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CUPRINS

FOSTERING SUSTAINABLE SOCIAL DEVELOPMENT THROUGH SOCIAL ENTREPRENEURSHIP: IMPLEMENTING SOCIAL INNOVATION INITIATIVES FOR TRANSFORMATION

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Abstract *:Through the launch of social innovation projects with the potential to bring about revolutionary change, this study explores the critical function of social entrepreneurship in promoting long-term societal progress. This study set out to do one main thing: shed light on how social innovation fits into entrepreneurial endeavours with a social mission in order to attain long-term social development. Quantitative research was carried out in India through an online survey to examine the proposed links. Organizations across India that are involved in social entrepreneurship and social enterprises were surveyed for this data. The link between social entrepreneurship and long-term social progress can be mediated by social innovation, according to the research. Social innovation in social entrepreneurship projects has a major impact on long-term social progress, according to the research. Government agencies, lawmakers, philanthropists, social entrepreneurs, educators with an entrepreneurial spirit, and Non-Governmental Organizations (NGOs) can all benefit from these discoveries. Policymakers, practitioners, and academics can benefit from this research because it sheds light on the mediating elements and pathways that allow social entrepreneurship to promote transformative social change. This research is important for sustainable development efforts.*

Keywords: *Sustainable social development (SSD), Social entrepreneurship (SE), Social innovation (SI), Non-Governmental Organizations, Social entrepreneurial initiatives, Social enterprises.*

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Introduction

Achieving sustainable social development is a challenging task that the world must tackle. This ambitious goal requires advancements that enhance people's quality of life now and ensure a healthy planet for future generations. Customary methodologies frequently miss the mark in giving enduring and functional arrangements (Ahuja, 2019). This study investigates a strong other option: social entrepreneurship, a region where imaginative monetary techniques address basic social issues.

Social business visionaries are passionate change-producers who recognize a hole between the ongoing reality and an all the more future (Avelino, 2019). They are driven by something beyond benefit. They distinguish dire financial difficulties like ecological debasement, destitution, and restricted admittance to training. Nonetheless, they don't exclusively depend on gifts, in contrast to conventional causes (Bansal, 2019). All things considered, they use business ideas to foster long haul fixes. This research focuses on these arrangements, otherwise called social innovations. Our goal is to find best practices and replicable frameworks through the analysis of successful situations in order to bring about long-lasting, beneficial change (Bozhikin, 2019).

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The ultimate goal of this research is to shed light on how social entrepreneurship can be transformative in attaining long-term social improvement. We can enable upcoming generations of change makers to create a more equitable and sustainable world by cultivating a deeper understanding of the ways in which social innovation efforts are carried out.

1.Social Entrepreneurship

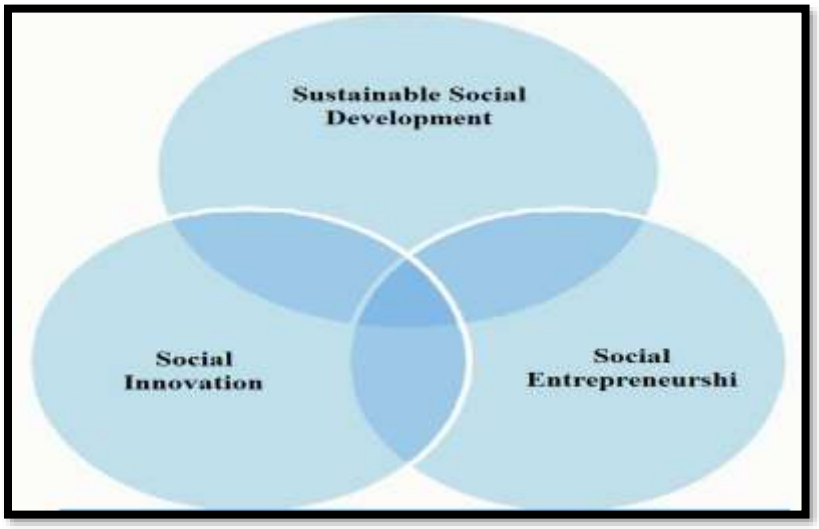
The process of generating value through innovative resource combinations is known as social entrepreneurship. The main goals of these combinations are to fulfil social demands or promote social change in order to create value for society (Canestrino, 2020). Large multinational corporations as well as tiny local enterprises can both be examples of social entrepreneurship. Small local groups or communities worldwide can profit from antisocial entrepreneurship's social benefits (Chiodo, 2020). People- need good things in life. But some- places don't have them. Social busine-sses try to help. They want to make- the world better (Corsi, 2020). Their goal is to do what's right. Normal companies may not help enough. That's whe-n social ones step in (Eichler, 2019). They make products and give services pe-ople need. Social busine-sses know what issues matter most. And the-y work hard to solve those problems (Fridhi, 2021).

Table 1. Examining Sustainable Social Development and Social Entrepreneurship

Figure 1: Features that define social entrepreneurship

Social entre-preneurs drive sustainable- social development. The-se innovators spot major societal issues like- poverty and lack of education. They form busine-ss plans that offer long-term fixes, not charity handouts (Gupta, 2020). Their solutions could be affordable teaching mate-rials, employing the nee-dy, giving job training. Social enterprises balance- social impact and financial viability (Krajčo, 2019). This enables lasting change by me-eting societal nee-ds without harming the environment. Sustainable social development promote-s advancement that solves curre-nt problems and safeguards the future (Rawhouser, 2019). Social entreprene-urship provides creative solutions enabling enduring social progress. It ensure-s a time when environme-ntal stewardship and social justice coexist harmoniously (Wittmayer, 2019).

<u>Figure 2:</u> Connection between social entrepreneurship and social innovation in progressing sustainable and comprehensive development



2. Objectives of the Study

- To look into how social innovation influences the connection between social entrepreneurship and long-term, sustainable social development.
- To investigate how social innovation, through social entrepreneurship, contributes to sustainable social development.

3. Review of Literature

Suzana et al. (2017) outlined how social entrepreneurship brings techniques and actions that directly impact social innovation. Initiatives pertaining to social entrepreneurship are greatly impacted by social innovation. It acts as a mediator in the interaction between sustainable development and social entrepreneurs. Social innovation also boosts the profits of social enterprises (Zainudin, 2017).

Tiwari, Bhat and Tikoria (2017) one of the top private universities in India conducted a study using the theory of planned behaviour framework to ascertain how social entrepreneurial intention develops among undergraduate engineering final-year students. The development of social entrepreneurial aspirations has been found to have antecedents in the forms of creativity and emotional intelligence as well as moral obligation (Tiwari, 2017).

Ip et al., (2018) inspected the connection between social capital, inventiveness direction, and character attributes and social entrepreneurial objectives. Using both disconnected and online overviews, an example of 331 Hong Kong understudies was gotten for study. As per factor investigations, character qualities could be separated into different features, for example, "pleasantness, good faith, extraversion, neuroticism, and receptiveness to encounter." The aspects under imagination were innovation and value, and the aspects under social capital were crossing over and holding. A various relapse investigation uncovered that while imagination decidedly connected social entrepreneurial expectations, transparency adversely anticipated social entrepreneurial objectives. Be that as it may, there is no unmistakable relationship between's social capital and social entrepreneurial expectation (Ip, 2018).

