ratio Analysis Continuous, Trend Analysis, Computer Assisted Tools, Expenditure Trend Approach, and Net Worth Approach are the most popular among professional fraud examiners.

Data mining in this study emerged as the most suitable for forensic examination. This is because it involves the inference from data that can serve as evidence; It enables the forensic auditor to get more information than what is presented; it involves most use of IT software; it can incorporate statistical models,

machine learning techniques, neural networks, and mathematical algorithms; and It helps to dig out untampered information from sources. Also, computer-assisted tools are suitable forensic investigation techniques because they are efficient and transparent; and facts and figures can be gotten within a reasonable period. Computer-assisted tools have also been proven to provide more analytical, reliable, and accurate reports because it is ICT driven.

Trend Analysis takes advantage of the periodic stamp attached to the transaction to systemize the collection of required data to prove or disprove cases. That is, it considers the use years in analysis. Trend analysis gives broad knowledge of what happened in the previous year before the investigation by providing comparative figures. The Net Worth Approach is also useful in determining net worth increase by considering the assets and liabilities, income, and expenses; and it takes care of both sources of funds and utilization of funds of all persons under investigation, some respondents find it appropriate. Other techniques such as Expenditure Trend Approach, Ratio Analysis, and Continuous and Anonymous Communication come after the aforementioned.

The third research question seeks to ascertain the theories or models with which forensic examiners are conversant and to find out which of the theories or models best explain forensic accounting techniques. Analysis of the data gathered revealed White-Collar Crime Theory, Theory of the Fraud Diamond, and Fraud Triangle Theory are the most applicable theories that buttress forensic investigation.

The results show that the Theory of Fraud Diamond is most appropriate in forensic accounting because it guides forensic accountants on factors to watch out for while investigating fraud. The theory, assesses the four elements that influence a person to commit fraud, namely pressure, opportunity, rationalization, and capability. That is, it encompasses all the factors that make people involved in fraudulent practices. The Fraud Diamond Theory takes into consideration both accounting and non-accounting events that could lead to the conclusion that fraud has been committed and by who. The Fraud Triangle Theory was found to encompass the core areas of fraud. The theory further reveals that for fraud to occur, there is pressure in form of one need or the other that cannot be met and there is a window to exploit in form of opportunity and a rationale which is otherwise known as justification to engage in the act.

White-Collar Crime, Pearson's Statistical Technique Theory, Anomie Theory, Expenditure Theory, and Theory of Workplace Deviance were also found applicable to fraud investigation but not as known as the ones explained above.

From the empirical studies, the use of forensic accounting skills and techniques was found to be a viable tool for investigating and detecting cases of corruption, bribery, financial fraud, and other fraudulent exercises both in the public and private sectors (Dada, et al, 2013; Gbegi & Adebisi, 2014; Sidharta & Fitriyah 2015; Dauda, et al. 2016; Oyedokun, 2018; Sule, et al. 2019; Okoye, et al, 2020; Ojukwu, et al. 2020). In addition, Ogbeide, et al. (2017) revealed that the perceived benefits and perceived risks of using forensic accounting services were largely significant in influencing organizations' intention to use forensic accounting in fraud detection and prevention in the Nigerian context. However, the study of Dada and Jimoh (2020) shows that litigation support services had a significant but negative effect (reduction) on financial crimes in the Nigerian public sector. They opined that forensic accounting experts be employed to carry out more litigation support services to serve as an expert witness that will assist the court to conclude issues that the court may not ordinarily have the knowledge to decide, while more forensic accountants are engaged to reduce the rate of fraudulent cases in the Nigerian public sector. Similarly, Manhonlen, Otakefe, and Osikhenaogiedu (2020) also noted that forensic accounting serves as the basis for investigation, expert witness testimony, and opinion of an expert in a lawsuit to unravel crimes and reach a resolution for recovery.

Furthermore, the legal factor constitutes the most significant hindrance to the use of forensic accounting techniques, followed by educational factors and political factors (Inyang & Effiong 2016). Sagir, et al. (2021) revealed that behavioral, educational, and legal factors are positively related to the applicability of forensic accounting in the states. He noted that to successfully apply forensic accounting services, the educational, legal, and behavioral factors must be given special consideration. Kolawole, et al. (2018) also noted that information technology (IT), auditors' independence, training and development, and banking policy have a positive relationship with the application of forensic accounting in Nigerian deposit money banks and also revealed that forensic accounting and banking policy reduces asset misappropriation in Nigerian deposit money banks.

Alshurafat, Al Shbail and Mansour (2021) stated the strengths of forensic accounting to be of benefits to students and accounting professionals, the significant need and increasing demand, the new career channels, and the reduction of fraud, and that the weakness factors are the lack of regulation, the lack of control over the profession entry, the lack of agreement on how to teach forensic accounting, the lack of specialized research journals. Ojukwu, et al. 2020 concluded that forensic accounting services provide tertiary institutions with the

necessary tools to deter fraudulent activities but do not curb fraudulent activities and recommended that the eradication of economic and financial crime through the adoption of forensic accounting in the system will improve the image of the universities under review. Another study by Mbasiti, et al.2021) revealed that forensic data analysis techniques have positive effects on revenue leakages in Nigerian federal universities. The study of Suleiman and Othman (2021) recommended that the Institute of Chartered Accountants of Nigeria (ICAN) and the Association of National Accountants of Nigeria (ANAN) should promote forensic accounting formalization and specialization in their curricula, and academia should emphasize forensic accounting skills development through learning in a higher educational institution.

The study of Akinadewo and Akinkoye (2020) is of the view that there is no agreement as to the specific tools to be adopted for tax evasion detection and no record of it is included in the government reports. They opined that the techniques of forensic accounting, when applied, will reduce the rate of tax evasion, and improve the tax revenue of governments for economic development and growth. Also, Suleiman and Othman (2021) revealed that forensic accounting techniques are useful to curb corruption in Nigeria, that technology-centric investigation is essential and that to the frustration of the key players in the judiciary, such as the judges and the lawyers, is one of the causes of persistent corruption. They advocated that forensic bookkeeping minimised the level of fraudulent practices in Indonesia and Nigeria's public sector, their view was also corroborated by the study of Sidharta and Fitriyah (2015) and that of Igweonyia, (2016).

**Conclusion and Recommendations**

This study is an in-depth evaluation of the various forensic accounting techniques which apply to fraud prevention. The data gathered shows the nature of fraud under investigation which includes the level of crime perpetrated, how much involved, the stages and complexity of the fraud, and who is involved as the major determinant of techniques to be applied to fraud examination. Also, other factors such as criminal evidence, the expertise and experience of the examiner, organisational policies, and the risks involved.

Although there is no “one size fit all” approach to fraud prevention, detection, and deterrence, this study affirmed, confirmed, and adduced the relevant forensic accounting techniques to be Data mining, Ratio Analysis Continuous, Trend Analysis, Computer Assisted Tools, Expenditure Trend Approach, and Net Worth Approach are the most popular among professional fraud examiners. However, the

combination of two or more of the above-identified techniques is advised for forensic accountants, forensic legal practitioners, and all other similar parties as it gives them the flexibility to test different methods in the practice of forensic accounting and fraud investigation.

Also, this study ascertained the theories and models with which forensic examiners are conversant and which of the theories or models buttresses forensic accounting techniques. Analysis of the data gathered revealed White-Collar Crime Theory, Theory of the Fraud Diamond, and Fraud Triangle Theory as the most applicable theories that best explain forensic investigation.

From the findings of this study, therefore, the following are recommended:

1. that forensic accounting techniques should be deployed to help prevent and reduce fraudulent activity;
2. the need for corporations to engage the services of forensic accountants as forensic accounting now appears as one of the strategic and dynamic tools for the management of all types of corruption;
3. public and private sectors should engage, recruit, and employ the services of a forensic accountant to review, strengthen, reappraises records and internal control systems on a routine basis;
4. there is the need to focus on training and updating the skills of the internal control and audit staff in forensic accounting techniques, for their effective services deliveries;
5. the investigative legal system should be strengthened to be able to effectively handle forensic accounting and fraud cases;
6. educational and training institutions should consider the inclusion of forensic accounting curriculum in the relevant executive training;
7. governments at all levels should have the political will to prosecute offenders and institutionalize policies and employ the application of forensic accounting techniques;
8. Professional bodies should continue to encourage specialization in forensic accounting among the professional practices; and
9. the use of anonymous communication methods should be encouraged as well as extensive awareness should be put in place for the use by the public as well as quick responses to queries should be encouraged;

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# ANNUAL ACCOUNTING INFORMATION AND STOCK PRICE REACTIONS: EVIDENCE FROM NIGERIA DEPOSIT MONEY BANKS IN WEST AFRICA

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**Abstract**

*This paper examined the value relevance of accounting information and stock prices in Deposit Money Banks in Nigeria. Specifically, it assessed the behaviour of share prices in relation to accounting information in terms of earnings per share, book value per share, dividends per share and return on assets. The study adopted the expo-facto research design and the study elements covered all the 18 listed Deposit Money Banks; out of which, 10 Banks were selected as the study participants and this was achieved through a random sampling technique. The study covered 10 years, spanning from 2010-2019 and data were sourced from the fact book of the Nigeria Stock Exchange (NSE) and audited annual financial reports of the sampled banks. The estimation technique adopted in this study was panel data analysis technique. This was carried out after descriptive statistics and Pearson correlation. It was discovered that earnings per share, book value per share and dividends per share exert a positive and significant effect on stock prices and that return on assets exerts a positive and insignificant effect on stock prices. Based on the*

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*findings, it was established that accounting information has a positive effect on stock prices. Thus, it was recommended that timely and adequate accounting information should be made available by the management of Deposit Money Banks in Nigeria to induce the interest of investors and that investors are urged to pay more attention to earnings per share, book value per share and dividend per share in their investment decisions.*

**Keywords:** *value relevance, accounting information, stock prices*

**JEL Classification*:*** A47, S15

## 1. Introduction

The indispensability of the stock market to individuals, organizations and the nation at large cannot be overstressed. It is a place where the liquidity state of organizations is fostered by investors and a market for buyers and sellers of securities at a price determined by the market forces. While the buying and selling of securities are always motivated by profit-related reasons, the volume of transactions determines the enhancement of economic growth and development. This underscores the relevance of the stock market to the growth of other sectors in the country. Thus, the Nigerian Stock Exchange (NSE) was established in 1961 to facilitate the improvement of the capital market (Maku & Atanda, 2010).

The capital market avails investors, local and foreign, to invest their money with a singular aim of making a profit. However, there seems to be a general concern about the variability of the stock price. Olowolaju and Ogunsan (2016) (2014) argued that stock prices are more unstable than what is justified by time variation in dividends. Oyerinde (2016) opined that stock price is the current trading price of a security, as a result of the interaction of the traders, investors and dealers. It is the price determined by the extremity of the demand and supply of securities. Stock prices undulate during the trading days as the investors trade stocks. Consequently, when there is a high purchase of stock, the market prices inflate and equally decrease as the investors begin to sell more of the stock.

The intermittent changes in the stock prices appear to be the function of many factors, part of which is accounting information. Accounting information is an avenue where the effectiveness and efficiency of the management team of organizations are known. Accounting information summarizes the efforts of the management team in terms of business transactions and other relevant operational activities, as they relate to the attainment of the stated objectives. While existing and potential shareholders use accounting information to determine investment

decisions, stakeholders like the government uses it for tax-related reasons and other regulations.

Timely and adequate accounting information seems to be needed to make a profitable investment decision. accounting information reveals the financial performance of firms and, in turn, engender investors to make a rational decision. Uniamikogbo, Ezennwa and Bennee (2018) noted that the prices of stock might change at the release of new information in the market. However, the direction of the changes is dependent on the relevance of that new information as well as the degree in which the news surprise investors. Investors are rational thinkers; whose aim is to make a profitable investment. Hence, the value relevance of the accounting information of market operators determines the extent to which investors would be attracted.

Information contained in the accounting information is adjudged "value relevant" if it explains the movement of the stock prices. The value relevance of accounting information is the ability of the accounting figures to summarize the information underlying the changes in the stock price. However, the global financial crises that engulfed virtually every economic sector in 2008 brought value relevance of accounting information under serious criticisms (Olowolaju & Ogunsan, 2016). The claim is that accounting information is not appropriate to evaluate the market value of service-oriented firms, which are high-technology driven (Oyerinde 2011). In Nigeria, particularly in the banking sector, the 2009 crises that saw the collapse of some banks seems to affect the value relevance of the accounting information to investors. This seems to be a reoccurrence issue in the banking industry till date.

A lot of studies have been conducted to examine the relationship between accounting information and stock prices. Using different variables and methods of analysis, reported findings were disaggregated. Uniamikogbo, Ezennwa and Bennee (2018) revealed that earnings per share and dividend per share had a negative and significant effect on stock prices, while book value per share had a positive and significant effect on stock prices in Nigeria. Oliver (2015) reported that it was only EPS, amongst the other variables (ROA and bank age) that has both a positive and significant relationship with MPS. Umar and Musa (2013) discovered that firms' EPS has no predictive power on stock prices and should not be relied upon for the prediction of the behavior of stock prices in Nigeria.

Osundina, Jayeoba and Olayinka (2016) reported that accounting information (Earning per Share, Price-earnings Ratio, Book Value per Share and Dividend per Share) has a strong positive significant impact on stock price volatility. Also,

Uwuigbe, Uwuigbe, Jafaru, Igbinoba and Oladipo (2016) showed that a significant positive relationship existed between earnings per share (EPS) and last day share price. Adaramola and Oyerinde (2014) reported that information on earnings, dividend, book value and cash flows can be used to predict share prices of quoted firms significantly. The mixed findings created a vacuum for another study and this constitutes the motivation for this present study.

Another motivation for this study is found on the period covered by previous studies. While Uniamikogbo, Ezennwa and Bennee (2018) covered 2013-2017, Oliver (2015) covered 2004-2013, Umar and Musa (2013) covered 2005-2009, Osundina, Jayeoba and Olayinka (2016) covered 2005-2014, Uwuigbe, Uwuigbe, Jafaru, Igbinoba and Oladipo (2016) covered 2010-2014 and Adaramola and Oyerinde (2014) covered 1991-2010. These periods might not reflect the recent development in the industries and findings reported might not be relied upon given the intermittent change of the government policies and the business environment.

The problems solved by this study centered on the mixed findings reported by the previous studies regarding the behaviour of share price in relation to various predictors and the period they covered which might not reflect the recent happenings in the business environment of Nigeria. Based on these premises, the study examined annual accounting information and stock prices in Deposit Money Banks (DMBs) in Nigeria. The timeliness of this study is rooted in the recent happenings in the banking industry that saw the collapsed of Diamond bank and also the usage of recent data (2010-2019). The findings of this study would be useful for investors, creditors, bankers and analysts to make a productive investment decision. In the same vein, the findings of this study might be helpful to students and their teachers interested in a similar topic. The rest of the paper was organized as follows: the next section focused on the literature review, followed by the methodology, results and discussion of findings, and conclusion and recommendations.

## 2. Literature Review

Every investor, foreign and local, who transacts on the stock market aims to make fortunes rather than misfortunes. This could be accredited to the reason why a better understanding of the stock market prices is important to investors. Stock market prices stand as the basis for the evaluation of monetary institutes in line with its break-even point i.e. to determine the profitability of such a business entity (Okafor, Mgbame & Chijoke-Mgbame, 2011). As an investor, the most significant piece of information needed is when to buy or sell a stock is its market price.

Adequate information indicates the current value to buy or sell a stock. It could also be used to analyze the estimated value of financial institutes and their historic stock trends. Oyerinde, (2016) opined that the stock market price is the current trading price of security based on the market forces.

Changes in the market stock price is an indicator mostly used to detect changes in trends in the market place. However, a decrease or increase in the market stock value is as a result of the investor's reaction changes in the stock market. The change in stock prices tends to upsurge when new information is unconstrained into the stock market. The extent to which it increases is determined by the importance of the released new information together with the degree at which the news astonishes the investors (Ajao, 2012). The change of ordinary stock price is the systematic and organized risk faced by investors who possess ordinary stock investments (Guo, 2012). The greater the unpredictability of stock market price, the greater the opportunity of making great profits or losses in investment within a short period. Therefore, as a result of unstable stock, its price seems to vary over a given time. The slighter the change of a given stock, the better its prestige to investors.

Okafor, Mgbame and Chijoke-Mgbame (2011) asserted that the investors are meticulous in risk-taking, therefore, the instability of their investments is of paramount to them as it is a measure for the level of risk they are being exposed to. He added that the stock volatility is a measure of ambiguity about the productivity of the stock. Also, a market could be said to be unstable if the previous stock prices are mirrored in the future price of the stocks. Therefore, to be able to ascertain the estimates of the instability of stock, one can only observe the stock return series through financial information. Oyerinde, (2016) opined that an efficient stock market serves as an impetus for economic growth and development of a nation and enhances private capital for the development of business entities in Nigeria. In 1961, the Nigerian Stock Exchange (NSE) was established to simplify the development of the stock market (Maku & Atanda, 2010). Thus, a reliable and consistent accounting information is required as a vital prerequisite for the growth and development of the stock market as investors need accurate and reliable accounting information for investment decisions.