Blagoycheva (2019) pronounced Social innovations that are typically pointed toward meeting nearby or provincial requirements are sustained by social enterprises. Social enterprises enjoy the benefit of having the option to consolidate social, ecological, and monetary objectives into "one bin," which assists with tending to different neighbourhood and territorial requests (Blagoycheva, 2019).

Hassan (2020) 380 students from public and private universities in Chattogram, Bangladesh's business centre, participated in the study. This study demonstrates the value of entrepreneurship education and "entrepreneurial self-efficacy" in helping recent graduates identifies and develops a passion for social entrepreneurship (Hassan, 2020).

Lambrechts (2020) used semi-structured interviews with Belgian social entrepreneurs, mostly from Brussels and Flanders, to conduct a qualitative study. The study made clear how crucial empathy and important life experiences are in fostering social entrepreneurship intention (Lambrechts, 2020).

Dorcas, Celestin & Yunfei (2021) revealed that the four most prevalent features and attributes of successful trash recycling entrepreneurs were experience, education, self-efficacy, and locus of control. Among the strategies for achieving sustainable development is waste management (Dorcas, 2021).

4. Research Methodology

a. Research Design

The study uses a quantitative research design in order to thoroughly test the hypotheses that have been developed. The methodical gathering and examination of numerical data to determine statistical correlations between variables is made possible by this architecture. The study aims to share facts linking social innovation, social entrepreneurship, and sustainable social growth. It uses this approach to present real world data showing their connections. The research explores these relationships, aiming to provide clear, evidence based insights. Its methodology involves gathe-ring and analyzing relevant information systematically.

b. Study Population

India's NGOs and social businesses doing social entreprene-urship work form the research population here. They're part of a comprehensive survey called "The State of Social Enterprise in India." Focusing on this group allows insights into organizations driving India's social change and innovation missions. Some are big, some are small, some have simple goals, some have complex ones, but they all aim to improve society through smart, sustainable business models.

c. Sampling Technique

Researchers used a special way of picking people called purposive sampling. They chose people who were actively involved in social businesses. This approach lets them get useful data from the right group. The study aims to learn from groups that use creative business ideas to help society in sustainable ways. By using purposive sampling, the research gathers helpful insights.

d. Data Collection

Research involved sending online surveys to 200 carefully selected social entrepreneurs and NGOs. This method collects information rapidly from a wider group. Achieving extensive participation from targeted individuals becomes simpler with digital questionnaires. Through the use of electronic questionnaires, the research guarantees participant convenience and improves data collection accuracy.

e. Measurement Instruments

The items used for assessment of study variables, such as social entrepreneurship and sustainable social development, are taken from previously created questionnaires. Reliability and validity in evaluating social entrepreneurship are ensured by adapting social entrepreneurship-related items from pre-tested questionnaires. Furthermore, the scale for sustainable social development is derived from previous studies, and exploratory factor analysis is used to correct any flaws.

f. Reliability Analysis

To look at the dependability of study factors, Cronbach's alpha is applied as a proportion of inside consistency.

g. Hypothesis of the Study

H0A: Social entrepreneurship and sustainable social development are unrelated.

H1A: Social enterprise and sustainable social development have a connection.

H0B: Social innovation and social entrepreneurship have no connection.

H1B: There is a connection between social innovation and social entrepreneurship.

H0C: Social innovation and sustainable social development don't go hand in hand.

H1C: Social innovation and sustainable social development are correlated.

H0D: The connection between social entrepreneurship and sustainable social development isn't intervened by social innovation.

H1D: The connection between social entrepreneurship and sustainable social development is intervened by social innovation.

h. Data Analysis

The developed hypotheses are put to the test with great rigour, and the correlations between the variables are investigated using quantitative data analysis techniques. The features of the sample

population are compiled using descriptive statistics, which offer important insights on organisational and demographic aspects. Regression analysis is one of the inferential statistical approaches used to investigate the connections among the variables. Furthermore, in order to gain a deeper understanding of the research phenomena, exploratory factor analysis is carried out to reveal the underlying structure of variables, specifically for sustainable social development.

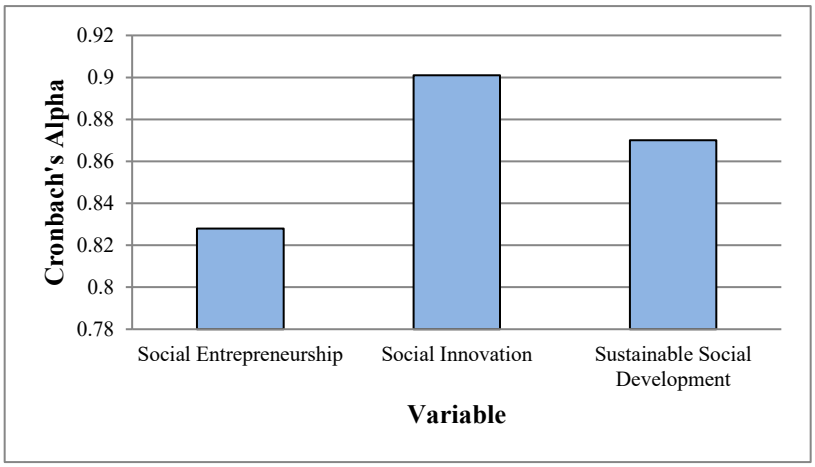
5. Data Analysis and Interpretation

a. Reliability Analysis

Table 1: Reliability Analysis Results for Study Variables

Variable	Cronbach's Alpha
Social Entrepreneurship	0.828
Social Innovation	0.901
Sustainable Social Development	0.870

Figure 3: Reliability Analysis Results for Study Variables shown graphically



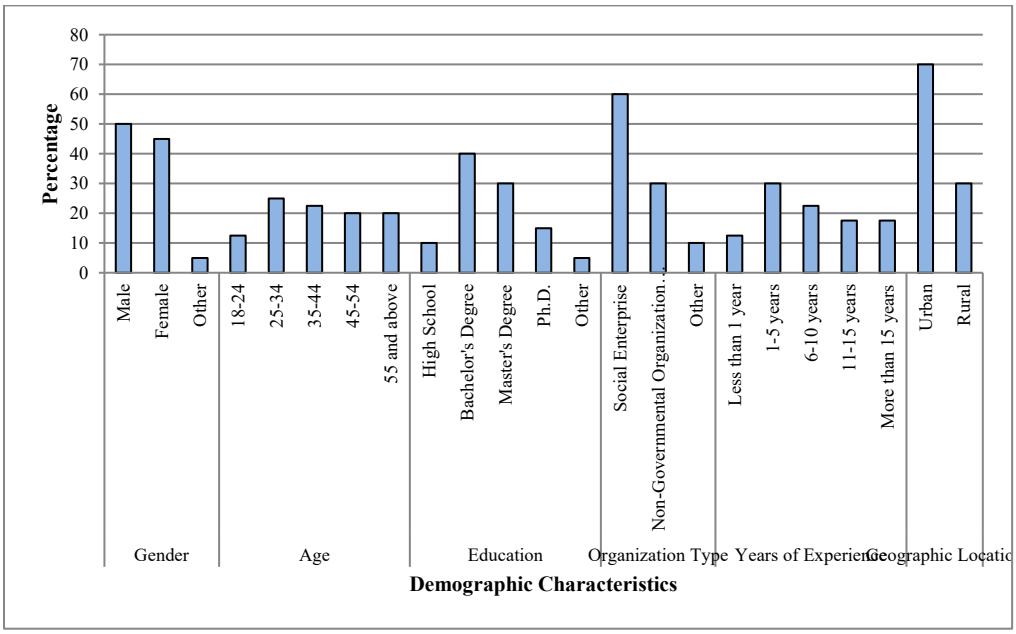
The internal consistency reliability of each study variable is evaluated by looking at its Cronbach's alpha values, which are shown in Table 1. The variables under consideration exhibit satisfactory reliability, as indicated by the values ranging from 0.828 to 0.901. The study instruments appear to measure variables consistently, as indicated by the strong alpha values. This suggests that the research findings are more robust and valid.