Accounting information seems to be the most crucial factor utilized by investors for their investment decision. Serife and Uger (2012) noted that investment decisions made on the financial institution's stock price is a comprehensive reflection of a financial institute's futuristic profit. Accounting information is generated to facilitate the user's decision making. Nevertheless, for the financial

report to be effective, it should be reliable, relevant and complete. High effectiveness also requires that the information must not have the tendency of unfairness, that is, favoring one party over the other. Therefore, accounting information seems to give an investor the ability to make investment decisions. Perera and Thrikawala (2010) opined that accounting information helps to increase its user's knowledge to identify the differences and similarities between two or more types of information. Financial statements help to provide relevant and reliable information to both the external and internal users. Managers, owners, employees, investors, suppliers, financial institutions, creditors, governments and their agencies, customers, and other stakeholders use financial information to make rational decisions on investment.

Deposit money banks generally use financial information contained in the financial statements as one of the basic channels of communicating to shareholders and stakeholders. On this basis, stock market controllers and accounting standards body seems to improve the financial statement's quality order to upsurge the transparency level in financial reports (Menike & Man, 2013). In the stock market, two factors are significant in the determination of the share price; these factors include accounting or non-accounting information (Khanagha, 2011). Accounting information refers to the channel through which economic events are communicated to its users to make investments decision (Abiodun, 2012). It comes in the form of ratios, which include earning per share, price earning ration, dividend per share, return on assets and book value per share.

Earnings per share are the sum of current period incomes (profit or loss) attached to a unit of ordinary share. It is the fiscal value of incomes per outstanding share of common stock for a business entity. Earnings per share is one of the most significant variables for determining an organization's share prices. This implies that high Earnings per Share (EPS) designates that the financial institution is more lucrative and has more earnings to allocate to its shareholders. Osundina, et al (2016), asserted that earnings per share are a digit unfolding a public financial institute's profit per outstanding share of stocks, calculated on an annual or quarterly basis. EPS is obtainable by dividing a company's annual or quarterly net income by the number of its outstanding stocks. EPS is an elementary measure for financial institutes' profitability level and to inform the investors whether the institute is a safe bet. It plays a vital role in the stock market price determination of most financial institutes as it influences the control of the stock market price.

In the long run, most financial institutes generate profits, much of which is paid out as interest to their creditors and as dividends to their shareholders. The leftover

is sum up with the amount publicized as collective retained earnings on the institute's books. The summation of the collective retained earnings and other entries under stockholder's equity is known as the book value per share (Osundina, et al, 2016). Osundina, et al (2016) asserted further that the book value of shares and assets is the worth of these items in a business entity's financial records. The worth could be found in the entity's accounting tools such as journals, ledgers and balance sheets. The book value per share is a market value ratio that weighs stockholders' equity against outstanding shares (Adaramola & Oyerinde, 2014). This implies that the division of the value of all shares by the number of shares issued. Consequently, the book value per share is mostly of use to investors for determining whether a share is undervalued.

Book value per share is one of the most crucial elements which influence the market value of equity share as it expresses the value of shares in a financial institute. The book value is a reflection of the dividend distribution policy, investment decisions and past earnings of a financial institute. Hence, a high book value reveals that a business entity has a huge reserve, while a low book value implies a liberal distribution policy of dividends and bonus, or a weak track record of profitability (Pushpa & Sumangala, 2013). The book value per share is deeply-rooted in financial accounting practice and hence can be recognized relatively easily.

Dividend per Share (DPS) is another financial information needed by investors to determine their decisions. According to Okafor, Mgbame and Chijoke-Mgbame (2011), DPS is a way to evaluate a business entity from the investment point of view and to know whether the business entity is cash propagative or not. It is the digit calculated by dividing the entire dividends paid by a business entity, with interim dividends, over a given period (Siyanbola & Adedeji, 2014). A financial institution's dividend per share is often obtained using the paid dividend in the recent quarter. It reveals the retention policy of a business entity as the investors would prefer a higher ratio to retain their investment. Over the years, dividends are sum together excluding special dividends but interim dividend inclusive for the right calculation of DPS. Special dividends are dividends that are issued once and are not included. While interim dividends are dividends distributed to declared shareholders and are paid before the business entity determines its annual incomes. If a business entity issues its common shares during its calculation period, the aggregate number of the outstanding ordinary shares is calculated by using the weighted average of shares over the reporting period, which is the same figure used for earnings per share (EPS).

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Return on Asset is rank as one of the most widely used variables to determine a business entity's profitability level. Return on Assets (ROA) is a financial ratio that reveals the percentage of profit a business entity receives in coordination with its overall resources. It is generally ascertained by dividing the net income by the total assets. The net income is obtained from the income statement and the profit after taxes of a business entity. Umar and Musa (2013), added that return on assets is an indicator of the profitability level of a business entity relative to its total assets. A high ROA value implies a higher profitability of a firm. It is a communal notion that if a firm is profitable, its share price seems to increase. This implies a positive sign for any investors to invest. Figure 1 showed the conceptual framework of this study.

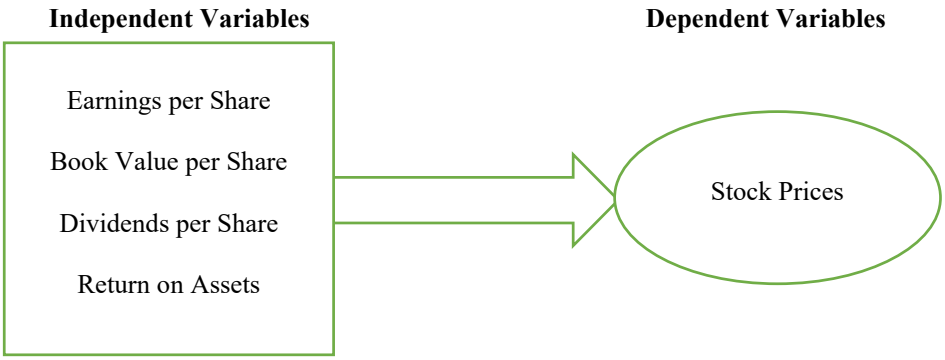


*Figure 1: Conceptual Framework*
*Source: Author's Design*

### 2.1. Theoretical Review

Signaling theory and the idea of market efficiency provided the theoretical framework for this research. In 1973, Andrew Michael Spence put out this notion. The concept of asymmetric information (a deviation from perfect information) served as the theoretical basis for the signaling theory, which postulates that inequalities in access to information disrupt the regular market for the exchange of goods and services in some economic interactions. Spence (1973) proposed that a solution to the issue of asymmetric information between two parties may be achieved by having one party send a signal disclosing some of the essential information to the other side. For the stock market, this hypothesis stands in for the possibility that not all participants have access to the same information at the same time. It has been shown that the signaling theory is helpful for assessing behavior

when two entities (individuals or businesses) have access to dissimilar information. Melisa (2013) argued that when markets are imperfect, managers will use cash dividend statements to signal shifts in their expectations for the company's future. In addition, it is hypothesized that company executives use earnings as a type of signaling to provide information about the future of their organizations.

However, Brian, Trevis, Duane, and Christopher (2011) argue that the theory's core premises have grown hazy as it has been applied to organizational challenges, thus the rationale behind the clarification isn't enough to save it from criticism. This hypothesis is relevant because it provides a realistic explanation for why and how financial news might affect stock price volatility. According to the hypothesis, the price of a company's shares will move when its management or shareholders make a statement that includes significant information. In essence, this theory agrees with the idea that financial statement that contains meaningful information might affect the view of a corporation when it is released publicly.

The concept of market efficiency was proposed by Fama (1965). It says that all information about a stock and the stock market as a whole may be reflected in its price at any one moment. According to this hypothesis, no participant in the market (companies, brokers, shareholders, investors, etc.) has any special knowledge that gives them an edge in forecasting the direction of stock prices. When considering the information available to market participants, the efficient market hypothesis takes into account not just its kind and origin but also its speed and quality (Amiri, Ravanpaknodezh & Jelodar, 2015).

According to Jonathan (2008), the basic ideas of this theory cannot be put to the test. The concept that returns are irregular, he went on to say, is wrong and impedes financial economics study. Only by using a risk-free probability measure can returns have any degree of uncertainty. With an actual probability measure, it is possible to foresee one's return, and it is this predictability that financial economists value (Jonathan, 2008). This hypothesis is important because it accurately predicts that most companies' share prices already include their value, profitability, and worth. When a company's value rises, its stock and bonds tend to follow suit on the stock market. Sometimes investors won't have time to go into every detail of a firm, but they may quickly compare stock prices to choose a company with which they feel comfortable investing.

### 2.2. The Effect of Financial Reporting on Stock Market Values

Numerous investigations on this topic have been conducted all across the globe. For example, Abiodun (2012) did a research on the influence of accounting

numbers on stock price in Nigeria using descriptive statistics paired with the logarithmic regression models. Forty firms from different sectors of the Nigerian economy were used as examples in the research, which spanned the years 1999-2009. Based on the results of the research, it can be concluded that earnings are more important than book values in determining the value of a company, and that information presented in the income statements is more important than data presented in the statement of financial position in determining the value of companies in Nigeria.

To see whether profits per share (EPS) and return on assets (ROA) significantly impacted the share price of publicly listed corporations in the Philippines, Placido (2012) conducted a research. Fifty publicly traded companies' 2009 financial statements were used, all culled from the OSIRIS database. Spearman's Rank Order Formula Outcome A detailed examination of the connection between earnings per share and share price revealed a robust positive relationship between the two. Return on Assets was shown to have a tepidly negative relationship with stock price. The average change in share price was shown to be significantly affected by the selected model in a multiple regression analysis. Umar and Musa (2013) also conducted research on the link between stock prices and earnings per share at various companies between 2005 and 2009. Businesses' EPS were shown to have no predictive value on stock prices when tested using a simple linear regression model on a panel of 140 firms out of a total population of 216 firms' operating on the Nigerian Stock Exchange (NSE).

Hemadivya and Devi (2013) conducted research on the influence of earnings per share (EPS) on the share prices of a number of publicly traded firms. By using regression and correlation analysis, we discovered that shifts in EPS had a considerable impact on the stock price. There is a strong, positive, and statistically significant link between market price and EPS, as evidenced by the correlation between these two variables. According to the data, there is a positive but statistically insignificant correlation between market price and earnings per share.

By using Ordinary Least Squares (OLS) Regression on data from over 500 publicly listed companies obtained from the Value Line Investment Survey database, Profilet and Bacon (2013) investigated the impact of certain financial factors on stock price volatility over time. It was shown that leverage and growth were inversely correlated with share price volatility, whereas the size of the firm and dividend yield had a negative correlation.

In a research published in 2014, Chege, Othieno, and Kodongo looked at monthly and weekly return series from January 1999 to December 2013 to

determine how the environment of return of share prices and volatility on the NSE had changed. In this analysis, we employed the GARCH-in-mean and E-GARCH models. The research concluded that shocks to equities returns tend to stick around for a long time. Further analysis of the data showed that recent disturbances had no effect on the conditional variance at the moment, but that historical variances do. Market volatility was also observed to be attracted to important international and local economic events. Accounting information's value significance in Pakistan's banking industry was also studied by Shehzad and Ismail (2014). Nineteen (19) private banks were analyzed in the research, covering the years 2008 through 2012. The pooled regression method was used. Accounting data explained a significant percentage of the stock price, while earnings per share was shown to be more value relevant.

The value relevance of accounting information in the Nigerian stock market was studied by Adaramola and Oyerinde (2014), who looked at the period from 1991 to 2010. The secondary information was collected from the Fact Books of the Nigerian Stock Exchange, the Annual Financial Reports of firms listed on the Nigerian Stock Exchange, and the Annual Reports of the Nigerian Stock Market. The panel model was analyzed using the Generalized Least Squares (GLS) regression technique. The results indicate that accounting data has a considerable impact on the share prices of firms trading on the Nigerian Stock Exchange. Share prices of publicly traded companies may be predicted using data like profits, dividends, book value, and cash flows.

Oliver (2015) conducted research on the correlations between financial performance measures and stock prices in the Nigerian banking industry, looking at their significance, directionality, causality, strength, and cointegration. Secondary data was collected from the 2004-2013 annual reports and accounts of four different banks in Nigeria: First Bank Plc, Access Bank Plc, Zenith Bank Plc, and United Bank for Africa Plc. Using a multiple regression model, we identified the kind and strength of the relationship between the MPS and the independent variables of Bank Age, Earnings Per Share (EPS), and Return On Assets (ROA). Among the factors tested, it was discovered that only EPS had a positive and statistically significant connection with MPS.

Over the course of 10 years, Osundina, Jayeoba, and Olayinka (2016) analyzed the effect of accounting data on the share price fluctuations of a sample of publicly traded Nigerian manufacturing firms (2005-2014). Ordinary Least Squares were used to estimate values for the study's variables, and econometric views (E-views) were used to do the analysis. Accounting data was shown to have a positive and

statistically significant influence on stock price volatility in a cross-sectional fixed-effects model.

To find out if accounting information could affect the prices and demand for shares of banks listed on the Nigeria Stock Exchange from 2005-2014, Olowolaju and Ogunsan (2016) evaluated the value-relevance of such data. Twelve banks from the Nigeria Stock Exchange were chosen at random for the research. Mean, standard deviation, kurtosis, and skewness are examples of descriptive statistics, whereas panel regression and correlation were employed to test the hypotheses. The findings also show that BVS and DPS have a high degree of predictive power for MPS. According to the results, the dividend per share of Nigerian banks has a beneficial effect on their stock prices. Moreover, the research found that accounting profits reflected by earning per share contribute considerably to the market pricing of bank shares.

The impact of financial statement value relevance on Nigerian company share prices was studied by Uwuigbe, Uwuigbe, Jafaru, Igbinoba, and Oladipo (2016). This study employed the audited financial statements of listed banks that were traded on the Nigerian Stock Exchange Market and the fact book from the Nigerian Stock Exchange Market to accomplish its goals. Purposive sampling was used to pick 15 banks trading on the Nigerian stock exchange for this investigation. However, descriptive statistics and the fixed effects Panel data method of data analysis approach were used in the study to analyze the research hypotheses. The results demonstrated a positive and statistically significant correlation between EPS and the share price on the last trading day (LDSP).

Mori (2016) conducted research on the impact of stock price volatility on the Nairobi Securities Exchange. The analysis spanned the 10 years from 2006 to 2015 and relied on secondary data. The acquired data was evaluated by means of SPSS version 23's Karl Pearson correlation and multiple linear regression. According to the results of the research, share price volatility and interest rates had a negative effect on the stock market, while interest rates and the availability of money had a favorable effect. The research also found that interest rates, money supply, and economic growth were significantly impacted, although share price volatility and stock market performance were not.

Accounting information on financial statements and its effect on the stock price of energy companies listed on Vietnam's stock market was studied by Hung, Viet Ha, and Binh (2018). The authors examined the relationship between stock prices and variables such return on assets (ROA), capital structure (LV), firm size (size), current ratio (CR), and accounts receivable turnover (turnover) using the OLS

regression model and the quantile regression model. Over the years of 2006-2016, data were gathered from 44 energy companies. Stock prices were shown to be positively connected with return on assets (ROA), firm size (size), current ratio (CR), and accounts receivable turnover (turnover), but not capital structure (LV).

An examination of the effect of accounting data on Nigerian stock market volatility was conducted by Uniamikogbo, Ezennwa, and Bennee (2018). The study used a cross-sectional research strategy. Twenty-two (22) company annual reports and accounts were employed as a supplementary source of data generation covering a five-year time frame (2013- 2017). Descriptive statistics and Ordinary Least Square (OLS) regression were used to examine the data derived from the annual reports and accounts. Their research showed that in Nigeria, stock prices were significantly influenced by book value per share but not by profits per share or dividends per share.

### 2.3. Development of Research Questions and Literature Gap

Several studies have examined the impact of accounting data on stock prices in Nigeria and elsewhere. However, it was clear from the papers examined that the stated outcomes were inconsistent, and that the time period may not be representative of current stock market activity. Following these principles, the following hypotheses were developed::

$H_0$1: Earnings per share would not significantly affect stock prices in Deposit Money Banks in Nigeria;

$H_0$1: Book value per share would not significantly affect stock prices in Deposit Money Banks in Nigeria;

$H_0$1: Dividend per share would not significantly affect stock prices in Deposit Money Banks in Nigeria

$H_0$1: Return on assets would not significantly affect stock prices in Deposit Money Banks in Nigeria.