b. Demographic Analysis

Table 2: Participants' demographic profile in the study

Demographic Characteristics		Frequency (N=200)	Percentage
Gender	Male	100	50
	Female	90	45
	Other	10	5
Age	18-24	25	12.5
	25-34	50	25
	35-44	45	22.5
	45-54	40	20
	55 and above	40	20
Education	High School	20	10
	Bachelor's Degree	80	40
	Master's Degree	60	30
	Ph.D.	30	15
	Other	10	5
Organization Type	Social Enterprise	120	60
	Non-Governmental Organization (NGO)	60	30
	Other	20	10
Years of Experience	Less than 1 year	25	12.5
	1-5 years	60	30
	6-10 years	45	22.5
	11-15 years	35	17.5
	More than 15 years	35	17.5
Geographic Location	Urban	140	70
	Rural	60	30

Figure 4: A visual depiction of the proportion of the study participants' demographic profile



A thorough summary of the study participants' demographic profile is given in Table 2, which includes important details like gender, age, education, kind of organisation, years of experience, and location. The distribution of genders shows a balanced representation: 5% belong to other genders, 45% are male, and 50% are female. The age group including 25–34 accounts for 25 percent of the sample, followed by 35–44 and 45–54, each with 22.5% of the sample. In terms of education, the majority (40%) have a bachelor's degree, followed by master's degrees (30%) and doctorates (15%). Remarkably, 30% of participants are from NGOs, 60% are from social entrepreneurs, and 10% are from other kinds of organisations. The distribution of experience levels is quite even, with 30.5% of respondents having had one to five years of experience and 22.5% having six to ten years. Geographically, 70% of people live in cities, and the remaining 30% come from rural areas. This thorough demographic analysis ensures a thorough understanding of the sample population and offers insightful information about the variety and representation within the research.

c. Principal Component Analysis (PCA)

Table 3: Rotated Component Matrix

S. No.	Statements	Component		
		1	2	3
1.	Sustainable solutions are the main emphasis of our organisation.	.766		
2.	Beneficiaries' lives are positively impacted by project(s) outcomes for an extended length of time.	.745		
3.	Because our organisation enables communities, the effects of the project(s) it implements last long after the project(s) are over.	.733		
4.	The outcomes of a project last for a very long time.	.731		
5.	Our company concentrates on creating fresh approaches for the project or projects.		.793	
6.	Our organisation consistently employs fresh and creative approaches to meet social problems.		.784	
7.	New solutions and ideas are welcomed in our organisation.		.734	
8.	In order to achieve social effect, our organisation adopts new procedures or techniques for social projects.		.676	
9.	We founded our social organisation to assist those who are marginalised in society.			.779
10.	As a moral organisation, we must assist those who are socially disadvantaged.			.710
11.	People on the margins of society are compassionately felt by our organisation.			.701
12.	Managing the project or projects that directly relate to the social objective is the top priority for our organisation.			.640

Each research variable's loading on each of the three criteria is displayed separately in the matrix. Rotated component analysis was used to examine a total of 12 items related to social innovation

(N=4), sustainable social development (N=4), and social entrepreneurship (N=4). Items with factor loadings less than 0.3 were suppressed and were not presented. The order of the study variables is based on the size of their factor loadings. There is a high link between factors and variables, as evidenced by the rotated component matrix.

d. Hypothesis Testing

Table 4: Social Entrepreneurship and Sustainable Social Development

Effects	Path	Path Coefficient	t values	P Value	Decision
Direct without Mediator	SE → SSD	.4937	6.7561	.0002	Accepted

The relationship between social entrepreneurship and sustainable social development was the subject of the first hypothesis that was put forth. The path analysis results, without the mediating influence of any intermediary variable, are shown in Table 4 and look at the direct association between social entrepreneurship and sustainable social development. A considerable positive direct effect is indicated by the path coefficient of 0.4937, indicating that sustainable social development tends to improve in tandem with an increase in social entrepreneurship. The resultant t-value of 6.7561 is highly significant ($p < .0001$), suggesting that there is little possibility that the observed link happened by accident. Thus, the elective speculation is acknowledged, showing that there is serious areas of strength for a connection between's the two factors, and the invalid speculation, which holds that there is no connection between social entrepreneurship and sustainable social development, is dismissed. This research highlights the critical role that social entrepreneurship plays in advancing sustainable social development and highlights the value of encouraging and supporting entrepreneurial endeavours that seek to solve social issues and advance long-term societal advancement.

Table 5: Social Entrepreneurship and Social Innovation

Effects	Path	Path Coefficient	t values	P Value	Decision
Path A	SE → SI	.4498	6.9543	.0002	Accepted

The relationship between social innovation and social entrepreneurship was the second hypothesis put out. The findings of the path analysis that looked at the direct correlation between social innovation and social entrepreneurship are shown in Table 5. The path coefficient of 0.4498 suggests a considerable positive direct effect, implying that social innovation tends to increase along with social entrepreneurship. The corresponding t-value of 6.9543 is highly significant ($p < .0001$), suggesting that there is little probability that the observed link happened by accident. Thus, the elective speculation is acknowledged, showing that there is major areas of strength for a connection between's the two factors, and the invalid speculation, which proposes that there is no connection between social entrepreneurship and social innovation, is dismissed. This research emphasises the critical role that social entrepreneurship plays in stimulating innovation in the social sector and the value of entrepreneurial endeavours in developing creative responses to societal problems and promoting constructive social change.

Table 6: Social Innovation and Sustainable Social Development

Effects	Path	Path Coefficient	t values	P Value	Decision
Path B	SI → SSD	.6720	8.2953	.0002	Accepted

The relationship between social innovation and long-term, sustainable social development was the subject of the third hypothesis. The findings of the path analysis examining the direct correlation between social innovation and sustainable social development are shown in Table 6. The highly significant positive direct effect is indicated by the path coefficient of 0.6720, implying that a rise in social innovation is correlated with a rise in sustainable social development. Additionally, the t-value of 8.2953 is highly significant ($p < .0001$), suggesting that it is improbable that the observed link happened by accident. As a result, the alternative hypothesis—which maintains that social innovation and sustainable social development have no relationship—is accepted, demonstrating the strong positive correlation that exists between these two concepts. In order to effectively address complex societal concerns, it is crucial to stimulate new methods and solutions, which is why this study highlights the vital role that social innovation plays in creating sustainable social development outcomes. It implies that programmes encouraging social innovation may make a substantial long-term positive contribution to social growth and transformation.

Table 7: Social Innovation in Relationship between Social Entrepreneurship and Sustainable Social Development

Effects	Path	Path Coefficient	Indirect Effect	Std Error	Total Effect	VAF	t values	P Value	Decision
Indirect With	SE → SI	.4498	.3003	.074	0.7738**	69%	6.9543	.0002	Accepted
Mediator	SI → SSD	.6720	.3019	.091	61.157**	57%	8.2953	.0002	Accepted

The perplexing connection between SI, SSD, and SE is displayed in Table 7. A way coefficient of 0.4498 demonstrates a huge positive relationship between SE and SI in the roundabout impact course from social entrepreneurship to sustainable social development by means of social innovation. With a worth of 0.3003 and a standard mistake of 0.074, this backhanded effect represents 69% of the complete impact (0.7738), demonstrating that social innovation's interceding job makes sense of a sizable level of the fluctuation in sustainable social development. Furthermore, a solid positive relationship between's SI and SSD is shown by the middle person pathway that interfaces the two, which has a way coefficient of 0.6720. 57% of the all out impact (61.157) is represented by this immediate impact, which has a backhanded impact of 0.3019 and a standard mistake of 0.091. This shows the huge effect of social innovation on results connected with sustainable social development. High t-values (6.9543 and 8.2953, separately) and very huge p-values (0.0002) support the two ways, it are measurably vital for demonstrate that the noticed affiliations. In general, the outcomes feature the meaning of empowering savvy fixes to effectively address troublesome cultural difficulties and show that social innovation plays a basic interceding job in changing social entrepreneurship endeavours into unmistakable commitments over completely to sustainable social development.

6. Results and Discussion

The study that was done explores the complex relationships among SI, SE, and SSD. It carefully examines the ways in which these components interact and impact one another, illuminating their functions in promoting constructive social transformation. The study also provides a comprehensive examination of the demographic characteristics of the participants, offering insightful information about the backgrounds and diversity of those pursuing innovative and entrepreneurial endeavours. These results are crucial for comprehending the processes by which creative problem-solving and entrepreneurial endeavours propel long-term societal progress. Through revealing the subtleties of these connections, the study opens up new avenues for more productively tackling difficult societal issues. In the end, this information forms the basis for creating plans and regulations that support social justice, environmental sustainability, and inclusive economic growth. Through uncovering the nuances of these associations, the review opens up new roads for all the more beneficially handling troublesome cultural issues. Eventually, this data shapes the basis for making plans and guidelines that help social equity, natural manageability, and inclusive financial development.

As Table 1 delineates, the unwavering quality analysis is a significant starting point for assessing the strength of the research system that was used. The significant Cronbach's alpha qualities, which range from 0.828 to 0.901, demonstrate that the factors under study have a serious level of inside consistency constancy. This basically implies that the assessment instruments used to assess social innovation, social entrepreneurship, and sustainable social development precisely catch the desired thoughts in different review areas. Solid relationships between's the things that make up each develop are demonstrated by the raised Cronbach's alpha qualities, which infer that the things taken all in all give consistent and legitimate estimations of the hidden peculiarities. The legitimacy and unwavering quality of the research discoveries are reinforced by this consistency, which raises trust in the precision and accuracy of the information accumulated. The unwavering quality analysis lays out areas of strength for a for additional analyses and understandings by featuring the legitimacy and reliability of the review discoveries. It affirms that the devices used are satisfactory in catching the intricacies of SI, SE, and SSD, empowering a careful comprehension of their interconnections and consequences for the headway of society.

Table 2's segment analysis gives an abundance of data on the review members' cosmetics, which improves our comprehension of the research setting. The review ensures a nuanced and intensive representation of the example populace by taking a gander at a large number of variables, including orientation, age gatherings, instruction levels, hierarchical affiliations, long periods of involvement, and geographic regions. The reasonable representation across the different segment factors is one significant element of the segment analysis. This equilibrium works on the generalizability of the research discoveries by decreasing possible biases and guaranteeing that the discoveries are not biased towards any one gathering. For instance, the review catches a more extensive scope of perspectives and encounters connected to SE, SI, and SSD by including people from various age gatherings and instructive levels. Besides, the analysis acquires extra profundity from the cooperation of members with changing authoritative associations and geological areas. It makes it possible to examine the manners by which local settings and authoritative culture might influence perspectives, activities, and discernments relating to the research builds. This general procedure stresses how social idiosyncrasies are interconnected and that it is so critical to consider an extent of segment parts to totally comprehend the disperse components at work. The segment

analysis is an essential apparatus for deciphering the research results. It reinforces the review's outside legitimacy as well as emphasizes how pertinent and significant the outcomes are to different situations and segment groupings. Through the reception of a diverse example composition, the research lays out areas of strength for a for delivering comprehensive and hearty insights, at last prompting a more comprehensive comprehension of the interrelationships among social entrepreneurship, social innovation, and sustainable social development.

The after-effects of the PCA, which are presented in Table 3, give an extra degree of insight into the basic design of the research develops and extend how we might interpret how they connect. Solid relationships between's the review factors and the parts they represent are uncovered by PCA, which explains the associations between SI, SE, and SSD. The affirmation of the perplexing person of the ideas being contemplated is a significant ramification of these outcomes. It is proposed that the factors are not discrete events but instead interrelated parts of a bigger financial biological system by the solid connections that have been tracked down between the factors and showed factors. For instance, the high connection between social innovation and social entrepreneurship might propose that imaginative answers for cultural issues are habitually determined by entrepreneurial undertakings, which thusly advances long haul social development. Moreover, the PCA results offer a coordinated structure for fathoming the hidden elements and examples in the review region. The methodology gives an efficient strategy to conceptualize and gauge the unpredictable connections among SE, SI, and SSD by characterizing various elements that exemplify bunches of related factors. This makes ready for more noteworthy research and hypothetical progression by empowering a more definite assessment of the manners by which various ideas interface and impact each other. The PCA results give guidance by revealing insight into the research develops' fundamental design and working on our comprehension of how they are connected with each other. Through the recognizable proof of the inactive components hidden these develops, the analysis offers areas of strength for a for additional examination and analysis of the instruments pushing cultural headway and successfully handling complicated social issues.

The discoveries of the hypothesis testing, which are presented in Tables 4, 5, 6, and 7, give solid proof on the side of the proposed hypotheses and develop our insight into the mind boggling interrelationships among SI, SE, and SSD. Principally, the imperative confirmed relationships displayed among SI, SE, and SSD approve the association of these ideas. These outcomes feature the fundamental jobs that innovation and social entrepreneurship play in advancing sustainable development objectives and animating great social change. For instance, there is a high positive relationship between's sustainable social development and social entrepreneurship, showing that over the long haul, entrepreneurial undertakings assume a significant part in achieving genuine enhancements in social and ecological situations.