## 3. Methodology

The study used an expo-facto research design, and all 18 of the listed Deposit Money Banks were analyzed; however, only 10 of the Banks were included in the study due to a random selection process. Data on predictor and outcome variables came from the fact book of the Nigeria Stock Exchange (NSE) and audited annual financial reports of the selected banks, covering the whole 20-year time frame of the research (2000-2019). The global financial crises of 2008 and 2009, corporate malfeasance, capital market volatility, and bank failure overtook the nation and

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shaped the time period under consideration. The formula, a-priori expectations, and individual variables are listed in Table 1. Panel data analysis, which covers pooled effect panel, fixed effect panel, and random effect panel, was used as the estimate method for this investigation. This was done after descriptive statistics and Pearson correlation were already completed. Taking into account time-series and cross-sectional variables, as well as allowing for variables to be observed across businesses and years, panel regression analysis was deemed suitable. This is because it may significantly lessen the difficulty arising from omitted variables. This is the format that the fixed effect must take:

$$Y_{it} = a_0 + \beta_1 X_{it} + \delta i + \mu_{it} \quad (1)$$

$\delta i$ is a time-varying intercept that captures all the variables that affect $Y_{it}$ that vary over time but are constant cross-sectionally. The random effect model follows the forms presented below:

$$Y_{it} = a_0 + \beta_1 X_{it} + W_{it}, W_{it} = \pounds_{it} + \mu_{it} \quad (2)$$

Where $\pounds_{it}$ measures the random deviation from the global intercept a, subscript "it" represents the combination of time and individuality. $U_{it}$ means error term.

This study modified one of the models used by Olowolaju and Ogunsan (2016) to examine the value relevance of accounting information in the determination of the share prices of quoted Nigerian Deposit Money Banks.

$$ASP_{it} = f(EPS_{it}\ BVS_{it}\ DPS_{it}) \quad (3)$$

Where ASP is Average Share price, EPS is Earnings per Share, BVP is Book Value per Share and DPS is Dividends per Share. However, the model was modified with the incorporation of another predictor variable (Return on Assets). This is to enhance the analysis of the relationship between accounting information and share prices. Hence, the modified model is presented thus:

$$ASP_{it} = f(EPS_{it}\ BVS_{it}\ DPS_{it}\ ROA_{it}) \quad (4).$$

While ROA is Return on Assets, the equation of the model becomes:

$$ASP_{it} = \beta_o + \beta_1 EPS_{it}, + \beta_2 BVS_{it}, + \beta_3 DPS_{it} + \beta_4 ROA_{it} + \varepsilon_{it} \quad (5)$$

Where $\beta_1$ - - - - - $\beta_4$ = the slop parameters, i = cross-sectional variable from 1, 2, 3, 4 and t = time series variable from 1, 2, 3, 4

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**Table 1: Variables in the Research Model**

| Variable Names | Type | Code | Measurement | Expected Direction of Impact |
|---|---|---|---|---|
| Stock Price | Dependent | ASP | Average Share price at the end of the year | |
| Earnings per Share | Independent | EPS | Net income ÷ Total number of capital stock shares | + |
| Book Value per Share | Independent | BVS | (Shareholders' Equity − Preferred Shares) ÷ Total Number of Outstanding Shares | + |
| Dividends per Share | Independent | DPS | Annual Dividends ÷ Number of Shares | + |
| Return on Assets | Independent | ROA | Profit after tax/total assets | + |

*Source: Author's compilation*

## 4. Results and Discussion of Findings

### 4.1 Results

The estimation technique adopted in this study includes panel data analysis technique which consists of pooled effect panel, fixed effect panel and random effect panel. This was carried out after descriptive statistics and Pearson correlation.

**Table 2: Descriptive Statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **ASP** | 100 | 13.9938 | 8.7282 | 1.11 | 42.08 |
| **EPS** | 100 | 1.3039 | 1.1411 | -1.58 | 5.48 |
| **BVS** | 100 | 13.8797 | 6.0323 | 3.32 | 30.13 |
| **DPS** | 100 | 0.9431 | 1.2412 | 0.21 | 11.23 |
| **ROA** | 100 | 11.3019 | 8.8802 | 0.14 | 39.23 |

*Source: Data Analysis, 2020*

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Table 1 showed the summary of the descriptive statistics of the variables. It showed that the mean value of the share price of all the sampled firms was 13.9938, flagged by a minimum and maximum values of 1.11 and 42.08 respectively. The dispersion around the mean indicated by the value of standard deviation was given to be 8.7282. The average value of earnings per share stood at 1.3039 and fluctuates from a minimum value of -1.58 to a maximum value of 5.48. The dispersion around the mean indicated by the value of standard deviation was given to be 1.1411. also, the average value of book value per share was 13.8797 and ranged from a minimum value of 3.32 and a maximum value of 30.13. The dispersion around the mean indicated by the value of standard deviation was given to be 6.0323. The mean value of dividend per share was given to be 0.9431 and fluctuates from a minimum value of 0.21 to a maximum value of 11.23. The dispersion around the mean shown by the value of standard deviation was given to be 1.2412. The mean value of return on assets was 11.3019, flagged by a minimum and maximum values of 0.14 and 39.23 respectively. The dispersion around the mean indicated by the value of standard deviation was given to be 8.8802.

**Table 3: Pearson Correlation**

| Variable | ASP | EPS | BVS | DPS | ROA |
|---|---|---|---|---|---|
| **ASP** | 1 | | | | |
| EPS | 0.4283 | 1 | | | |
| BVS | 0.4605 | 0.2241 | 1 | | |
| DPS | 0.3254 | 0.1255 | 0.1487 | 1 | |
| ROA | 0.1015 | 0.0807 | 0.2498 | 0.2901 | 1 |

*Source: Data Analysis, 2020*

Table 3 showed that share price maintained a positive correlation with all the predictor variables with a specific correlation coefficient of 0.4283 for share prices and earnings per share, 0.4605 for share prices and book value per share, 0.3254 for share prices and dividend per share and 0.1015 for share prices and return on assets. This implies that share prices move in the same direction with earnings per share, book value per share, dividend per share and return on assets. In the same vein, the correlation between all the predictor variables was positive all through, reflecting that they followed the same direction.

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**Table 4: Pooled OLS Estimation Result**
***Series: ASP EPS BVS DPS ROA***

| *Variable* | *Coefficient* | *Std Error* | *T-Test* | *Probability* |
|---|---|---|---|---|
| | | | | |
| C | 6.8323 | 2.466 | 4.77 | 0.000 |
| EPS | 2.9855 | 0.7108 | 4.20 | 0.000 |
| BVS | 0.6207 | 0.1369 | 3.06 | 0.002 |
| DPS | 0.6863 | 0.2442 | 2.50 | 0.020 |
| ROA | 0.0391 | 0.0901 | 0.43 | 0.655 |

*Source: Data Analysis, 2020. R-square=0.5371, Adjusted R-square=0.4571, F-statistics=56.17, Prob(F-stat)=0.0000.*

Table 4 revealed that when heterogeneity effect across the sampled firms in the study is not given consideration, all the predictor variables exert a positive significant effect on share prices of Deposit Money Banks in Nigeria except return on assets to the tune of 2.9855(p=0.000<0.05) for earnings per share, 0.6207(p=0.002<0.05) for book value per share, 0.6863(p=0.020<0.05) for dividend per share and 0.0391(p=0.655>0.05). This indicates that the null hypothesis that earning per share, book value per share and dividend per share would not exert a significant effect on share prices are rejected and that the null hypothesis that return on assets would not exert a significant effect on share prices is accepted. The R-square value given to be 45.7 indicated that the systematic variation in the share prices was jointly caused by earning per share, book value per share, dividend per share and return on assets. The F-statistics along with the probability value given to be 56.17 and 0.0000 respectively showed that the model is fit.

**Table 5: Fixed Effects Estimates (Cross-sectional and Period specific)**
***Series: ASP EPS BVS DPS ROA***

| CROSS-SECTIONAL SPECIFIC EFFECT | | | TIME SPECIFIC EFFECT | | |
|---|---|---|---|---|---|
| Variables | Coefficients | Prob | Variables | Coefficients | Prob |
| Constant | 6.0637 | 0.000 | Constant | 6.3875 | 0.001 |
| EPS | 3.0122 | 0.000 | EPS | 2.9305 | 0.000 |
| BVS | 0.2057 | 0.042 | BVS | 0.2273 | 0.002 |
| DPS | 0.8113 | 0.023 | DPS | 0.5884 | 0.068 |
| ROA | 0.0478 | 0.1102 | ROA | 0.0747 | 0.490 |

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| Effects | | | Effects | | |
|---|---|---|---|---|---|
| ACCESS | 1.7295 | 0.299 | 2011 | 0.7438 | 0.694 |
| POLARIS | -0.5014 | 0.780 | 2012 | 0.8253 | 0.658 |
| FIRST | -0.9594 | 0.580 | 2013 | 1.3500 | 0.449 |
| UBA | 0.3895 | 0.854 | 2014 | -2.8591 | 0.0.195 |
| ZENITH | 1.7607 | 0.021 | 2015 | 3.7364 | 0.031 |
| FIDELITY | 2.1513 | 0.001 | 2016 | 0.4371 | 0.805 |
| WEMA | 1.1337 | 0.038 | 2017 | 0.3949 | 0.850 |
| STANBIC | -0.7972 | 0.704 | 2018 | 4.7381 | 0.007 |
| ECO | 1.5592 | 0.373 | 2019 | -1.3418 | 0.458 |
| R-square=0.782<br>Adjusted R-square=0.766<br>F-statistics=44.16<br>Prob(F-stat)=0.0000 | | | R-square=0.5848<br>Adjusted R-square= 0.5413<br>F-statistics=49.75<br>Prob(F-stat)=0.0000 | | |

*Sources: Data Analysis, 2020.*

*Accounting for each firm's individuality required this estimator to systematically factor in the heterogeneity impact across companies in the sample. Each business and year were given their own unique intercept term in the model to account for the heterogeneity effect and period impact. Table 5 shows that the null hypothesis is rejected due to the positive and significant effect of earnings per share on share prices of 3.0122(p=0.0000.05) for cross-sectional estimation. And the null hypothesis is rejected since book value per share has a positive and substantial influence on share prices, amounting to 0.2057(p=0.0020.05). With a co-efficient of 0.8113 and a p-value of 0.068, dividend per share had a positive and statistically insignificant influence on share prices. For this reason, we accept the null hypothesis. Insignificantly (p=0.0478), a good ROA affects share prices by 0.490% (0.510>0.05). An R-squared value of 76.6% indicates that earnings per share, book value per share, dividends per share, and return on assets are jointly responsible for the systematic variation in share prices. F-statistics of 44.16 and a probability value of 0.0000 both indicate that the model is appropriate. Table 5 displays the results of fixed effect period-specific estimate, which show that earnings per share (2.9305, p=0.0000.05) and book value per share (0.2273, p=0.0020.05) have a positive and substantial influence on the share prices of Deposit Money Banks in Nigeria. This disproves the idea that earnings per share and book value per share would not have any impact on stock prices. Further, dividend per share (0.5884) and return on assets (0.0747) have a positive and*

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*statistically significant influence on share prices (0.068>0.05 and 0.0490>0.05, respectively). This means that investors accept the alternative premise that dividend per share and return on assets do not have a significant impact on stock prices. Earnings per share, book value per share, dividends per share, and return on assets were all found to be significant in explaining the systematic variation in share prices (R-squared = 54.1%). Model fitness was determined using 49.75 and 0.0000 for the corresponding F-statistic and probability value.*

*Access Bank, Polaris Bank, First Bank, UBA, Zenith Bank, Fidelity Bank, Wema Bank, Stanbic Bank, and Eco Bank all deviated by 1,7295, -0.5014, -0.9594, 0.3895, 1,7607, 2,1513, 1.1337, -0.7972, and 1,5592 from the intercept term (6.0637) corresponding to the reference businesses (GTB). For 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019 the percentage difference from the intercept term (6.3875) of the reference period (2010) was 0.7438, 0.8253, 1.3500, -2.8591, 3.7364, 0.4371, 0.3949, 4.7381, and -1.3418 on Table 6 .*

**Table 6: Random Effect Estimation**
***Series: ASP EPS BVS DPS ROA***

| ***Variable*** | ***Coefficient*** | ***Std Error*** | **Z-Test Values** | ***Probability*** |
|---|---|---|---|---|
| C | 8.2392 | 2.8993 | 4.08 | 0.000 |
| EPS | 2.4958 | 0.7913 | 3.15 | 0.002 |
| BVS | 0.4482 | 0.1530 | 2.25 | 0.041 |
| DPS | 0.6705 | 0.2081 | 2.34 | 0.038 |
| ROA | 0.9198 | 2.8993 | 0.91 | 0.362 |

*Source: Data Analysis, 2020.* R-square=0.4741, Wald chi2(5) =18.66, Prob> chi2 =0.0000

Random effect estimation result presented in Table 6 revealed that when heterogeneity effect across firms and over time is incorporated into the model via the error term, earnings per share, book value per share, dividends per share and return on assets exert a positive effect on share prices of Deposit Money Banks in Nigeria, although the positive effect was only significant for earnings per share, book value per share and dividends per share unlike return on assets that is not significant. Reported coefficient and probability values of earnings per share, book value per share, dividends per share and return on assets stood at 2.4958(0.000<0.05), 0.4482(0.041<0.05), 0.6705(0.038<0.05) and 0.9198(0.362<0.05) respectively. This indicates that the null hypothesis that earning per share, book value per share and dividend per share would not exert a significant effect on share prices are rejected and that the null hypothesis that

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return on assets would not exert a significant effect on share prices is accepted. The R-square value given to be 47.4% indicated that the systematic variation in the share prices was jointly caused by earning per share, book value per share, dividend per share and return on assets. The Wald chi2(5) along with the probability values given to be 18.66 and 0.0000 respectively showed that the model is fit.

**Table 7: Hausman Test**

| Null hypothesis | Chi-square stat | Probability |
|---|---|---|
| **The difference in coefficient not systematic** | 8.57 | 0.0727 |

***Sources:*** *Data analysis, 2020.*

Table 7 reported a chi-square statistic of 8.57 and a probability value of 0.0727. The result revealed that there is no enough evidence to reject the null hypothesis that differences in coefficients of fixed effect estimation and random effect estimation is not significant. Therefore, the most consistent and efficient estimation is given by the random effect estimation as presented in table 7.

**Table 8: Other Post Estimation Tests**

| *Wald test* | | |
|---|---|---|
| Null hypothesis | Statistics | Probability |
| *Panel homoscedasticity* | 4.0017 | 0.1607 |
| *Pesaran test* | | |
| Null hypothesis | Statistics | Probability |
| *No cross-sectional dependence* | 2.116 | 0.4518 |
| *Wooldridge test* | | |
| Null hypothesis | Statistics | Probability |
| *No AR (1) panel autocorrelation* | 0.4419 | 0.5019 |

***Sources:*** *Data analysis, 2020.*

Tabulated probability statistics of 0.1607> 0.05 for the Wald test, 0.4518> 0.05 for the Pesaran test, and 0.5019> 0.05 for the Wooldridge test indicate that there is

insufficient evidence to reject the null hypothesis on panel homoscedasticity, null hypothesis of no cross-sectional dependence, and null hypothesis of no AR (1) panel autocorrelation. Therefore, the analysis proves that the cross-sectional independence, lack of serial autocorrelation, and equal variance of residual terms assumptions for the calculated panel-based model hold true.

**Analyzing the Results**

Share price movements have been analyzed in connection to accounting data including EPS, book value, dividends, and ROA. Table 7 displays the results of an evaluation test that compared fixed effect and random effect estimators and found that the random effect estimation was the more consistent and efficient choice for the study. It was found that the share prices of Deposit Money Banks in Nigeria are positively influenced by earnings per share, book value per share, dividends per share, and return on assets; however, the positive effect is only statistically significant for earnings per share, book value per share, and dividends per share. Earnings per share (EPS) has shown to be a reliable indicator of future stock price movements for Deposit Money Banks in Nigeria, in line with a priori expectations. This might be due to the fact that investors are logical creatures with a vested stake in a profitable company. Oliver's (2015) and Osundina, Jayeoba, and Olayinka's (2016) conclusions that earnings per share affects stock prices were bolstered by this result. This finding hints to the possibility of using changes in earnings per share to forecast stock prices. Similarly, the beneficial impact of book value per share confirms the earlier belief that this metric is superior for analyzing stock price fluctuations. This suggests that the historical value of a Deposit Money Bank in Nigeria's assets per share has a significant impact on the stock price volatility in Nigeria. Adaramola and Oyerinde's (2014) observation that book value per share may be utilized to forecast share prices of listed corporations considerably is supported by these results. Therefore, the beneficial influence of dividend per share on stock prices was in line with the a-priori hypothesis, suggesting that dividend per share data might provide useful insight into stock price behavior. One possible explanation is that shareholders value banks that have a track record of regular dividend payments. It follows from this finding that dividends per share may be used as a predictor of stock price movements. Despite contradicting the conclusion reached by Uniamikogbo, Ezennwa, and Bennee (2018), this result bolstered the conclusions reached by Osundina, Jayeoba, and Olayinka (2017) that dividends per share has a negative and substantial influence on stock prices (2016). Additionally, the a-priori anticipation that return on assets would have a positive and negligible

influence on stock prices was verified. As a result, Oliver's (2015) finding that EPS is the sole variable (together with return on assets and bank age) that has a positive and substantial link with stock prices was confirmed.

## Conclusion and recommendation

Finally, some recommendations and a summary are presented.Accounting data and stock prices at Nigerian deposit money banks were analyzed for their potential value significance in the research. The research concluded that the dissemination of accounting data is beneficial to the market as a whole. Based on the data, it was determined that earnings per share, book value per share, and dividends per share trends were significantly more predictive of stock prices than the prediction of return on assets. Therefore, it was suggested that the management of Deposit Money Banks in Nigeria make accessible timely and appropriate accounting information to attract investors. Financial reports should be prepared and presented in accordance with legislation and international standards to win over both domestic and international investors. Increasing the management team's efficiency and effectiveness in order to increase profits is strongly promoted. Some investors might be enticed by this. Earnings per share, book value per share, and dividends per share are all important metrics that investors should consider closely when making portfolio allocations. The top banks should keep an eye on the accounting data presented by the rest to prevent any misinformation of investors. Although the scope of this study was narrowly focused on Nigeria's Deposit Money Banks, researchers interested in this issue might easily broaden their investigation to include other industries, such as healthcare or manufacturing.

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# ANALYSIS OF SALES MANAGEMENT STRATEGIES. STUDY CASE TO A DISTRIBUTION COMPANY OF BUILDING MATERIALS AND INTERIOR FURNISHING ELEMENTS HEADED IN ROMANIA

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**Abstract**

*This paper aims to study the sales in the field of construction materials and interior design, presenting in a case study, managerial aspects of the DedeRman SRL Company[1], as well as the factors that can influence the purchase decision. All these characteristics are closely related to management strategies, so its societal branch is vital to better anticipate buyers' wishes. Thus, the company DedeRman SRL has adopted as values: seriousness, honesty, diligence, and values, that have guaranteed this company the road to success. The theme of this project was chosen because of the importance of*

[1] For data and information security reasons, the real name of the company will not be disclosed. Thank you for understanding.

*management strategies aimed at construction materials, a vast field, which is in continuous development, being at the same time a good field to exploit.*

*This work aims to achieve the following objectives:*

*• Knowing the distribution of projects monitored in 2021*

*• Identifying the evolution of the construction materials market both internally and externally*

*• Knowing the types of customers*

*• Identifying the strengths and weaknesses of the DedeRman SRL company*

*• Recognition of some communication parameters that influence the company's management.*

*The novelty of this topic is represented by the management analysis of the DedeRman SRL company and the construction materials market in a pandemic context.*

**Keywords:** *sales management strategy, communication, purchase decision*

**JEL Classification:** M21

## Introduction

This paper is descending from the general to the most important aspects of sales management.

The first part of the work reports the current parameters of the international and national market, as well as the legislation in force characteristic of it in the country of origin. By presenting the distribution of projects carried out in 2021 both nationally and internationally, the importance of the real estate market was highlighted, a market on which the field of construction materials is dependent. All this information was, of course, studied under the context of the current pandemic, which has loudly influenced the sales market. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

Then we presented the DedeRman SRL company in detail, describing the most important aspects. From the beginning of the company to the present, certain branches regarding the marketing environment, both internal and external, as well as the essential aspects (performance, risk, competition), which brought DedeRman SRL to the first place in Romania on the construction materials market, were polished and interior arrangements.( Gallati, R. R. , 2022).

The last part of the paper aims to present general information about sales management. Thus, the most important activities aimed at obtaining maximum

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business figures of the company are described. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022)

We opted for this theme starting from the premise that in the current context of the market of construction materials and interior design, customer requirements are developing at an accelerated pace, the competition is increasingly competitive, and the failure or success of a company on the market depends on customer behavior and the consumer market. (Apaolaza, U., Orue, A., Lizarralde, A., & Oyarbide-Zubillaga, A., 2022)

The products and services offered by this company must be in line with market and customer requirements and knowing customer needs and purchasing power is important for effective management and marketing strategies, this knowledge being possible by expressing their wishes. (Islamgaleyev, A., & Uruzbayeva, N., 2022).

## 1.National and international construction materials market and related profile legislation

### 1.1 The national market of construction materials

In 2021, in Romania were found around 26,269 projects running in various stages of development and over 10000 projects targeting housing construction ( Graph 1. ), a figure above the level of the one recorded in the year of the onset of the pandemic, but also above the value of 2019.

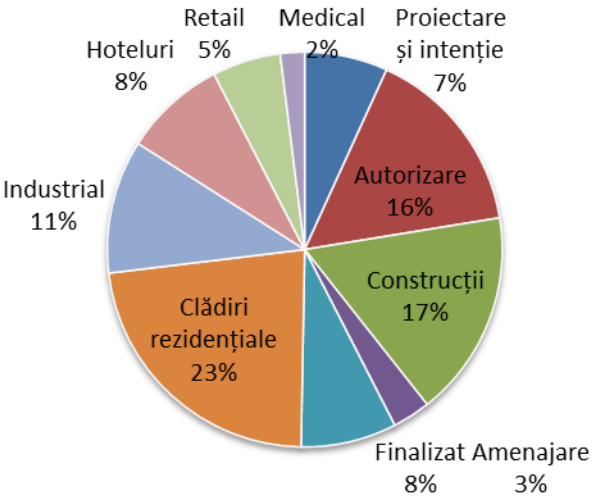

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**Chart 1. Projects monitorized in 2021**

As it was easy to anticipate, the most popular field is that of private residential buildings, approximately 40% of the ongoing projects in 2021 aimed at building homes. Although the pandemic brought travel restrictions, hitting the tourism market hard, and established remote work, hitting the office market, even this year developers continued to invest in these sectors as well. In 2022, the construction market is under the influence of inflation and the crisis of raw materials.

Regarding the distribution of projects in the country, the most active were registered in Bucharest, Ilfov and the counties of Bihor, Timiş and Cluj.

The manufacturers of construction materials were less affected by the current pandemic context than the companies belonging to the areas of the economy. In the longer term, the evolution of this sector will depend on the financing and execution of infrastructure projects. In the next period, the expansion strategy of these companies aims at automation, digitization, and sustainability; these things being concluded following the Roland Berger study. (Tran, N. Q., Tien, N. H., & Chi, D. T. P. , 2022). Considering the increasingly significant impact of constructions on the environment, the effective development strategy is sustainability, aiming at the decrease of energy consumption to reduce carbon emissions, but also the increase of the collection of materials for the purpose of recycling. (Tran, N. Q., Tien, N. H., & Chi, D. T. P., 2022). A study regarding the year 2020, the construction materials market reached 4 billion euros, which brought a 9% increase compared to 2019.

Looking towards the year 2022, a continuous increase in prices is inferred, and the purchasing power will be intensely affected by the increase in the cost of living, thus, no increases of 10-15% annually in terms of constructions are foreseen. This year a minimum evolution of +0.3% is expected with a slight increase until 2025, the problem facing the market being related to the labor force and the price increases of construction materials. Contrary to these things, even if not all projects will be completed in 2022, a considerable number of constructions are announced. ( Asghari, M., Afshari, H., Mirzapour Al-e-hashem, S. M. J., Fathollahi-Fard, A. M., & Dulebenets, M. A., 2022).

### 1.2 International market of construction materials

The international construction market will grow by 70%, approximately 63,000 billion dollars in the next 12 years. Approximately 2 billion inhabitants are expected by the year 2050 in the urban environment, but problems regarding energy, water, and sanitation will slow down development; another 2 thirds of the

world's constructions will focus on China, India, the U.S.A., a challenge for humanity being urbanization.

Next to the real estate market, there is also the global market for the construction of highways, roads, and bridges, which are growing strongly. This is due to increased government initiatives and economic expansion in developing countries.

The very high increase in the prices of construction materials in Europe have determined that in some countries like Hungary they launch investigation after investigation, and Poland treats these increases with superficiality and finances the projects from public money. This price explosion put the competition council on alert. ( Asghari, M., Afshari, H., Mirzapour Al-e-hashem, S. M. J., Fathollahi-Fard, A. M., & Dulebenets, M. A., 2022).Thus, in 2022, an increased number of constructions is expected, but their finality is questioned due to the high prices of material resources, but also the limited availability of labor. At the same time, DIY retailers will be the most profitable due to the increase in the price of construction materials even by 300%, as they are continuously expanding on the local market. ( Asghari, M., Afshari, H., Mirzapour Al-e-hashem, S. M. J., Fathollahi-Fard, A. M., & Dulebenets, M. A., 2022).

At the European level, towards the end of 2020, when the raw material stock crisis worsened, the prices of construction materials were felt, the first being iron by 30-50%. Thus, the wood industry, which includes timber and other finishing materials, increased by 30% (Graph 2). Another very important product is sand, without which constructions are impossible, it brought prices up by 10% per ton, metal doubled, while most people who needed to buy brick and paint had to pay 20% more. Real estate developers took advantage of these price increases, which is why prices rose by approximately 20%. Given that most of the materials come from Russia, China, Turkey, the blockage caused by the Covid 19 pandemic has accentuated the massive increases in raw materials. Another cause of price increases is also due to the war in Ukraine, a fact that brought down builders due to high prices, bringing the construction sector to near collapse.

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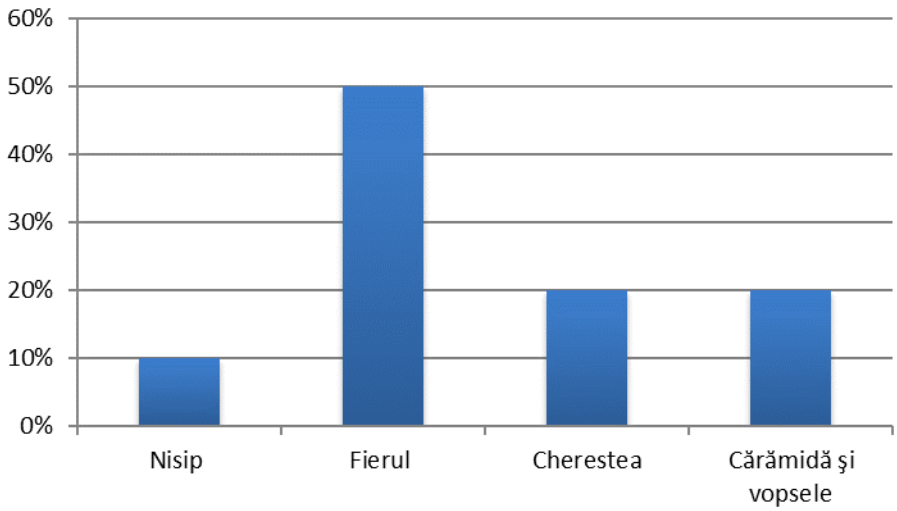


**Chart 2. Prices of raw materials.**

Between the months of September-2021 and February 2022, there were increases in construction materials between 60-80%, these being caused by the lack of raw materials. According to statistics, Ukraine was an important supplier of a whole series of profile materials such as concrete, cement, profiles and bitumen, these enormous increases being able to bring to a halt many construction sites both in the country and in Europe.

The European demand for wood was significantly influenced by the very high demand from the USA. Thus, the sales market being larger in the USA, European producers mostly exported to the American market, which led to high prices including in Eastern Europe. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022). Another reason would be to reduce deforestation and log processing in British Columbia. A conclusive example would be Poland, where construction materials have been more expensive for months, and in September 2021 record jumps were recorded. Thus, the price of OSB boards increased by 125%, anti-moisture materials by over 60% and thermal insulation materials by 53%.

Financial analysts say that the prices of construction materials will not decrease until the following year, which is why domestic production is recommended for some countries.

These high prices in Europe and the USA lead to the influence of general inflation and for this reason great efforts of economic regulation are necessary for

the central banks, the purchasing power of the common man and even the contracts with the state.

**1.3 National legislation regarding the market of construction materials. Analysis of the framework**

The current law in the field of landscaping and construction needs to be adapted to the current requirements and development possibilities of the population, but also regarding economic growth. In this case, the legislation adopts new concepts and reformulates new principles, as well as develops new processes in a well-designed legislative framework that leads to the quality of the built environment. An extremely important thing is development planning, especially for Romania, which has gone through many fundamental changes from a political point of view. (Pereira, D. F., Oliveira, J. F., & Carravilla, M. A. , 2022). Regarding law no. 50/1991, which includes the authorization of construction works, with subsequent amendments and additions, the issuance of the opinions of the services of the central authorities aimed at the protection of the health of the population, is not necessary for some categories of works except in certain special situations of derogation from the norms in force, for which a human health assessment study is required, namely:

- construction of certain types of housing (single-family)
- the construction of household outbuildings, except for those intended for raising animals
- dismemberment of lands
- construction of fences

The legislation in force aims to regulate existing problems, but also improvements and additions. The weak coordination and correlation of the legislation activates in some situations confusion and holds a source of divergences in the process of constructions, investments, control bodies, it being necessary to approach some innovative solutions that lead to the adaptation of economic, social and environmental challenges. (Singh, N., & Rennstam, J. , 2022)The approval system can involve high deadlines and costs regarding the development of the territory, and some procedures that issue the approvals are conditioned by situations that indicate misunderstandings of the purpose of the approval and reduce the quality and efficiency of these types of documents.

Following the abolition, by the decree-law no. 1 of December 26, 1989, regarding the repeal of some laws, decrees and other normative acts, for the development of the territory and urban planning, work was constantly done on the

modernization of the system of design and execution of constructions in the economic parameters of the market. (Pereira, D. F., Oliveira, J. F., & Carravilla, M. A., 2022). Thus, a correct development presupposes a good coordination of decisions, the exact adoption of the legislation in force, as well as their improvement.

## 2. Presentation and brief history of the DedeRman SRL company and analysis of the main indicators of the company

### 2.1 Presentation and brief history of DedeRman SRL

The story of DedeRman SRL began in 1992 in Bacău. It started by running the activity in a few small stores where they sold products of great interest. Gradually the field of interest focused on construction materials and DIY, in 2003 having the big debut, the construction of the first large store in Suceava. If in 1994 DedeRman SRL had only 11 employees, in 2002 the team was already made up of 245 people, and today there are over 11,000 employees.

The Pavăl brothers developed the do-it-yourself store chain of construction materials and interior design stores, especially for customers who want to design both their home and related spaces. They are the most dynamic in this field at the moment; after 8 years since the inauguration of the first DIY store, which has an area of 5000 square meters, they have become leaders on the national market of interior design and construction materials retail with 100% Romanian capital, currently having a number of 57 stores. (Islamgaleyev, A., & Uruzbayeva, N., 2022).

The company's values represent the foundation on which it was built. They strengthen the path to success:

S – seriousness
O – honesty
P – perseverance
H – diligence
A – ambition

In 2018, The Bridge building in Bucharest was purchased by Pavăl Holding, thus the company started the acquisition of real estate, later in 2019 buying The Office real estate project in Cluj Napoca. In 2011, DedeRman SRL became a sponsor of the Romanian Olympic and Sports Committee, later the project was named Team Romania in 2015, thus strengthening the partnership. Therefore, the company DedeRman SRL supported Romanian athletes at the Olympic Games in London (2012), Rio (2016) and Tokyo (2021).

In 2014, DedeRman SRL decided to become the sponsor of the tennis champion Simona Halep, the company building several tennis courts in the areas of Deva, Târgul Jiu, Oradea and Bucharest.

The company DedeRman SRL has grown at a constant and sustained rate and besides numbers and calculations the most important is the business model DedeRman SRL. At the same time, the company DedeRman SRL means quality services that accompany and complete the customers' purchases. (Lilien, G. L., Petersen, A. J., & Wuyts, S. (Eds.)., 2022).

The range of DedeRman SRL products is quite wide and exceeds 60,000 products in the DedeRman SRL store and 85,000 in the online environment. (Chen, L., Nan, G., Li, M., Feng, B., & Liu, Q., 2022). Among the products sold are those belonging to thermal, electrical, sanitary, gas and sewage installations, construction materials, but also interior fittings, accessories, and tools.

In 2020, DedeRman SRL increased its net profit by 1.45 million lei, over 13% higher than in 2019, and its business by 10%, which exceeded 9 billion lei (Graph. 2). (Lilien, G. L., Petersen, A. J., & Wuyts, S. (Eds.), 2022).

Procuring the best quality products at the best prices and distributing the products of the most prestigious manufacturers is the main goal of the company. The company's activity aims to ensure fair and profitable benefits for its partners by implementing an efficient organization, oriented towards the continuous reduction of costs.

Over time, the DedeRman SRL company also invested in education, culture, sports, a project known by the phrase: Plans for good.