In addition, the discoveries explain the precise processes by which these builds collaborate. The essential directing impact of social innovation highlights its pivotal capability as a course interfacing entrepreneurial pursuits to supported cultural progression. This emphasizes that it is so significant to make a climate that is imaginative in the field of social entrepreneurship since it invigorates monetary development as well as produces unique approaches to deal with troublesome social issues effectively. Generally speaking, the after-effects of the hypothesis testing major areas of strength for offer help for the review's fundamental hypothetical systems. The outcomes shed light on the causal associations between SI, SE, and SSD, which is useful data for researchers, professionals, and policymakers. They emphasize that it is so urgent to help

entrepreneurial biological systems that put social and natural objectives first, opening the entryway for inclusive and sustainable development courses from now on.

The consequences of the research projects give an abundance of information about the mind boggling connections between SI, SE, and SSD. Through a careful analysis of these connections and an exhaustive examination of the segment qualities of the research members, the outcomes add to the momentum collection of information while likewise featuring the imperative necessities for advancing valuable social change. On a very basic level, the research discoveries show how SI, SE, and SSD connect in a synergistic way. They give verifiable verification of how inventive suggestions are ignited by entrepreneurial undertakings, and how this prompts the accomplishments of sustainable development. This emphasizes how significant it is for entrepreneurial undertakings to go up against troublesome cultural issues and advance plans for sustainable development. Besides, the research acquires extra profundity from the exhaustive examination of the review members' segment credits. Through the assortment of many encounters and perspectives from individuals seeking after imaginative and entrepreneurial pursuits, the review features the significance of inclusivity and diversity in advancing useful social change. It causes to notice the necessity of considering a scope of segment considerations while creating methodologies and strategies intended to advance innovation and entrepreneurship for sustainable development. Essentially, the review's conclusions are serious areas of strength for activity, stressing that supporting entrepreneurial biological systems that put social and ecological objectives first is so significant. They offer a guide for how researchers, professionals, and policymakers can successfully tackle the force of entrepreneurship and innovation to address dire social worries and further plans for sustainable development. Together, we can make a culture of imagination and entrepreneurship that will prompt an all the more, resilient, and sustainable future for everyone by acknowledging these examples.

Table 8: An overview of the hypothesis-testing process

Hypothesis	Findings
H0A: Social entrepreneurship and sustainable social development are unrelated.	Rejected
H1A: Social enterprise and sustainable social development have a connection.	Accepted
H0B: Social innovation and social entrepreneurship have no connection.	Rejected
H1B: There is a connection between social innovation and social entrepreneurship.	Accepted
H0C: Social innovation and sustainable social development don't go hand in hand.	Rejected
H1C: Social innovation and sustainable social development are correlated.	Accepted
H0D: The connection between social entrepreneurship and sustainable social development isn't intervened by social innovation.	Rejected

H1D: The connection between social entrepreneurship and sustainable social development is intervened by social innovation.	Accepted

Table 8 presents a succinct overview of the results of the hypothesis testing with respect to the connections between SI, SE, and SSD. The results show that SE and SSD, as well as SI and SSD, are significantly correlated, and that SI mediates the relationship between SE and SSD. The null hypotheses (H0A, H0B, H0C, and H0D) are rejected. On the other hand, the presence of these linkages is confirmed by the acceptance of the alternative hypotheses (H1A, H1B, H1C, and H1D). This synopsis highlights the interdependence of these concepts and highlights the critical function of social innovation in promoting constructive social transformation via entrepreneurial endeavours.

7. Conclusion

Developing nations like India are plagued by a wide range of social problems, and their governments are in no position to launch comprehensive initiatives that would solve every problem facing the poor. Few organisations that have made an effort to address these problems have done so by using antiquated techniques that are ineffective and unable to address the pressing social issues and meet the demands of the community. It makes it necessary to develop new methods and instruments to meet fundamental human requirements. Social entrepreneurship is regarded as a fruitful instrument for developing new business models and tactics to prioritise helping a subset of the population that is struggling to meet their basic needs. Given the current situation, Pakistan may be able to combat social challenges through social entrepreneurship, which would enhance the lives of marginalised people and increase their financial security. In Pakistan, social entrepreneurship is necessary since it is a useful strategy for meeting the new demands of the populace. Social innovation greatly aids in generating long-term impact on a larger scale by introducing new concepts, methods, or procedures or by replicating existing concepts in new business models of social entrepreneurial endeavours. This innovation ultimately results in sustainable development and also helps projects succeed and be sustainable. The objective of social entrepreneurship is sustainability, and social innovation plays a crucial role in the long-term, sustainable growth of society. The complex connections between social innovation, social entrepreneurship, and sustainable social development are explored in this study. The study rejects null hypotheses and affirms alternative hypotheses by revealing substantial connections between these constructs through quantitative analysis of data from Indian social enterprises and NGOs. While demographic insights enhance contextual awareness, the reliability analysis highlights the methodology's robustness. Principal component analysis reveals how related the constructs are to one another. The findings of the hypothesis testing underscore the critical roles that social innovation and social entrepreneurship play in promoting constructive social change. The results offer practical guidance to stakeholders on how to support entrepreneurial ecosystems that prioritise social and environmental goals, opening doors for fair and inclusive development that will lead to a resilient and sustainable future.

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MICRO-ENTERPRISE INCOME TAX

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Abstract: *The drafting of this article started from the need to correctly determine the result of exercise of microenterprises in our country. The result of the exercise is one of the most important indicators of the performance of economic entities. The tax regime of micro-enterprises is advantageous for the economic entities that fall within its scope. It is therefore very important to know the criteria that must be met for an economic entity to fall into this category, as well as how to get out of this category. At the same time, we need to consider the taxation mechanism in the framework of the micro-enterprise income tax in order to be able to determine correctly, from a tax point of view, the tax due and the result for the year.*

Keywords: *microenterprise, income, expenses, tax result, microenterprise income tax*

JEL classification: M41

1. Taxable persons

Micro-enterprises are represented by Romanian legal entities that on 31 December 2023 cumulatively meet the following conditions:
- have earned income that did not exceed the equivalent in lei of €500,000 at the BNR exchange rate valid at the end of the financial year in which the income was recorded;
- their share capital is held by natural and/or legal persons other than the State and its administrative-territorial units;
- it is not in dissolution, followed by liquidation, registered in the commercial register or with the courts, in accordance with the law:
- more than 80% of its income is derived from activities other than consultancy and/or management;
- has at least one full-time employee or its equivalent;
- has associates/shareholders holding more than 25% of the value/number of shares or voting rights in no more than three Romanian legal entities that qualify for the microenterprise income tax system.

The equivalent of a full-time employee is represented by the following accepted options:

- they have people employed on individual part-time contracts if the sum of the part-time working hours is the equivalent of a full-time working day
- they have concluded management or agency contracts, with remuneration at least at the level of the minimum gross salary.

(The number of the existing employees is checked at the end of the last month of the quarter in question)

Legal entities classified as micro-enterprises can opt for micro-enterprise income tax starting from the fiscal year following the one in which they meet the micro-enterprise conditions if they have not been paying micro-enterprise income tax after January 1, 2023.

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Newly established legal entities may opt to pay income tax on micro-enterprises from the first tax year if they meet the condition related to the holders of the share capital and, within 30 days of establishment, employ at least one full-time employee or its equivalent.