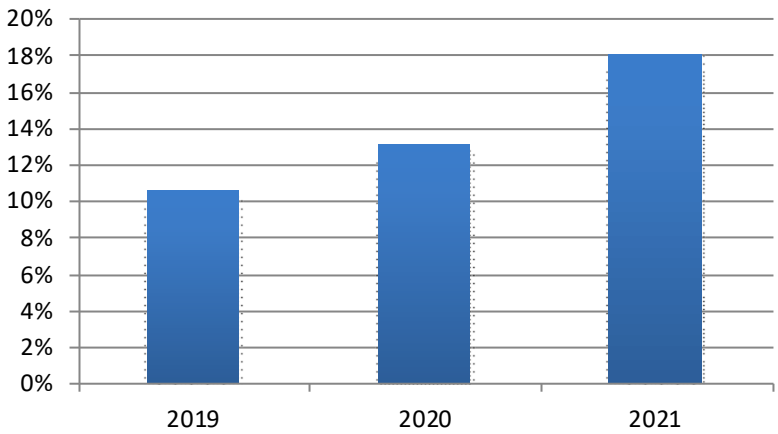


**Chart 3. Turnover of DedeRman SRL during 2019-2021.**

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**2.2 The microenvironment of DedeRman SRL Company**

The microenvironment of a company or the immediate environment has components of the external environment, with which the company is in permanent relations for the fulfillment of marketing objectives. Marketers have a very important role in evaluating and monitoring expectations, opinions, attitudes regarding customer behavior and improving or maintaining the customer's relationship with the company. (Mehralian, M. M. , 2022). The internal microenvironment is represented by customers, suppliers, competitors involved in the company's logistics. (Islamgaleyev, A., & Uruzbayeva, N., 2022).

On a daily basis, DedeRman SRL company comes into contact with a multitude of customers, these being the most important part of the business, their absence leading to the failure to fulfill the objectives. Each individual client must be treated with all the attention and due help, and the company's experience has made employers meet clients of various personalities.

An example of a customer typology is the perfectionist who buys only when he is convinced that the product is very good and always asks the question, is there something better? ", this type of customer can be easily lost, pleasing the competition. (Islamgaleyev, A., & Uruzbayeva, N., 2022). Another type of customer is the undecided one who uses the arguments of the competition, not knowing the details of the product he is looking for, with many questions, who must be helped by effective communication to decide, offering him alternatives to the type of product he is looking for. Another aspect of the microenvironment is that of customer loyalty through stages, techniques, and training. (Islamgaleyev, A., & Uruzbayeva, N., 2022). The most difficult to approach is the economic customer who is the least interested in the benefits offered and always has the feeling that he is being tricked, his main concern being related to the price of the product. ( Asghari, M., Afshari, H., Mirzapour Al-e-hashem, S. M. J., Fathollahi-Fard, A. M., & Dulebenets, M. A., 2022).

The market of a product can be affected by the power of customers who are a force of influence on competitiveness because they can drive down prices and demand increased quality. (Apaolaza, U., Orue, A., Lizarralde, A., & Oyarbide-Zubillaga, A., 2022)

The products of goods and services for businesses and their competitors receive necessary resources from companies or individuals, these being the suppliers. The range of marketed products is extremely generous, exceeding 45,000 landmarks, these coming from national autochthonous producers or from imports - France,

Italy, Spain, Poland, Germany, China. These suppliers can induce certain influences and pressures on the company. Very important are the reputation and performance of suppliers that can represent sources of competitive advantages.

Some of the main suppliers of DedeRman SRL are:

- Bosch Group for power tools
- Junkers represented for the thermotechnical field
- Cesarom, Sanex as internal suppliers for tiles, faience, and sanitary ware
- Saer and Grundfos for electric pumps
- Kastamonu for the prosecutor's office
- Giant, Ecoeuro for interior doors.

As far as competition is concerned, it represents a great open, fair competition in which sellers and buyers can learn through a continuous system to improve their situation in and through the market. Thus, competition can be considered a way to satisfy the interests of all participants in economic life. The main competitors of DedeRman SRL are composed of other chains such as Hornbach, Bricostore, Baumax, Leroy Merlin, Arabesque.

Thus, the microenvironment of a company brings together all the components of the external environment such as the client, the supplier, the competition, with which the company enters direct relations, relations that are dictated by the need to achieve the objectives.

### 2.3 The macroenvironment of the DedeRman SRL Company

The macro environment of a company has several uncontrollable factors that enter into long-term indirect relationships, referring to the demographic, economic, natural, political, socio-cultural, political and legal environment. (Singh, N., & Rennstam, J. , 2022) These factors can help the good functioning of the business, and regarding its field of activity, the management of DedeRman SRL took into account the Romanian regulations regarding both fair and unfair competition.

The company's macroenvironment is used to include all the external variables that affect a company's activity. The company functions in the same way as the other structures of the microenvironment, under the action of some environmental factors that operate on a higher stage. All the factors that the company cannot influence, but act against them and the other structures of the microenvironment make up the company's macroenvironment.

Depending on the information found, the PESTLE elements of the DedeRman SRL company where its activity is not influenced by the political situation in the country are highlighted. The opportunities that the company has are the economic

growth trends following the studies done by the company. Currently, the DedeRman SRL company is in partnership with the community support foundation that ran a program called DedeRman SRL for the community in 2006. Among its activities are home care services, sponsorship of children's camps and donation of construction materials. From a technological and technical point of view, a threat is the company's tendency to increase its competitiveness. Thus, regarding the legislative part, the company is prejudiced as a result of the increase in fees and taxes. (Apaolaza, U., Orue, A., Lizarralde, A., & Oyarbide-Zubillaga, A., 2022)

The ecological environmental factors of the company are well established thanks to the correct selection of waste and the frequent maintenance of hygiene and cleanliness. Unexpected changes in the macro environment can often occur, but a better picture helps the company not to be taken by surprise.

### 2.4. The SWOT Analysis

SWOT analysis is an analysis method used in the business environment that helps to design an overview of the company. (Lilien, G. L., Petersen, A. J., & Wuyts, S. (Eds.). , 2022).

The strengths of DEDERMAN SRL are the fact that the company is the largest Romanian entrepreneurial company dealing with the sale of construction materials and interior design, with an excellent quality-price ratio. ( Asghari, M., Afshari, H., Mirzapour Al-e-hashem, S. M. J., Fathollahi-Fard, A. M., & Dulebenets, M. A., 2022).The company provides free advice to all its customers, having a wide variety of items and providing its customers with a free parking lot. Also, the company provides service after the purchase of the products, receives orders and honors them with its own means, as well as providing the rental of tools. The company has its own promotion systems and provides its customers with free delivery services, within the vicinity. Edwards, J., Miles, M. P., D'Alessandro, S., & Frost, M. (2022).

The weak points of the company derive from the fact that the staff of the analyzed company is not regularly trained, and the lighting at the workplaces is poor. At the same time, the company does not have means of transport for employees, feeling the pressure of competition here. Also, the company does not provide security in the parking lot, and another weak point is its non-participation in fairs and exhibitions.

The company's opportunities on the market consist in the fact that it holds large contracts for other companies with foreign capital, but also does intense advertising campaigns. Another opportunity for the company is the sharp

development of the construction materials market and the demand for loans for the purchase of housing and for construction.

The main threats to the company come from - competitor no. 1 which is Leroy Merlin, but also other products from other companies. A threat is also represented by the espionage activities of the competition, as well as by customers who are increasingly selective. At the same time, the fluctuations of the environment, the pressure of competition, the entry of other competitors on the market, the increase in land prices represent all the same threats to the company. (Islamgaleyev, A., & Uruzbayeva, N., 2022).

A beneficial improvement for the company is recommended to be the addition of personnel and the change of the IT system with a new generation one.

In conclusion, the company DedeRman SRL is the leader on the DIY market, succeeding through honesty, diligence, ambition and the promise of the best quality at the best prices. It is expected that in 2022, DedeRman SRL will record an increase in turnover by approximately 10%.

## 3. Sales management strategies at SC DEDERMAN SRL

Determining, directing and coordinating the processes of expanding the portfolio of sales activities for the organization's services meet sales management. (Helmold, M., 2022). The nature of the industry, the field of products and services, the geographical spread of the business influence the sales management approach. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

Sales management includes the following processes:

- the implementation of sales types and a well-established management, as well as the income obtained from sales
- implementation of sales strategies, specialized training, support
- determination of sales targets.
- management of the sales force through the implementation and development of sales as well as the establishment of sales principles. (Helmold, M., 2022)

Through sales management, the establishment, directing, coordination of the types of development of sales activities for products and services are analyzed. (Helmold, M., 2022)

The sales force, selecting and recruiting salespeople, training employees, motivating and rewarding salespeople, and creating a sales plan are just some of the broad objectives covered by sales management (table 1.).

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| Objectives | |
|---|---|
| *QUALITATIVE* | *QUANTITATIVE* |
| Sales execution<br>Full realization of the sale<br>Provision of procedures<br>Support and maintain collaboration with customers<br>Support in the training of the personnel involved<br>Gathering and reporting information on market developments | Achieving and maintaining market share<br>Establishing sales volume in a way that leads to profit<br>Keeping sales staff costs below the specified maximum level |

**Table 1. Objectives of sales management**

Effective communication is the process of transmitting information, opinions, ideas, opinions from one individual to another, each conversation being different from the other. Customer loyalty is the most important part of business, as losing a customer gives you competitive advantage. (Apaolaza, U., Orue, A., Lizarralde, A., & Oyarbide-Zubillaga, A., 2022)

The steps of the sale in the DedeRman SRL company embody kindness, analyzing the customer's needs, presenting the customer with a variety of products through the C.A.B method (characteristics, advantages, benefits) and the gratitude given to the customer to make him return. (Islamgaleyev, A., & Uruzbayeva, N., 2022).

The sales force includes the following aspects:

- the certainty that he needs
- assurance that what is offered has a benefit/plus over others
- the conviction of a better choice with a sense of fulfillment.

The sales force from the point of view of negotiation or persuasion can be paralleled to A. Maslow's pyramid through the spirit of persuasion, the aloneness of the customer that increases the security of the seller's proposition and the assurance of a sense of fulfillment with a good deal. (Islamgaleyev, A., & Uruzbayeva, N., 2022). A solid sales position provides mobility to the business and helps to acquire forecasts of market developments. Sales management will oversee the alignment of sales with marketing and assist the sales force. (Lilien, G. L., Petersen, A. J., & Wuyts, S. (Eds.). , 2022).

In the company DedeRman SRL there are a multitude of types of salesmen, among which are the philanthropic salesman who is the friend of the customers,

the efficient one with a business spirit and optimistic, the road salesman, classic and capable of progress and the indifferent one who avoids involvement and acts impulsively . (Helmold, M., 2022)

Commercial law is based on the creation of a set of legal forms that regulate commerce, including distribution, production and provision of services.

Following the marketing analyses, the company is on a higher level. Unexpected changes in the macro environment can often occur, but a better picture helps the company not to be taken by surprise. (Mehralian, M. M. , 2022).

According to the SWOT examination, it is demonstrated that the company DedeRman SRL is in a fairly favorable position considering that it was founded in 1992.

In conclusion, the company DedeRman SRL has an important role on the construction and interior design market, recording record sales in recent years, this position being won through the well-developed management of its values. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

## 4. Psychological and communication sales management strategies

### 4.1 Efficient communication strategies

Effective communication in sales represents for DedeRman Company a type of transmission of information, ideas, opinions from one individual to another or from one group to another, from the simple activities of the daily routine that we experience to the complex activities carried out at the level of organizations, societies, which cannot be conceived outside the communication process. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

The purpose for which people of the analyzed company communicate is not to transmit a message, but to receive an answer or to obtain a result, a change in attitude, behavior, a change in the state of behavior, and the receiver manifests beforehand according to what he understood, not according to what he was told. A complete communication consists of transmitter, receiver, message, feedback. If what is said contradicts the non-verbal message conveyed by the speaker, then listeners almost invariably react according to the non-verbal message. There is no universal recipe for communication with clients, and DedeRman Company realized that each client is different, so each conversation must be different, and professionalism towards them must remain constant.

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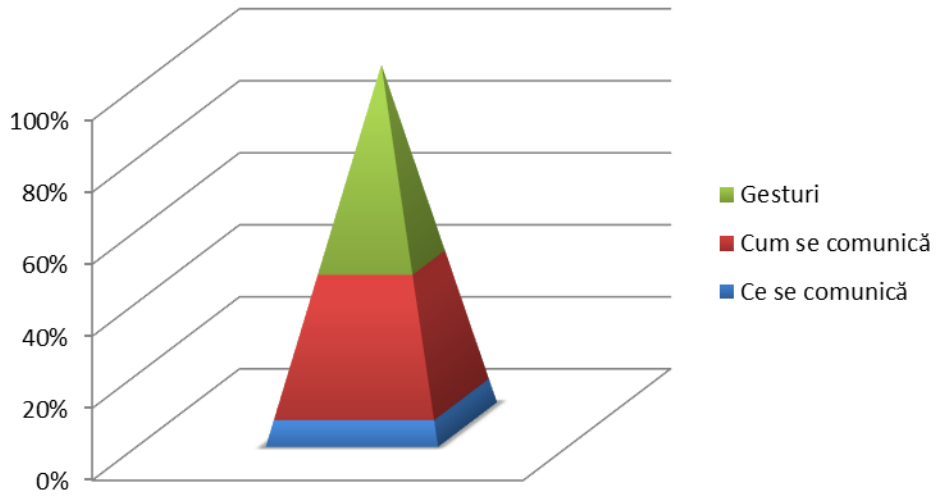


**Chart 4. The parameters on which the language depends**

With regard to sales performance of DedeRman Company, it reflects the listening part and the speaking part appropriate to the interlocutor adapted to the needs and the setting. Thus, for appropriate reactions and positive responses, listening is very vital, representing the first step towards understanding the message. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

Several listening strategies are highlighted by DedeRman management, thus there are several types of listening that suit different situations. (Wu, B., Monfort, A., Jin, C., & Shen, X., 2022).

The six types of listening, used by our company, are:

- active
- misleading
- combative
- selective
- empathy

Effective communication in DedeRman's sales highlights the part of speaking appropriate to the interlocutors, for the needs and setting, but also the part of listening. To ensure appropriate reactions and adapted responses, listening in DedeRman Company is vital, thus it is the first step towards understanding the message. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

4.2 **Body language role**

Being able to read buying messages is just as important as listening. Most of the time customers od Dederman Company provide a strong buying signal provided by their body movements. A negative signal is highlighted by thinned lips, tense lips, clenched teeth, the customer appears nervous, avoids eye contact, treats all details about the product with indifference. But there are also positive examples in DedeRman SRL represented by several aspects such as: smiles, asking specific questions or the customer always looking at the product that interests him. (Islamgaleyev, A., & Uruzbayeva, N., 2022).

Thus, we agree with what scientists say that more than 90% of the message we send to a person is issued through non-verbal elements. In DedeRman company, employees believe that body language is a way to express thamselves, but in order to know how to translate this body language, they must always know the intentions and the psychological state of the interlocutor. Considering the non-verbal language, it was concluded that there is concrete evidence regarding the verbal behavior, and especially the non-verbal language when there must be persuasion in sales. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).From the point of view of personality, each person is unique, being the product of his experience, training, desires, elements, which separately or together can influence the understanding of messages. The management of DedeRman Company believes thaht the difference in status makes the position of the element and the receiver in the communication process affect the meaning of the message, and the information is also accepted depending on the person from whom it comes. To the extent that an effort is made to improve non-verbal language, it can be observed that in a short period of time both the ability to communicate and the sales results will improve significantly. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022). Thus, it is the following aspect: if the customers do not trust the company, the seller's ideas will not reach their goal.

Moreover, the level of knowledge can influence communication with someone who has a different educational background. At DedeRman Company, a good salesperson must be a good specialist in verbal and non-verbal communication who can intuit the gestures and signals behind each message, and this fact makes selling an art. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

4.3 **Active listening**

Most people are not good listeners, that's why when we listen we use about 25% of our listening capacity, so it means that we don't pay attention, forget or

misunderstand 75% of what we hear. Such low listenership rates can be costly for the DedeRman Company and the seller.

Active listening inside DedeRman SRL is a communication technique that has the following characteristics as its objectives:

- truly understanding the message conveyed
- conveying respect to the other person
- understanding the other person's feelings towards the discussed topic
- involvement in listening to the message.

The elements of active listening are represented by communication techniques, which have the following aspects at the company level: look and body language - the client must be looked at and listened to, maintain visual contact and open discussion, reformulate the content - it is necessary to ensure the understanding of the message, the reflection of feelings - through empathy, understanding for the feelings behind the interlocutor.

Of particular importance in sales regarding customer relations is active listening, which leads to building a relationship of understanding and trust followed by several steps: (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

- listening and silence
- providing feedback
- removing all distractions
- empathy
- patience
- avoiding personal judgments
- progressive attention

An important thing for DedeRman SRL is the relationship with the customers, which is crucial, which means that a satisfied customer wants a quality relationship with the seller, generating satisfaction, something that reflects the purchase decision or the extension of the relationship with the company. (Islamgaleyev, A., & Uruzbayeva, N., 2022). Thus, the active listening communication technique developed by the psychologist Carl Rogers focuses on conveying to the interlocutor the feeling of trust following the communication so that he opens up. From another perspective, active communication involves more than the transmission of a message, it consists of transmission, understanding and reaction.

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## Conclusion and proposal

This paper aims at the evolution of the DedeRman SRL company, but also at the evolution of construction materials both internally and externally. In this way, the points, opportunities, weaknesses followed by threats are highlighted according to the SWOT analysis. The company enjoys a great success, being always prepared with strategies and taking measures regarding the range of products in continuous development. The company regularly reaps the benefits in terms of customer satisfaction as well as economic improvement in the profile market. (Reguly, I. Z., Csercsik, D., Juhász, J., Tornai, K., Bujtár, Z., Horváth, G., ... & Csikász-Nagy, A., 2022).

Another aspect is the sales process, which is seen as an attempt to adjust the customers' problems, and the managers have a well-defined meaning both practically and theoretically, so the sales activity must always be based on the customers' requirements. An important role they also have sales agents who know how to always find the best solutions to have a balance with distributors and retailers. Another aspect of sales is taking special orders for the permanent satisfaction of the clientele by constantly offering advice. (Badrinarayanan, V., Madhavaram, S., & Manis, K. T. , 2022).

Very important is the success of this company, which can be influenced by the mistakes in the texts it publishes in the product magazines, a fact that erodes the image of this brand on the market, having about 11 mistakes per 1000 words. (Liu, X., Wu, X., Shi, W., Tong, W., & Ye, Q. ,2022).

Currently, the company has transferred part of its business to other fields such as automobiles, agriculture and construction under the umbrella of a holding company, intending in the future to enter other niche markets, but especially on the foreign market targeting construction and DIY materials in countries such as Italy, Hungary, Austria and Germany. (Lilien, G. L., Petersen, A. J., & Wuyts, S. (Eds.)., 2022). A beneficial improvement for the company is recommended to be the addition of personnel, as well as the change of the IT system with a new generation one.

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# QUALITY MANAGEMENT IN THE ROMANIAN PHARMACEUTICAL FIELD DURING THE COVID-19 PANDEMIC

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**Abstract**

*Health services are very important, as in any economy, because the life of all mankind depends on them. Bearing in mind that the pharmacist is the first and last filter in the medical system, we believe that they have a decisive role in the COVID-19 pandemic. Pharmacists must take extra measures to protect themselves, their families, and the community. All patients can be considered as COVID-positive, but pharmacists will offer them the same services and care as before.*

*In the last 15 years, Romania has faced a complex socio-demographic process.*

*The decrease in the birth rate, the general mortality rate and the emigration of the young population led both to the aging of the working age population and to the decrease of the total population of the country.*

*All this aspect led to the reduction of the population size and required a rethinking of the health services system of social protection, in view of*

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*prolonging the active life of the population both from the point of view of the quality of the services offered and of the infrastructural facilities.*

*The consumption of services represents an indicator of the quality of life, which we want to discuss in this article.*

**Keywords**: *quality management, pharmaceutical field, pandemic, COVID-19, pharmacy*

**JEL Classification**: I11, I18, M16

## Introduction

Medicine appeared once with the people themselves, and the preparation of multiple pharmaceutical forms used for the care and healing of the sick has been known since antiquity.

Starting from ancient times, medicine has known a long history, which is confusing and is closely related to the history of medicine, marked by successive civilizations. (Castiglioni, A., 2019).

Medicine can be considered any substance or combination of substances presented as having properties for the treatment or prevention of diseases; any substance or combination of substances that may be administered to humans, both for correct restoration and modification of physiological function by exerting a pharmacological, immunological or metabolic action, or to establish a medical diagnosis.In the specialized literature, there is more point of view in the definition of services, starting from their characteristics. (Frank, J. R., Mungroo, R., Ahmad, Y., Wang, M., De Rossi, S., & Horsley, T. , 2010)

## Literature Review

The American Marketing Association (A.M.A) defines services as: activities, benefits, or utility offered on the market or provided in association with the sale of a material good.

In international standards, services are seen as: "the result of at least one activity that takes place in the necessary manner at the interface between the supplier and the client and is generally material". (Dann, S., 2008).

Services are involved both in satisfying material needs and in maintaining complex relationships with material goods, relationships that can be of substitution or complementarity.

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The concept of quality of life can be the degree to which a person enjoys the quality of the services he receives in the important moments of his life. The possibilities resulting from the opportunities and limitations that each person has in life to reflect their interaction with personal factors and of the environment. This concept is, however, subjective, the quality of services can be understood in different ways, by different people from different geographical areas or different cultural contexts. (Patrick, D. L., Danis, M., Southerland, L. I., & Hong, G., 1988).

## 1. Particularities of Services in The Romanian Pharmaceutical Field During the Covid Pandemic – 19

### 1.1. Services offered in pharmacies during the Pandemic

During the Pandemic period, the services offered in pharmacies were at a high level (58%) and the perceptions regarding the impact on the provision of medical services at the level of local communities, as follows. 1 to 9 In residential environments, the weight of subjects from the urban environment who provided such evaluations is higher than that recorded in the case of respondents from the rural environment (66%, compared to 50%). (Cadogan, C. A., & Hughes, C. M., 2021) Most likely, as a result of the transition from the specific rules of the state of emergency to the one corresponding to the state of alert, 26% of respondents stated that there have been some improvements in the provision of medical services, and 50% were of the opinion that this the evolutions were rather insignificant. On the types of services, slight reductions can be observed in the percentages that show the effect on their provision, which indicates a relative improvement in the perceptions among the population, along with the passing of the critical period in the state. The exceptions are represented by the increases recorded for the interventions carried out within the hospitals (from 19% in round 3 to 29% in round 4) and for rehabilitation services for children with disabilities (from 20% in round 3 to 22% in round 4). Pharmaceutical services are not limited to medication assistance (medication delivery), they include information, education, health promotion, consultation, regulatory and training services. (Aruru, M., Truong, H. A., & Clark, S., 2021)

A pharmaceutical service can also exist without medication, in some cases it even excludes the use of medication to obtain the maximum benefits for the patient.

If medicine is a product, a tangible good, then a service is a tangible good, which cannot be kept or transported, which is currently used up and appears only at the time of its provision and consumption.

Often the service is hard to be separated from the tangible product, being associated as "added value" to the product itself. In these conditions, the understanding of the essence of pharmaceutical services is often wrong, assuming only the delivery of medicines without other additional support activities. Community pharmacies in the countries of the European Union provide a wide range of professional services to its visitors. (Austin, Z., & Gregory, P., 2021).

Measuring blood pressure, cholesterol and glucose levels are routine things in pharmacies in many countries, although the reasons of the pharmacy owners for offering these services are discreet.

Bearing in mind that the pharmacist is the first and last filter in the medical system, we have a decisive role in the COVID-19 pandemic. Pharmacists must take extra measures to protect themselves, their families, and the community. (Alomi, Y. A., & Al-Jarallah, S. M., 2021).

All patients can be considered as COVID-positive, but we will offer them the same services and care as before. (Liu, S., Luo, P., Tang, M., Hu, Q., Polidoro, J. P., Sun, S., & Gong, Z., 2020).

### 1.2. COVID-19 personnel measures

Bearing in mind that the pharmacist is the first and last filter in the medical system, we have a decisive role in the COVID-19 pandemic. Pharmacists must take extra measures to protect themselves, their families and the community. All patients can be considered as COVID-positive, but we will offer them the same services and care as before. The following procedures will be implemented in the pharmacy, which aim to limit the exposure of staff and patients:

The following procedures will be implemented in the pharmacy, which aim to limit the exposure of staff and patients:

► adaptation of the program, to avoid physical and mental oversoliciting of the staff and to be able to maintain the continuity of pharmaceutical services.

► elimination of self-service in the pharmacy, to prevent contamination of health products available to patients (food supplements, dermato-cosmetics, teas, medical devices).

► using a method of separating the personnel area from the area patients, such as: serving the emergency window, mounting panels or protective foil, ideally from

the ceiling to the floor, provided with a window and having a recommended minimum height of 2 m.

► use of air purifier with HEPA filter and UVC lamp in the personnel area. This measure is optional, but especially useful in areas where quarantine has been established.

► the use of UVC lamps for periodic sterilization (maximum 2 hours) in the patient traffic area, with the interruption of the relationship with the public during this interval. This measure is optional, but very useful in areas where quarantine has been established.

► at regular intervals (10 minutes to a maximum of two hours) disinfect surfaces with hypochlorite or other disinfectants recommended by the Ministry of Health. The disinfectants suggested by the World Health Organization are sodium hypochlorite solution 1/10 or 1/8, alcohol (minimum 70%), hydrogen peroxide, quaternary ammonium compounds.

► the staff will protect their family as if they could be exposed to an infectious contact at any time, keeping their distance from the elderly, using a separate bedroom, separate toilet and tableware, washing after each use.

► pharmacists and pharmacy assistants will monitor their temperature twice in 24 hours and keep a state of alert regarding possible symptoms in themselves, colleagues, or family members.

► the chief pharmacist is responsible for health insurance staff and patients - he can request from the company administrator the means of protection necessary for the staff (masks, gloves, disinfectants) and to apply all methods of prevention, protection, and disinfection within the pharmaceutical unit according to the updated RBPF procedures. (Mallhi, T. H., Liaqat, A., Abid, A., Khan, Y. H., Alotaibi, N. H., Alzarea, A. I., ... & Khan, T. M., (2020)

► if the minimum necessary materials, according to the emergency ordinances in force, are not provided (masks, gloves, disinfectants), the pharmacist may refuse to carry out his activity.

► special attention to the symptoms of our patients, especially to symptoms suggestive of COVID-19 such as: fever, dry cough, sore throat, headache, muscle pain, diarrhea, lack of taste and smell, shortness of breath (increased breathing rate).

► to protect the staff and the following patients, in the case of a patient who is very likely to be positive, after his passing, the activity will be interrupted and a complete disinfection procedure will be performed (UV surfaces, floors).

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► the provision of other pharmaceutical services in accordance with RBPF PL 11 (BLOOD measurement, blood glucose) is suspended until the end of the pandemic, except for emergencies, in which case additional preventive measures will be taken.

► information for pharmacists regarding general and additional measures to be followed for protection against COVID-19 only from the official source, e.g. the sites stirioficiale.ro, cetrebuiesafac.ro, fiipregatit.ro

**1.3. Patient counseling during pandemic times**

The following procedures will be implemented for counseling the patients:

► Strict adherence to chronic treatment and regimen life imposed by the pre-existing pathology, in order not to decompensate to the point of needing additional medical services, which on the one hand are not available, on the other hand, would cause additional exposure to the risk of illness.

► monitoring and recording in a journal (e.g., in the Android smartphone application "Pharmacist's recommendation for patients") of some basic biological parameters (blood pressure, pulse, temperature and others depending on the pathology — blood sugar, saturates, etc.).

► considering the discontinuities of medical services and generalization of telemedicine services, pharmacists will grant increased attention to symptoms that suggest a possible emergency (hypertensive chest, myocardial infarction, AVC, appendicitis, etc.), with the guidance of patients to the nearest emergency units, requesting first aid, the case may be12 and, as patients will be encouraged to call the telepharmacy, in the sense that the patient should first call the pharmacy, communicate with the pharmacy staff regarding his needs, at which time he can be advised remotely, and then come to the location or send a close one.

►management of stomatological patients with acute dental pain, with the increase in the volume of the affected area and other signs of local inflammation (possible dental abscess) during the period when the stomatological offices are closed by the emergency order

► the pharmacist (not the pharmacy assistant) after a detailed history (to check possible allergies and other health problems) will recommend OTC medicine for pain as much as possible, avoiding when it is possible to contact the stomatologist for a remote diagnosis and the release of a prescription that can be sent by email to the patient/pharmacy to which the patient is addressed.( Fox, E. R., Stolbach, A. I., & Mazer-Amirshahi, M. , 2020)

► if this is not possible and the situation requires it, bearing in mind that access to stomatological services is practically blocked in many localities, an antibiotic can be issued without a prescription for a complete treatment of the tooth and its**.** **T**his procedure is valid only during the period in which stomatological services are blocked by the state of emergency.

► patients will be directed to the stomatological offices in the emergency hospitals provided with the UPU, which provide emergency assistance. Management of patients whose symptoms suggest that they are COVID-19 positive (Bragazzi, N. L., Mansour, M., Bonsignore, A., & Ciliberti, R., 2020)

► to recognize a patient whose symptomatology suggests that he is positive for COVID-19, he is recommended to self-isolate and call 112 for the requested medical assistance, follow the instructions received and notify the family doctor by phone.

► if there are mild symptoms, the OTC present in the treatment protocol (e.g., paracetamol) and isolation at home and from family members will be recommended, according to the protocol for handling 1 of the COVID-19 cases.

The pharmacist is an asymptomatic person in contact with possible cases of coronavirus infection, with a reduced risk of contamination in the conditions of compliance with the above prevention methods. Therefore, he/she will self-monitor his/her temperature and symptoms of COVID-19 until the end of the pandemic. If symptoms appear, the pharmacist will self-isolate and seek medical assistance immediately.

### 1.4. COVID-19 patient management

The following procedures will be implemented for patient management:

► the pharmacy door will be locked open, so that the patient does not have to touch it to open it, a contaminating gesture.

► the number of patients in the pharmacy will be limited, depending on its surface area.

► be posted in the pharmacy and verbally request patients not to touch the surfaces.

► priority will be given to persons over 65 years old in the time interval 11-13, with the display at the entrance of this priority.

► to limit the time patients spend in the pharmacy - ideally under 5 minutes (so that they do not have time to contaminate with significant amounts of the virus, in the case in which they are infected).

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► after a maximum of 20 patients or 10 minutes per two working hours with patients (the first condition to be met) will undergo a complete disinfection procedure: washed down with specific disinfectant solutions (e.g., sodium hypochlorite), surface disinfection, turn on the UVC lamp in the area intended for patients, with the temporary interruption of the activity.

## 2.Management of Pharmaceutical Services Provided Within Sensitive Pharmacy Company During the Pandemic of Covid 19[1]

### 2.1. General presentation of the pharmaceutical company

Am&Di PHARMA HOLDINGS is a Dutch company that operates the largest and most dynamic pharmaceutical group in Romania, a group that also includes SENSITIVE PHARMACY SRL.

The group's shares have been listed on the London Stock Exchange since 2006.

The group includes the most capable and experienced division of promotion and commercialization of pharmaceutical products from Romania through Am&Di PHARMA MARKETING & SALES, the strongest drug distribution network through MEDIMPLUS EXIM SRL and the largest pharmacy network through SENSITIVE PHARMACY SRL

Am&Di PHARMA HOLDINGS has been on the market for over 15 years and has over 4000 employees.

Am&Di PHARMA HOLDINGS also launched the regional expansion program, being present in the Republic of Moldova since 2006, in Hungary since 2008, as well as in other countries of Central and Eastern Europe.

By promoting high-quality medical products and services, both doctors and patients contribute to the improvement of the health sector. (Goff, D. A., Ashiru-Oredope, D., Cairns, K. A., Eljaaly, K., Gauthier, T. P., Langford, B. J., ... & Schellack, N. , 2020).

In 2021, the group's activity is structured on three business lines, each of which is managed by a Chief Operating Officer:

- Marketing & Sales
-Whole sales
- Pharmaceutical retail

[1] For data and information protection, in this paper we will not use the real names of the companies involved in the study exposed

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Sensitive represents the pharmaceutical retail line, being the most extensive network of pharmacies in Romania.

With more than 230 pharmacies throughout the country, Sensitive Pharmacy SRL is present in 51 of the large towns in Romania.

At the network level, it serves more than 500,000 unique patients per day, and has 1,500,000 loyal customers (loyalty card holders)

The spectacular growth of the chain of pharmacies was especially due to the attention and dedication to patients, but also to creativity and innovation.

Innovative concepts for circuit pharmacy Romania opened for the sale of cosmetic products and additional services addressed to the patient, were extremely appreciated by patients and clients, so that in a short time it became the market leader and a model to follow. The development of the company aimed at increasing the quality of services, thus, at the level of the entire network, more than 1,700,000 vouchers are made monthly on average.

Over time, Am&Di PHARMA HOLDINGS has been actively involved in humanitarian campaigns to help women, children, victims of family violence, victims of natural disasters, children with disabilities or chronic diseases, the elderly, as well as many others.

Medicines, medical equipment, hygiene products are constantly donated to non-profit organizations as well as to hospitals that take care of people in difficulty.

Founded in 2002, the Sensitive Foundation represents the social responsibility division of Am&Di Pharma and is a link between the company, the community, and the non-governmental environment.

With its establishment, it launched the Blue House of Patients Program to support women and children's victims of domestic violence and is one of the few corporate foundations that provide services directly to a number of beneficiaries.

The intervention component is related to the prevention of family violence, the foundation running annual public education and information campaigns. Also, increased attention is given to the professional development of specialists from other organizations and institutions, concerned with the problem of domestic violence, who can benefit from specific trainings and workshops.

The mission statements. The foundation aims to increase the quality of life of the different categories of people in need - children, elderly people,

People with disabilities, people dependent on the consumption of drugs, alcohol or other toxic substances, single-parent families, people affected by violence in the family, people infected or sick with HIV/AIDS, without income or with low

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income, etc., the promotion of quality services in the field of social assistance and active participation in the development of social services.

The foundation proposes to strengthen the non-governmental sector by increasing the quality of activities carried out within it and developing the institutional capacity of non-governmental organizations, as the main actors of civil society.