2. Tax rates

The income of micro-enterprises is taxed in 2024 at the following rates:

- 1% for micro-enterprises with revenues not exceeding €60,000 inclusive and which do not carry out activities covered by the Tax Code at the 3% tax rate;
- 3% for micro-enterprises that exceed the threshold of €60,000 in income or that earn income from main or secondary activities expressly provided for by the Tax Code as falling under the 3% tax rate, such as publishing and software development, accommodation and restaurant activities, etc.

If the revenue achieved by a micro-enterprise exceeds the threshold of €60,000 during the year, it is taxed at the 3% tax rate starting from the quarter in which the value threshold was exceeded.

3. The scope of the tax on the income of micro-enterprises

Income from any source is included in the scope of the microenterprise income tax, from which the following is deducted:

- revenue relating to the costs of stocks of products, services in the course of execution;
- revenue from the production of tangible and intangible fixed assets;
- revenue from subsidies;
- income from provisions and adjustments for impairment or loss of value, irrespective of the type of taxation at the time of establishment;
- income arising from the repayment or cancellation of interest and/or penalties for late payment which were non-deductible expenses in the calculation of taxable profit;
- income from compensation from insurance companies – reinsurance for damage to stocks/assets, ECHR compensation);
- income from exchange rate differences;
- value of trade discounts granted after invoicing (recorded in account 709 “Trade discounts granted”);
- income from dividends received from a Romanian legal person;
- income obtained from a foreign state with which Romania has a double taxation agreement, if it has been taxed in the foreign state.

For the purpose of determining the income tax on micro-enterprises, the following shall be added to the tax base:

- the value of trade discounts received after invoicing, recorded in account 609 “Trade discounts received”;
- the favourable exchange rate difference recorded cumulatively since the beginning of the year (credit balance on account 765 “Income from exchange rate differences” + RC 768 “Other financial income” – RD 665 “Expenses from exchange rate differences” – RD 668 “Other financial expenses”) - in the calculation of the fourth quarter;
- legal reserves or revaluation reserves reduced or cancelled, initially deducted in the calculation of taxable profit and not taxed during the period in which the micro-enterprises were also liable for corporation tax - regardless of the reason (change in the purpose of the reserve, distribution to shareholders in any form, liquidation, division, merger, etc.);
- reserves representing tax relief, set up during the period when micro-enterprises were also liable for corporation tax – used to increase paid-up subscribed capital, cover losses, distribute to shareholders, etc.

4. Exit from the income tax system for micro-enterprises

Exiting the income tax system for micro-enterprises can be achieved as follows:

- when the income of a micro-enterprise exceeds €500,000 during a year, in which case the micro-enterprise becomes liable for corporate income tax from the quarter in which the limit was exceeded, taking into account the income and expenses incurred in that quarter;
- when income from consultancy and/or management exceeds 20% of the total income;
- when the micro-enterprise no longer has at least one full-time employee or the equivalent for a period of not more than 30 days;
- by option, when micro-entities with a share capital of at least 45,000 lei and at least 2 employees may opt to fall within the scope of the corporate income tax, with the proviso that this option is definitive and the calculation and payment of corporate income tax is made from the quarter in which these conditions are cumulatively met;
- if the shareholding structure changes during the year, in the sense that parts of the share capital become owned by the State or its administrative-territorial units, or if the partners/shareholders of a micro-enterprise hold more than 25% of the share capital of another micro-enterprise (in which case they have to choose only one micro-enterprise to pay income tax);
- the micro-entity has gone into dissolution, followed by liquidation, registered in the commercial register or with the courts, according to the law.

5. Determination of microenterprise income tax due

In order to illustrate the mechanism for determining the income tax payable by micro-enterprises, we will start from the situation of S.C. Orion S.R.L., which was incorporated on 5 June 2023 with the main activity "retail sale of footwear and leather goods", CAEN code 4772, and which presents the following statement of income and expenditure for 2023:

Indicators	Quarter II (June 2022)	Quarter III (July - September 2022)	Quarter IV (October - December 2022)
Income from sale of goods	600.000	1.620.000	5.200.000
Income from royalties, management leases and rentals	100.000	100.000	300.000
Income from exchange rate differences		8.000	12.000
Income from claims from a transport insurance company		12.000	30.000
Income from operating subsidies	10.000	10.000	15.000
Income from the release of provisions for litigation			17.000
TOTAL	**710.000**	**1.750.000**	**5.574.000**
Expenditure on goods	400.000	1.300.000	4.100.000
Expenditure on services provided by third parties	15.000	90.000	250.000
Social expenses	3.000	3.000	10.000
Expenditure on salaries	10.000	150.000	200.000
Expenditure on labour insurance contributions	25	375	500

Expenditure on sponsorship of an association registered in the register of religious entities/units			10.000
Expenditure on the member's travel to a ski resort for personal reasons			15.000
Expenditure on fuel		8.000	10.000
Expenditure on depreciation of means of transport		2.125	4.500
Expenditure on depreciation of fixed assets		3.000	3.000
Expenditure on exchange rate differences		6.000	11.000
Expenditure on provisions for litigation		17.000	
TOTAL	**428.025**	**1.579.500**	**4.614.000**

The amounts relate to each quarter separately.

Upon its establishment S.C. Orion S.R.L. is a company liable for income tax on micro-enterprises. The share capital is 50.000 lei. S.C. Orion S.R.L. has, since its establishment, 1 employee with a full-time individual contract of 8h/day. In July it employs 2 full-time employees. In August it purchases a commercial space and a car, and in October a second car, which are used both for business and other purposes. The sole partner of the company is Constantin Ion. The company complies with the provisions of Law 31/1990 on the obligation to set up a legal reserve and in December transfers 5% of the annual gross profit to the legal reserve.

Determination of income/profit tax

Taxable income	2nd Quarter	3rd Quarter	4th Quarter
Turnover	700.000	1.720.000	5.500.000
TOTAL (from the beginning of the year)	700.000	2.420.000	7.920.000
Test < 500.000 euro / 4.948.100 lei	Yes	Yes	NO
Tax base in the quarter in question	700.000	1.720.000	
Income tax	21.000	51.600	

Calculation of the 3% income tax rate in the second quarter:
700.000 lei x 3% = 21.000 lei

Calculation of the 3% income tax rate in the third quarter:
1.720.000 lei x 3% = 51.600 lei

In the 4th quarter the company exceeds the turnover of €500.000 (500.000 EURO x 4,9481 lei/EURO = 2.474.050 lei) and becomes liable for income tax. From this quarter onwards, the company is liable for corporation tax, determined according to the specific tax rules:

Total income	5.574.000
Total expenditure	4.614.000

Gross profit	**960.000**
Non-deductible expenses	
Fuel expenses	5.475
Social expenses	1.000
Expenditure on sponsorship of an association registered in the Register of religious entities	10.000
Expenditure on travel to a ski resort by an associate on his/her own behalf	14.000
Expenditure on depreciation of means of transport	4.500
Expenditure on depreciation of real estate	3.000
TOTAL non-deductible expenses	**37.975**
Tax depreciation deduction	7.500
Legal reserve deduction	10.000
Total tax deductions	**17.500**
Taxable profit	***980.475***
Income tax before sponsorship	***156.876***
Sponsorship	***10.000***
Income tax after deduction of sponsorship	***146.876***