The values of the Sensitive Foundation are the following ones:

Intergity Responsibility…….Respect……Caring for others

### 2.2 Analysis of the company's internal and external environment

#### 2.2.1. Competitors

The main competitors of Sensitive for the pharmaceutical retail segment are Help-Net, Catena Gedeon Richter, Recipes. The development of the business of the profile players is largely rooted in the legislative changes.

Changing the lists for compensated and free medicines can be done up to four times a year, the release rules are some of the elements that many players in the industry complain about.

Again, most of the chains tried to offer us loyalty cards, Sensitive had the first loyalty cards in Romania with over 1,500,000 card holders.

Competitors influence the volume of sales, especially through their behavior in terms of policy, pricing, communications, and distribution.

Thus, competition is an open and honest confrontation, through which economic agents try to maintain and improve their position on the market.

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### 2.2.2. Suppliers

The company's suppliers are divided into two large categories: medicine, food supplement and cosmetic suppliers and service suppliers.

Medicine suppliers that provide a range of more than 3500 products in the company's portfolio are grouped in two categories:

- internal suppliers, namely MEDIMPLUS EXIM, the classic distribution line of pharmaceutical products that includes 12 warehouses at the national level

-external suppliers from which the company imports different products, for example, FarmeximRed, Superfoods. Interbrandis, etc.

Service providers are those from IT, suppliers of machines, cleaning services, rental space for storage, bank deposits and other services for the current activity.

### 2.2.3. Location and its influence on attracting buyers

The company has its headquarters near Bucharest, in Mogosoaia Municipality, as well as in 12 other cities strategically chosen to be able to cover 100% of the country's territory.

Each pharmacy must meet the standard of functionality, accessibility, competent staff and, finally, a special appearance. Thus, the locations of Sensitive pharmacies are spread in the most accessible locations with intense commercial traffic.

The open circuit pharmacy is a health unit that ensures assistant in the outpatient clinic of the population with medical, hygienic-sanitary, cosmetic products, medical devices, but it can also contain veterinary drugs, and in which magistral prescriptions are executed. Pharmacies release medicine to the population only at retail, but they can also release in larger quantities to different polyclinics or business dispensaries.

The operating program will be displayed in a visible place and will be communicated to the General Pharmaceutical Directorate.

The necessary documents for the operation of the pharmacy are:

- Order of the Ministry of Health number 626 of 2001
- Order of the Ministry of Health number 1199 of 2004

Obtaining the operating authorization for pharmaceutical units of distribution-pharmacy, storage, drugstore is done based on the request for planning the pharmaceutical inspection and the following documents, which are submitted to the Ministry of Health and Family-General Pharmacy Directorate:

- request type;
- the employed staff - the organizational chart of the staff depending on the size of the unit, the qualification requirements in the field, the employment contracts of the specialized staff employed and the notice of practical freedom;
- the appropriate opinion of the county pharmacists' college, respectively of the municipality of Bucharest, regarding the establishment of the respective pharmaceutical unit
- the constitutional act of the commercial company (statute and/or contract);
- the irrevocable termination of the judge delegated for the authorization and registration of the commercial company as the case may be, the judge's decision is final;
- a copy of the registration certificate at the trade register and, if applicable, the request for mention in the trade register for the registration of the headquarters of the pharmaceutical units;
- the sketch and technical report regarding the premises of the unit;
- furnishing with furniture, utensils and equipment;
- the sanitary authorization of the pharmaceutical unit;
- the sanitary authorization of the pharmaceutical unit;
- proof of ownership of the space;
- the list including specialized literature and the legislation in force.

After the analysis of the complete submitted documentation, the applicant will be answered within a maximum period of 15 days from the date of registration of the application, in the case of an incomplete documentation, the maximum period of 15 days from the date of application.

In case of a favorable answer, inspectors from the Inspection Service of the General Pharmaceutical Directorate will carry out the inspection within 30 days from the date of communication. The inspection is completed with an inspection report for authorization, drawn up in two copies, one of which will remain at the inspected unit.

In the case of a favorable inspection report, the applicant will pay the authorization amount provided by the Government Emergency Ordinance no. 152/1999 on medicinal products for human use, with subsequent amendments.

The operating authorization will be issued within a maximum of 30 days from the date of the inspection.

In the case of an unfavorable inspection report, the applicant can appeal within 3 days from the date of receipt of the report to the Ministry of Health and Family -

General Pharmaceutical Directorate. The response to the appeal will be communicated to the applicant within 30 days from the date of filing the appeal.

In the urban environment, a pharmacy can be established for a population of 5,000 in neighboring or subordinate communes, where there are no pharmacies.

In the rural environment, pharmacies will be established, preferably near the headquarters of the sanitary units, and the pharmaceutical activity can be carried out in the pharmaceutical unit that can serve one or more communes.

In isolated rural localities where pharmacies do not operate, the population's medication insurance will be provided by the nearest pharmacies, by establishing a work point. The authorized pharmacies that can establish this point of work will request the consent of the Ministry of Health and Family and will respect the following conditions:

- they will ensure a space that meets the conditions of storage, conservation and release of medicinal products;
- they will nominate pharmacists to move to those localities;
- they will establish an activity program in accordance with the program of the sanitary unit in the respective locality;
- the county pharmacists' college will announce;
- the work point will cease its activity of authorization to an independent pharmacy in the respective locality.

### 2.2.4. The company's workforce

The contracting parties agree that the employment of the Sensitive personnel shall be based on an individual employment contract under the terms of the Labor Code and the Law. 130/, 1999

The staff employed by Sensitive brings together more than 4000 professionals with degrees in medicine, pharmacy, management, informatics, human resources, legal marketing, communication, or supply.

Sensitive permanently invests in the professional training of its team so that it can adapt to the changes that constantly intervene in the pharmaceutical market and can satisfy the demands of the clients and the current business. ( Sami, S. A., Marma, K. K. S., Chakraborty, A., Singha, T., Rakib, A., Uddin, M., ... & Uddin, S. M. , 2021)

The staff is one of the company's most important resources.

In the pharmacy they carry out their activity, based on the free practice authorization, the specialty staff is composed of:

- pharmacists;
-specialist pharmacists;
-primary pharmacists;
- resident pharmacists;
- pharmacy assistants;
- main pharmacy assistants;
- beauticians;
- administrative staff.

The work clothes of the specialty pharmacy staff, regulated uniformly by the Ministry of Health, must be dignified, impeccable, decency, and inspire professionalism, safety, and trust in the patient. Special attention should be paid to the work equipment in the pharmacy (gown). It will be white in color.

The specialized personnel will obligatorily wear a badge on which the name and function will be visible.

The specialized staff must ensure and maintain their professional training at a high level, by permanently updating their knowledge in their professional area, to fulfill their duties with high competence.

The specialized staff must not use the means of unfair competition to obtain material or other advantages.

The following activities are unfair practices, without being limited:

-attracting patients by offering material advantages or false advertising;

-using the position held or the mandate entrusted within the management bodies to attract patients. (Kretchy, I. A., Asiedu-Danso, M., & Kretchy, J. P., 2021).

Unjustified and competitive denunciation of colleagues is punishable.

Any information provided to the public by the specialist staff in connection with the health services provided must be correct, decent, legal, and honest.

Any information and promotional material regarding professional services must be consistent with the role of the specialty staff in health promotion and allow the patient to decide on the appropriate service.

To promote their own services, the specialized staff must refrain from defaming the professional services of other colleagues.

The specialty staff must refrain from any procedure or means contrary to professional dignity, which would harm the patient's right to choose his specialty staff.

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Throughout the practice of the profession, the pharmacist must ensure that the actions to promote medicines, in which he is involved, or which take place in the units where he works, are following the provisions regarding their publicity.

The pharmacist will make sure that the promotion of medicines does not involve the obligation of the patient to buy or receive unwanted or excess medicines instead of the ones he wants or together with them.

In view of the permanent updating of professional knowledge, the specialized staff is obliged to:

- to plan and participate in professional training organized or accredited by the Romanian College of Pharmacists;
- to evaluate and apply in current practice the permanently updated knowledge;
- to document his preparation, through the forms of the accepted professional development programs, when this is requested by the specialty commissions of the college he is in charge of;

The pharmacy is managed by the chief pharmacist who appoints a substitute during his absence from the pharmacy.

Resident pharmacists or pharmacy students and pharmacy assistants in internship can carry out the activity in the pharmacy under the guidance of specialist or primary pharmacists. (Hamza, M. S., Badary, O. A., & Elmazar, M. M. , 2021).

Apart from the pharmacy specialty staff, the following categories of staff can work:

- accountants;
- programmers, cashiers;
- carers etc.

Staffing with pharmacists and pharmacy assistants is done in such a way as to ensure the proper functioning of the pharmacy for the duration of the declared program and correlated with the volume of activity.

Duties of the chief pharmacist:

- he must be informed about all the aspects and requirements related to the function he performs;
-he must ensure that all members of the staff under his command are informed about the professional duties that they must fulfill;
- must transmit clear instructions to prevent any risk of error; as far as possible, he will transmit standard operating procedures in writing;

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-ensure that subordinate staff members perform their duties in accordance with the legal provisions, but also with competence and personal skills;

- must respect the professional independence of subordinate pharmacists;

- ensure that the equipment, premises and utilities at the workplace are maintained to the standards accepted for the proper performance of professional activities;

- ensure that all professional activities carried out under his control, as well as those performed by him personally, are subject to professional liability insurance;

-ensure that all measures regarding the preservation of confidentiality are effective;

-he has the duty to notify the college within which he carries out his activity of any change of professional interest regarding the staff members subordinate to his position;

- he must accept, as far as possible, pupils and students to complete the internship in the unit he leads. "The code specifies, in order to underline the importance of the function, the obligation of the pharmacist that, before occupying a management position, he also has the obligation "to self-evaluate and make sure that he is able to fulfill all the responsibilities of this position". The clarification is welcome, given the fact that a series of administrative and management activities make a lot of the work of the farm of the subordinate, even if the requirements regarding professional decisions are the same. Practically, in each chief pharmacist we have a small manager, manager, economist, etc.

Therefore, for these functions, other skills than those strictly related to the pharmacist profession are often required, such as: a good computer user, a person with initiative and a highly developed sense of responsibility, etc.

We must not forget that through the membership certificates in the College Pharmacists are certified in the pharmaceutical field, but for the other activities carried out tangentially by the chief pharmacist, it is possible to obtain a certificate of completion to attest his training in related fields (management , calculation technique, etc.). On the other hand, compared to the recent accession and the flow of information accessible via the Internet, in order to be informed about new treatments, substances, medicines.

The pharmacist's duties:

- ensures the preparation, conservation and release of magisterial and official documents;

-ensures the preservation and release of medicinal products, hygienic-cosmetic products, as well as medical devices;

- performs the qualitative and quantitative reception of medicinal products and other products for human use when they are received in the pharmacy;

-performs, in accordance with the provisions of the Romanian Pharmacy in force, the quality control of distilled water;

- participates in the pharmacovigilance activity;

- cooperates with the doctor in connection with the therapeutic scheme in the case of drug associations and the prescription of the master's prescription;

-follows the therapeutic novelties on the national and international level;

- must know the sanitary and pharmaceutical legislation in force;

-find out about the legislation and regulations of international organizations in the field of medicine, to which Romania has joined;

-supervises the activity of the pharmacy assistant and the pharmacy assistants in practice;

-ensures and monitors the practical internships of students, resident pharmacists and trainees; (Hamid, H., Masood, R. A., Tariq, H., Khalid, W., Rashid, M. A., & Munir, M. U., 2020)

- throughout his activity the pharmacist will respect the principles of professional ethics and deontology.

The chief pharmacist or his substitute is responsible for the activity of the pharmacy as a whole and for representing the pharmacy before any control of the competent authorities and cannot be replaced by another professional.

The duties of the pharmacy assistant:

- the pharmacy assistant is a health worker who graduated from the post-graduate school with a pharmaceutical profile or from another form of post-graduate education whose studies were equivalent and who has the title of pharmacy assistant

- the pharmacy assistant carries out his activity in the pharmacy under the direct guidance of the pharmacist. He is the executive staff.

- the pharmacy assistant can dispense medicinal products that are dispensed without a medical prescription, the handling of toxic and narcotic products being prohibited.

- the pharmacy assistant must know the health and pharmaceutical legislation in force.

The responsibilities of the chief pharmacist, as well as the entire staff, must perform certain tasks that are well established in the job description.

For the pharmacy staff, there is a contract or other written form that certifies the right to perform their profession in that pharmacy.

The pharmacy staff is carefully supervised by the chief pharmacist during the execution of the given attributions and a periodic evaluation of the professional competences is done.

**2.2.5. Supply activity**

Supply is one of the most important and vital aspects of commercial activity, without supply the optimal activity of the company cannot be carried out.

The supply must be dynamic, to ensure the medicines, on time; this type of activity must be continuous, rhythmic, without gaps, without breaks.

The supply must be rational, avoiding the exaggerated loading with certain products, which would lead to the unjustified agglomeration of the spaces, but also to the blocking of the sum of money, respectively to the impossibility of supplying another product.

A complete assistance to the population with pharmaceutical products is determined by the existence within the unit of the necessary assortments and in appropriate quantities, so the supply is made according to the nature and the specialty. (Kuo, S., Ou, H. T., & Wang, C. J., 2021).

The need for the pharmaceutical product is established according to the probable need for a certain period (days, weeks, months), this being expressed for each assortment in part.

Method for determining the need for medication:

-direct method that uses precise concrete data

- the indirect method that uses data on the drug consumption of the previous period of determination (this is the most used method).

**2.2.6. Management of pharmacy goods**

Asset management represents the totality of operations related to the receipt, storage and release of material assets or monetary values performed by an employee within the scope of his duties.

Objectives:

- participates in the inventory activity

-participates alongside the leading pharmacist in the preparation of the documents related to the management of the pharmacy:

- the register of the house, currency (daily), the description of the method of completing the register of the house and the currency (example) and the method of calculating the daily salary
- management report, inventory list, register of fixed assets and inventory objects, drawn up at certain time intervals
- knowledge of pharmaceutical IT systems for carrying out the activity of managing pharmacy goods
- knowledge of the pharmacist's relationship with the institutions, the ability to control the management of the pharmacy (the control of the National Health Insurance House, of the stock of medicine, consistency between the displayed and registered prices, of the recipes, the invoice, the grant).( Strand, M. A., Bratberg, J., Eukel, H., Hardy, M., & Williams, C. ,2020)

**2.2.7. Reception of medicines in Sensitive pharmacies**

By reception is meant the totality of the operations that are performed upon receiving the medicinal products, verifying the existence of the quantity and value entered in the accompanying documents.

Terminology:

- collection order: an internal, unique document, based on an order, which is used in the process of collecting the goods for the customer
- route list: internal document, unique generated for a delivery tour, which centralizes all the orders prepared for delivery and which is used in the delivery process (Bahlol, M., & Dewey, R. S., 2021)

-package: the box containing individualized product units by the attached collection order

- types of packages: - two-dimensional standard boxes with black lids containing units of product packaged in an environmental environment, according to the order of collection, which can be found inside or attached to the side;
- two-dimensional cold box with red lid with isotherm kit containing the attached order
- special product boxes of two dimensions that contain the product with the related order

- produced under a special regime from the category of psychotropics and narcotics, provided with a seal, which in turn are accompanied by the collection order;
- the original box sealed by the factory, which contains the product quantity, seal, which in turn are accompanied by the collection order;
-distributor-delegate of the warehouse who delivers the products to the pharmacy;

Description of the procedure:

All orders are processed at the individual parcel level, based on the pick-up order.

All products are picked and packed according to the order and must match in number and name.

Distribution is carried out for Sensitive pharmacies according to the following procedure:

- the distributor of the Medimplus warehouse delivers to the pharmacy the boxes and boxes at the order level
- the Medimplus distributor handles the delivery of the travel list to the pharmacy representative for scanning (bar code related to the delivery point)

The pharmacy representative scans the route list, so he stores all the information from the Route List (number of the box, order, received bills)

The MDP distributor operates the delivery of orders by counting in accordance with the information retrieved by the pharmacy's IT system from the Track List.

The pharmacy representative validates the receipt directly in the pharmacy's IT system.

If there is a difference between the number of orders received in the report with the data taken from the Track List, the pharmacy representative and the distributor proceed to the identification of the missing order. This identification can be done by scanning order by order, or by counting the orders and numbers from the Track List, physically delivered.

The MDP distributor, together with the pharmacy representative, proceeds to pick up the products, identifying the name, expiration date and number for each product in the batch.

For the product in the special regime (toxic and narcotic), the pharmacy representative will stamp the second copy of the invoice to hand over to the distributor

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The MDP distributor will take over the empty boxes and isothermal kits from previous delivery or from the current delivery, you will count them in the presence of the pharmacy representative, who will directly fill in the number of the box delivered in the "number of delivered box" section in the IT system. The pharmacy representative in the presence of the warehouse representative will close the primary order reception directly in the IT system by accessing the "save receipt" button

Then proceed to the receipt of the products by scanning the unique Sensitive codes, first identifying the bbd, then scan each product separately, and finally save the receipt.

In case of non-conformity with the order of collection, they will be sent by filling in a complaint to the "customer support" department of the MDP deposit, by filling in a form specifying: product minus, product plus or inversion.

The decision to deposit will be made after receiving the collection order.

Based on this, the traceability in the deposit and the cause that led to the non-conformity of the delivery will be made.

The response time is 24 hours from the receipt of the claimed order.

The resolutions are as follows:

- the product found to be defective will be sent to the next delivery accompanied by the related verbal process.

If the related product does not exist in the warehouse, a negative invoice for the respective product will be sent to the pharmacy,

- the surplus product is sent by the MDP deposit agent accompanied by the related collection order.

- the damaged product will be sent to you through the MDP warehouse distributor for replacement or for the issuance of a return invoice for the respective product.

The reception of medicines is carried out by the leading pharmacist or a substitute, in a specially arranged space

The main suppliers of pharmaceutical products for pharmacies are pharmaceutical warehouses.

The pharmaceutical recipients, the herbal medicinal product, can also be received by the population

Reception of pharmaceutical products can take place:

- directly at the pharmaceutical warehouse.

- in the pharmacy, in the case of their transport with the transport of the deposit.

In addition to the main supplier, namely the Medimplus warehouse, Sensitive pharmacies are also supplied by external suppliers.

The reception of the products is as follows: the representative of the pharmacy takes the goods quantitatively, qualitatively, and organoleptically.

The pharmacy representative will stamp the second copy of the invoice, which will be handed over to the representative of the respective deposit.

The next step consists in the introduction of invoices into the IT system by the pharmacy representative.

Objectives:

- knowledge and participation in the quantitative, qualitative, and quantitative reception of medicines and parapharmaceutical products
- identification and description of the component parts of an invoice (filling method, due date, validity period in accordance with the one written on the box)
- checking the prices listed on the invoice, which must not exceed the maximum price
- knowledge of how to prepare receipt notes for medicines and parapharmaceutical products
- participation in the activity of recording the prices on the packaging, in accordance with the ones in the calculator.
- the use of pharmaceutical IT systems (computerized management program) in the reception activity of the pharmacy - registering invoices, drawing up and issuing internal reception notes in the pharmacy

**2.2.8. The procedure for ensuring the storage conditions of medicines**

The leading pharmacist continuously monitors the quality conditions for keeping the medicines in the pharmacy's stock by:

- self-inspection measures
- supervision of the personnel responsible in this sense
- the pharmacy staff nominally responsible by the pharmacist in charge for monitoring the storage conditions in accordance with the manufacturer's regulations (explicitly mentioned on the label/packaging of the food)

The managing pharmacist appoints by internal note a person responsible for monitoring compliance with the storage conditions:

- in the office, the optimal temperature must be 20 degrees Celsius +/
-5 degrees Celsius and relative humidity RH:60% +/-5%

- in reception, the optimal temperature must be 20 degrees Celsius +/-5 degrees Celsius and the relative humidity RH: 60%+/-5%

- in the pharmacy warehouse, the temperature must be similar to that of the office and reception

- the refrigerator for keeping medicines in the "cool" place, the temperature must be between 8 and 15 degrees Celsius

-fridge for keeping medicines "in the cold" 5 degrees Celsius+/-3 degrees

The managing pharmacist will assign to each storage space/premises medication in the pharmacy as a device for measuring temperature and relative humidity, calibrated annually by an authorized metrology body, keeping records of daily records for a minimum of one year from the date of delivery to the expiration date Monthly temperature and humidity monitoring tables.

In order to avoid omissions, the leading pharmacist prepares the List Medicines that are kept in a cool place, as well as those that require a temperature of 5 degrees Celsius + /-3 degrees Celsius and display them in a place visible to the pharmacy staff (usually within inches of the refrigerator).

The recording of temperature and humidity data will be carried out at six-hour interval, the recording of data during the night will only be carried out in the case of automatic measuring devices that allow the data to be downloaded on paper.

As a rule, in the case of temperature measuring devices and humidities that do not have their own alarm devices for recording exceedances in case of heat wave or other situations with extreme temperature (negative or positive), the leading pharmacist together with the rest of the people around the world emergency corrective and preventive measures. (Meghana, A., Aparna, Y., Chandra, S. M., & Sanjeev, S., 2021)

The entire staff of the pharmacy is obliged to identify from the moment of receipt the products delivered by the authorized distributors of thermolabile medicines to store them in the appropriate environment.

Also, all personnel ensure that at the time of release photosensitive thermolabile drugs like his patients their owners have understood the special storage conditions including the special mentions, referring to the validity of external preparations, as well as those with limited validity in certain humidity conditions and/or the light at the time of unsealing the package.

During the summer holidays, the pharmacy staff will take care of additional precaution to ensure the maintenance of the quality of thermosensitive medicines

during transport by patients or their relatives, making them available: cooler bags, shoe bags.

**2.3. Quality control and company's policies within Sensitive pharmacies**

Pharmaceutical services are the services provided by pharmacists in the pharmaceutical care concept. Pharmaceutical services are not limited to medical assistance (delivery of medicines), they include information, education, health promotion. A pharmaceutical service can also exist without medication, in some cases it even excludes the use of medication to obtain maximum results for the patient.

If the medicine is a product, a tangible good, the service is a tangible good that cannot be transported or kept, which is temporarily exhausted and appears now of its provision and consumption.

Often the service is hard to separate from the tangible good, being associated as "added value" to the product itself.

In these conditions, the understanding of the essence of pharmaceutical services is often mistaken, assuming only the delivery of medicines without other supporting activities.

It is important for pharmacists to understand any interaction with the patient/visitor to solve his health problem represents a service rendered by him which must be of quality, in accordance with the existing professional standards. As is known, quality, in the most accessible sense possible, has been defined as representing the degree of consumer satisfaction and is oriented in four directions:

- to the product
- to the technological process
- to the beneficiary
- towards costs

The old saying about quality being in the eye of the beholder is true, quality is measured by the customer.

Sometimes, there is a tendency to think of quality as the best material, the best equipment and absolute zero defect, however, in most cases, one does not expect and cannot afford a perfect solution.

Since quality is defined by the customer, it may seem that it is completely subjective, yet there are many things about quality that can be done objectively. This first requires breaking down the generic term "quality" into the specific aspects of quality that are important to the customer.

About the existence of some services, or more correctly said, about existing a quality control service, organized on a scientific basis, can rarely be spoken of. As a rule, quality control is ensured by a certified employee who is up to date with international regulations. In addition to understanding the definition of quality, it is important to recognize the interests of other participants.

Depending on the roles of the participants, there may be other quality requirements that must be met, such as:

- the company-solution reaches the strategic discovery
-buyers-the solution meets the specifications
- end users - the solution helps them to do their work better, faster, easier

**2.3.1. Price policy**

Sensitive cannot set the price of medicines because it is imposed by the Ministry of Health, to which it can only possibly apply the lowest surcharge or sell more products at the price of one.

Regarding the price of OTC (over the counter) medicines, Sensitive did not increase the commercial allowance, but even more since last year it has come with numerous promotions.

It is possible that the price of some products has known a slight increase, but this is not due to Sensitive's price policies, but due to the price increase at the producer, or the exchange rate fluctuation.

Another reason that led to the increase in the price of OTCs, this being the only medicine whose price is not imposed by the ministry, is due to extensions of payment terms from the insurance system for free and compensated medicines. In this sense, the only receipts on which the pharmacies had them came from the sale of OTCs and the patients' co-payment for the compensated medicines.

**2.3.2. Promotion policy**

The promotional activity of the Sensitive company includes a series of methods aimed at increasing the number of customers and increasing the rate of profit.

Such principal means are:

- information magazine for the company's clients
- means of information on the Internet
- presentations organized by doctors
- the media advertisement

By definition, the strategy consists in specifying the fundamental approach to obtain the competitive advantage pursued by the company, which contextually provides the actions to be taken in each functional area.

In practice, many strategic plans are a list of action phases, without a clear articulation of the competitive advantage to be achieved and the methods to be used.

The main characteristics of the strategy applied by the company are:

- the strategy always aims, explicitly and implicitly, at achieving well-defined goals, specified in the form of its objective mission
- the strategy concerns the future period of the company's life and the high degree of risk, including the uncertainty associated with it
- the scope of the strategy is the organization as a whole
- the strategy is based on the correlative approach of the organization and the environment in which it carries out its activity
- the strategy has a formalized character, taking the form of a plan
- the strategy aims at prefiguring a competitive behavior for the organization in the long term
-achieving the greatest synergy is always the goal of the strategy development process; its economic expression is the generation of added value as substantially as possible, recognized by the company's customers
- the basis of the strategy approach is the principle of equi-finality, according to which there are several modalities or combinations of resources and actions, through which it is possible to ensure the achievement of a specific objective
- the strategy is a result of the explicit implicit negotiation of the stakeholders, the negotiation based on the discovery of multi-dimensions, which is not completely opposite

### 2.4. SWOT Analysis

Based on the SWOT analysis, in order to maintain and especially increase the company's competitiveness, it is recommended to follow a ST strategy (strengths-threats), taking into account the existing weaknesses.

There is a need for the continuous development of the existing Work Points (increasing storage spaces, relocating certain warehouses, the development of the car park) and the creation of new ones to strengthen the position of the company on the Romanian market, thus being able to face the appearance of companies from abroad, thus raising the entry barriers on the market.

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Fighting the actions of the competition is possible by continuing customer loyalty through special services, because, as I have shown before, in the distribution of medicine, the services offered are particularly important, the services that can weigh more than the commercial conditions. The continuation of the motivation of the employees in the involvement in the development of the company and the loyalty of the internal clients protects the organization, keeping and attracting the competent staff against the competition.

It is necessary to adopt a flexible development plan for the company depending on the actions of competition on the market and the possibility of adopting restrictive laws in the pharmaceutical field

**SWOT Analysis of the SENSITIVE SA private pharmacy**

| Strong points | Weak points |
|---|---|
| - the pharmacy is registered and operates legally, and has authorization for toxic and legal narcotics<br>- the pharmacy's computers are permanently connected to the Internet<br>- the staff consists of pharmacists, pharmacy assistants and beauticians with thorough training<br>- the staff is receptive to patients' problems<br>- good position on the domestic market<br>- reduced debt level<br>- favorable liquidity and solvency values<br>- the company offers a diversified range of financial strength products<br>- national coverage<br>- strong image promotion system<br>- a very powerful IT system<br>- offering special customer services<br>- very good collaborative relationships with producers<br>- opening in the promotion of internal competences (persons from within the company) | - there are delays in the payment of suppliers due to the large amounts of ordered and unsold goods<br>- insufficient funding source<br>-modest financial result in 2014<br>- this car park is reduced compared to needs<br>- reduced spending budget<br>- less advantageous commercial conditions compared to the competition<br>- lack of division of the sales department into divisions, compared to some competing companies |

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| Opportunities | Threats |
|---|---|
| The opportunities represent external environmental factors favorable to the Sensitive company, the new chance to increase the company's capital<br>- winning new niches on the market by introducing new brands<br>- the medicine market in Romania is poorly developed (the lowest medicine consumption per inhabitant in Eastern Europe)<br>- increasing the minimum income per economy<br>- increasingly better qualified workforce in the field of sales<br>- modification of the medication compensation system<br>-increasing the percentage of GDP allocated to the health care system, according to the standards of the European Union | Threats represent negative external environmental factors for Sensitive SRL and<br>namely, situations or events that can adversely and significantly affect the company's ability to achieve its established objectives, determining the reduction of economic and financial performance.<br>- the existence of payment delays on the part of the National Health Insurance House, which leads to delays in the payment of suppliers<br>-foreign competition from large profile companies<br>-there were more reductions in the price of medicines imposed by the Ministry of Health, which decreased the commercial margin of the pharmacy, including the profit.<br>- there is a greater demand for generic drugs that are much cheaper than the originals<br>- the economic situation of the country<br>-liberalization of the pharmacy market |

**Conclusion and Recommandation**

The pharmaceutical market in Romania is strongly fragmented, in being present at the national level over 5000 pharmacies of which, according to certain estimates, 1500 are included in 150 chains (the legislation in force only allows for chain pharmacies), 70% of these are contained in chains, with at least 10 pharmacies.

Although there are a large number of drug manufacturers (Sanofix, Therapia, Hoffmany La Rocher, Novartisa, Serviery, Pfizeras, GSKs), the majority of which are of international size, which due to their diversity could not exert adequate pressure on the price policy, the market that there are changes in the price that are

directly caused by the discount policy of the medicine suppliers as well as the payment terms practiced by them in the relationship with the distributors.

Another important aspect is represented by the mix of the original molecule and the generic that each producer brings to the market as well as the inclusion of this molecule in the national health program, in the list of compensated drugs and of drugs released without a prescription.

In recent years, the wholesale market has matured and at the same time concentrated, so that the first 10 distributors own 90% of the market.

Having the largest market share, Medimplus (part of Am&Di Pharm) remains the market leader followed by the following players (in random order): Pharmexperts DCI, Pharmexims, RemediaRed, Polisany, Europharms Holding, AmDiM Pharmacy, Pharmyx, etc.

With the constant evolution of the number of players, the market allowed the consolidation of the position of the main players on the market who entered a war of discounts that led over time to the erosion of profit margins.

This evolution will require in a distant future new consolidation through takeovers and acquisitions, which will generate the synergies necessary to increase operating margins. The total value of medicines released to patients in the 2nd quarter of 2014 amounted to 3.01 billion lei, an increase of 5.7% compared to the 2nd quarter of 2013. value of 2.15 billion lei, increasing by 4.5%. Non-prescription drugs (OTC) reached a value of 0.46 billion lei, an increase of 12.8%, and the hospital segment reached 0.40 billion lei, an increase of 4.6% compared to the 2nd quarter of the year precedent.

Compared to the growth rates of the last 5 quarters, in the 2nd quarter there is a tendency to return through a positive growth rate, both in units (3.2%) and treatment days (6.9%), as well as in value, in lei (5.7%) or in euros (4.9%).

The pharmaceutical market is mainly represented by the urban area, specifically, 78% of the retail market is concentrated in big cities, and 95% of the hospital market is concentrated in cities and towns.

In these conditions, a third of the prescriptions prescribed by doctors in the rural environment remain only informative notes for patients.

This is because, if they don't have a pharmacy in the place where they live, many of them don't go all the way "to the city" to buy their medicines.

In Romania, there are less than 1,000 pharmacies in rural areas, say analysts from the management consulting company A.T. Kearny. Maybe also because a pharmacy should have a turnover of at least ten thousand lei per month in order to

survive, and in the rural environment, the purchasing power places the sales far below this value. that the average annual consumption of pharmaceutical products in the urban environment is around 100 euros per inhabitant in the rural area, it is only 50 euros.

Consequently, the reduced consumption of medicine in villages and communes cannot be attributed to the better health of the inhabitants, but to the much more difficult access to medicine.

Analysts from A.T. Kearney say that this situation offers opportunities for opening pharmacies in rural areas.

The opportunity that Sensitive has already taken advantage of, which opened the first rural pharmacy in the autumn of last year, in Crasna, in Gorj county, and the distributors are willing to deliver medicines to the village, because this is what they are going to do along the route, they thus have the possibility to distribute in the intermediate areas of the big cities, the baskets being distributed to a larger base of pharmacies.

As for the trend, the rural area has an unexplored potential and for the distribution channels of parapharmaceutical products. In addition, it is expected that the strong expansion of hypermarkets will have an influence on the pharmaceutical market as well. More precisely, the distributors of OTC products and medicine (non-prescription medicine) will turn to this channel, which ensures a good presentation to final customers, and which guarantees their circulation. In this situation, some parapharmaceutical product could be associated with the FMCG category (fast moving consumer goods), in terms of logistics and marketing dynamics.

According to a study by A.T. Kearney, a strong increase in health expenses is expected in the coming years.

The growth rate will quickly reach from an annual average of 12% to over 19% in the next four years.

Private expenses are growing faster than public ones, and a large share of these private expenses is the constitution of OTCs, medicines that come to act for prevention.

If we look at the field of producers, production is in the process of consolidation, because of foreign investments. In the last two years, there were several international players who made acquisitions in the local production: Ranbaxys, which bought Terapy, Actavisa, which bought Sindans, Zentivar with Sicomedy.

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Production is a different game than distribution.

In production there is a need for financial strength, no matter if ethical medicine or OTCs are produced.

The main ten players make more than 50% of the production. This means that the market is still fragmented and there is room for consolidation. There is still a lot of room for growth.

The Romanian pharmaceutical market is still far from reaching maturity. For this reason, it is considered that the main factor that generates the increase is the increase in the expenses allocated for the purchase of medicine, per inhabitant, the consumption being 70 euros per inhabitant, comparative with European standards - 240 euros per inhabitant.

This increase is realized directly by increasing the income of the population, who can afford to buy more or more expensive medicine, but also due to the larger sums allocated from the National Single Health Insurance Fund.

The other factor for the growth of the pharmaceutical market, respectively the introduction of new products on the market, is a decisive factor for the mature market, but for us, it will have an impact for some time.

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