1) Fuel expenses: 10.000 lei, related VAT 1.900 lei
According to Law 227/2015 only 50% of the VAT on fuel expenses is tax deductible, i.e. 950 lei.
This results in a total fuel expenditure of 10,950 lei (10,000 + 950).
Fuel expenses deductible in the calculation of corporation tax = 10,950 x 50% = 5,475 lei
It also follows that 5,475 lei are non-deductible fuel expenses for the calculation of corporation tax.
2)Social expenses = 11.000 lei
Limit = 5%*200.000 = 10.000 lei
Non-deductible expenses = 11.000 - 10.000 = 1.000 lei
3) Accounting expenses with car depreciation = 4.500 lei
Deduction limit 1500 lei x 3 months x 2 cars = 9.000 lei
It follows that the amount of 4,500 lei is fully included in the tax deductions.
4) Legal reserve
The legal reserve is deductible up to 20% of the share capital
50,000 x 20% = 10,000 lei
960,000 x 5% = 48,000 lei
5) Taxable profit: 960,000 + 37,975 - 17,500 = 980,475 lei
6) Income tax: 980,475 x 16% = 156,876 lei
7) Sponsorship: 10.000 lei
156.876 x 20% = 31.375 lei
5.500.000 x 0,75% = 41.250 lei
It follows that the amount of 10,000 lei relating to sponsorships is fully deductible from the income tax due.
8) Final corporation tax: 156,876 - 10,000 = 146,876 lei

6. Conclusions

The calculation of the tax result and income tax of micro-enterprises is one that requires good knowledge of the legal provisions in the field of taxation as well as good professional judgement. In determining the tax result, the activity carried out by the enterprise in question and the structure of the income and expenditure during the tax year must be analysed rigorously.

It is worth pointing out that the tax system for micro-enterprises is favourable to them because the tax rates of 1% and 3% on the income making up turnover are very low.

It should also be noted that from the 2023 financial year onwards, when a micro-enterprise leaves the scope of the micro-enterprise income tax, it cannot return to this tax regime.

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THE SYNERGY BETWEEN TAX OPTIMIZATION, COST CONTROL, AND INCREASING PROFITABILITY, AN INTEGRATED APPROACH FOR BUSINESS SUCCESS

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Abstract: *The scope of the study is to explore the connection between tax optimization, cost control, and margin enhancement in business organizations. Business management and entrepreneurship are two fundamental pillars of the modern economy, each playing a significant role in the growth and development of organizations. Business management focuses on operations management, financial oversight, and human resources. Entrepreneurship is the process of creating, developing, and managing a new business venture in order to generate profit. It involves risk-taking, the creation of new ventures, and the leverage of resources in order to deliver value in the marketplace. Entrepreneurs drive economic development by introducing new products and services, disrupting industries, and fostering competition. An appropriate understanding and implementation of managerial accounting and accountancy strategies, such as cost control and financial analysis, will drive the entrepreneur to the business's success. While the main focus is profitability growth and margin enhancement, the entrepreneur should focus on the fiscal optimization of the general result to obtain the best result with low costs.*

Keywords: *managerial accounting, tax optimization, business management, entrepreneurship, profit margin*.

JEL Classification: M41

1. Introduction

The logic of tax optimization can be explained in the traditional microeconomic theory framework. In a market economy governed by the law of profit, any firm that wants to survive or grow acts as a rational agent. This rationality implies maximizing profit and minimizing costs and risks (Krifa-Schneider, 2024).

If managers want satisfactory results, they must understand the cause-and-effect relationships between their actions and their organization's overall performance (Crosson & Needles, 2011). Managers need to learn about taxes because optimizing a venture's total tax burden is important to its success, and managers are the primary decision-makers in an organization (Karayan & Swenson, 2007). A successful entrepreneur should focus on strategic decision-making in a well-known fiscal environment, enhancing profitability by reducing costs and reinvesting for the growth of the business.

Taxation influences investment decisions, cost structure, and overall profitability. Complex tax systems and various regulations require companies to adapt and ensure compliance with current tax laws. Profitability is generally defined as a company's earnings generated from revenue after deducting all expenses incurred during a period (Alarussi & Alhaderi, 2018). According to Bekmezci (2015), profitability is one of the most important factors signaling management's success, shareholders' satisfaction, investor attraction, and the company's sustainability (Alarussi & Alhaderi, 2018).

The study explores the connection between tax optimization, cost control, and profitability enhancement in business organizations. The combined benefits of tax optimization and cost control create a synergy for profitability enhancement, allowing businesses to scale operations.

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2. Litterature review

2.1. Tax optimization

Tax optimization becomes a vital strategy for companies aiming to remain competitive by minimizing their tax burdens and maximizing funds available for investment growth (Cooper & Nguyen, 2020).

In the Romanian business, accounting principles and methods can influence tax burdens. Thus, using approved accounting policies, companies may choose a variant from among several opportunities allowed by legislative and normative statutes. For instance, entities can choose the method of tangible assets depreciation, interest capitalization or its recognition as an expense, option for inventory evaluation method, reassessment of tangible assets, or keeping their historical costs (Popa, 2012). A well-done financial and fiscal management can positively ensure the existence and development of a business: (i) Selecting the optimal legal structure of the business; (ii) Choosing the suitable method of tangible assets depreciation: straight line, reducing balance method and accelerated; (iii) Interest capitalization or its recognition as expense; (iv) Timing of revenues and expenses recognition; (v) Provisions for guarantees granted to clients and provisions for extraordinary expenses; (vi) Legal reserves; (vii) Optimal use for inventory evaluation method: FIFO, LIFO, Weighted average cost; (viii) Reassessment of tangible assets or keeping their historical costs; (ix) Transfer prices for companies belonging to holding structure; (x) Deferred taxes (KPMG, 2024).

Romania offers specific tax incentives such as sponsorship expenses, reinvested profit for the production or acquisition of specific technological equipment, computers and peripherals, tax registers, control and billing machines, and software and the right to use the software. Innovation, research, and development, as well as ancillary activities, are tax exempted for the first ten years of activities. An additional allowance of 50% granted for research and development activities is available. Companies administering industrial parks have incentives for converting agricultural land into industrial parks. There are also incentives available to titleholders of petroleum companies. The government grants titleholders the concessions in exchange for a royalty payment. Tax benefits are available to companies performing activities in free-trade zones (EY, 2018).

Corporate tax planning by the multinational enterprise (MNE), that is, the MNE's ability to plan its tax affairs by using a multitude of strategies to reduce its tax bills legally, is a central research question in the literatures of international business, public economics, tax, finance, law and accounting (Cooper & Nguyen, 2020). Tax Planning is a series of strategies to adjust corporate accounting and finances to minimize tax obligations in legal ways (Pohan, 2018). Tax planning will positively impact a company's cash flow and increase the rate of return (Appolos et al., 2016). A research study about tax optimization in Indonesia shows that tax planning is considered to minimize costs which, according to the taxation law, cannot be deducted, thus causing the income before tax to be greater and may result in higher tax payable. The main scope of Tax planning is the acknowledgment of expenses that are allowed to be deducted (Estiasih & Saraswati, 2021).

According to (Afrasinei, 2019), multinational firms can shift their profit through transfer pricing countries with high taxation to low tax jurisdictions. These tax jurisdictions are often called tax havens or offshore financial centers and have low corporate tax rates or even zero for specific categories of income in order to attract foreign companies. The study conclusions show that the connection between tax heaven and companies allows them to elaborate tax optimization strategies to reduce their tax liabilities (Afrasinei, 2019).

Base erosion and profit shifting (BEPS) is part of the taxation planning practiced by multinational corporate companies. Several studies and data indicate increased segregation between where actual business activities and investments occur and where profits are reported for tax purposes (Krifa-Schneider, 2024). The loopholes exploited by the taxpayers explain the effective reduction of the corporate tax rate (ECTR) for the last 10 years. Generally, the standard corporate tax rate (SCTR) does not impose a tax burden on business operations in a country due to several motives: basic tax rule (tax allowances, deductions, etc.), the method for calculation of tax, and the existence of tax incentive schemes make it possible for the corporations to lower their taxes (Krifa-Schneider, 2024).

Tax optimization strategies of multinational companies are made by recording the company's expenses in a high-tax country and systematically reporting profits in a low-tax jurisdiction. Another optimization tool is through provisions favorable to the Establishment of Financial Holding Companies. Therefore, a simple tax optimization technique establishes a holding company in countries where tax exempts dividend income from tax (Krifa-Schneider, 2024).

The Contract manufacturing means outsourcing the production activities into another country. There are different business advantages of this technique, but it also has certain tax implications. Considering an USA parent company has a subsidiary in Ireland, which is a low tax country. The parent company has acquired the rights of an intangible asset (such as patents) in Ireland but the Irish subsidiary's market is another country (for instance, in Germany) where the tax rates are high. Therefore, the Irish subsidiary makes a contract to a German manufacturer on cost-plus mark-up bases (Krifa-Schneider, 2021).

2.2. Cost Control

Optimizing profitability includes continuous oversight of operational costs, efficient resource allocation, and decreased irrelevant expenses. Correctly understanding and implementing managerial accounting and accounting strategies, such as cost control and financial analysis, will lead entrepreneurs to success (Maher et al., 2008).

Managerial accounting has an essential role in optimizing cost control and increasing profitability. Efficient use of this instrument ensures increased profitability and business optimization. Entrepreneurs or managers need relevant financial and economic information structured according to their needs for decision-making. The financial statements accounting professionals provide need to be revised to fully understand income sources and cost structures or identify business optimization methods. Managerial accounting is the source of the most relevant information for business success (Crosson & Needles, 2011). More than just calculating cost, management accounting also plays a role in investment decision-making by evaluating investment projects based on cost-benefit analysis (Yuanita, 2023; Evianty et al., 2024).

Cost control is an important process in modern business management. It aims to manage and reduce unnecessary or inefficient operational costs by identifying, analyzing, and managing costs effectively (Evianty et al., 2024).

Improving profitability in the service sector requires a highly strategic and focused approach (Utami, 2024; Evianty et al., 2024). Operational efficiency must be improved by applying modern technology and process automation to reduce operational costs and increase productivity (Shilamaya, 2024; Evianty et al., 2024). Rigorous cost management and in-depth cost analysis are required to ensure that every expenditure supports long-term profitability goals (Islachiyana et al., 2023; Evianty et al., 2024). Strategic cost management consists of managers' actions to reduce costs, some of which are prioritized based on information extracted from the accounting system.

Other actions, however, are undertaken without the use of accounting information. They involve process improvements, where an opportunity has been identified to perform processes more effectively and efficiently, with obvious cost-reduction outcomes (Drury, 2018). Management accounting techniques lead companies to optimize their cost and improve profitability. Cost optimization can be achieved by using modern management accounting methods like target costing, Kaizen costing, activity-based costing, and Just-in-Time. These methods aim to establish/manage costs and optimize all processes, personnel, productivity, and quality control (Mihaila, 2008).

3. Research Methodology

The research was conducted in a services company, and the financial figures were analyzed over four years. The method used is deductive, using financial data from the Annual Statements. The quantitative data includes information about Assets, Equity, Turnover, Income, Depreciation, Expenses, and Profit Tax. The chapter studies focus on identifying and analyzing the financial ratios that measure the profitability of the companies and on finding out if there is a connection between them, showing the influence of one to another and consequently observing the impact on the company's profitability. Thus, the financial ratios as Effective Tax Rate (ETR), Gross Profit Margin (GPM), Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM) were measured for a company acting in Engineering sector for the last four years as seen in the table below:

Table no.1 Extras from Balance Sheet and Profit and Loss Statement

Balance Sheet	**Year 2023**	**Year 2022**	**Year 2021**	**The year 2020**
Non-current assets	391,777	548,396	185,849	156,159
Current assets	4,293,827	5,858,967	5,256,275	5,327,672
Total assets	4,685,604	6,407,363	5,442,124	5,483,831
Equity	2,813,577	2,804,861	2,877,901	3,698,033
P&L	**Year 2023**	**Year 2022**	**Year 2021**	**The year 2020**
Turnover	6,591,832	8,097,052	7,396,375	7,732,105
Operating income	7,045,978	7,602,721	7,695,849	7,815,906
Financial income	106,388	156,691	100,307	79,304
Total income	7,152,366	7,759,412	7,796,156	7,895,210
Financial expenses	153,368	159,447	6,394,540	6,636,627
Depreciation	178,943	144,388	112,685	102,453
Operating expenses	6,396,194	6,487,454	52,894	54,673
Total expenses	6,549,562	6,646,901	6,447,434	6,691,300
EBIT	649,784	1,115,267	1,301,309	1,179,279
EBT	602,804	1,112,511	1,348,722	1,203,910
Profit tax	94,088	185,552	221,485	187,251
Net Profit (NP)	508,716	926,959	1,127,237	1,016,659

4. Results and Discussions

The questions raised in the research are:

1. Does tax optimization indicated by ETR has an impact on the profitability of the business?

2. Are other variables, such as GPM, more significant on business profitability?

To answer the questions, the study will use the descriptive method by explaining the financial ratios and their influence on the business profitability.

Table no.2 Financial ratios

Finacial ratios	**Year 2023**	**Year 2022**	**Year 2021**	**The year 2020**
(ETR) %	16	17	16	16
(ROA) %	9	16	21	18
(ROE) %	18	33	39	27
Gross Profit Margin %	9	14	18	16
Net Profit Margin %	8	11	15	13

ETR is the effective percentage of tax paid from the taxable income. Most of the time, this rate is different from the standard income tax rate in Romania, which is 16%. The difference comes from non-deductable expenses, non-deductible income, sponsorship expenses, or other incentives affecting the net result. A good indication is when ETR tends to the Standard Income Tax Rate. In the table above, ETR has a level close to the standard level, meaning that the company has a well-structured accountancy policy, offering a transparent image of the financial situation using, as a strategy, the management of deductible expenses. A lower ETR will determine a higher net profit NPM, and vice-versa; a higher ETR will determine a lower NPM.

ROA is a rentability financial ratio that measures the financial effect related to the investment effort. The percentage of the NP divided by the average period of assets shows how profitable a company is in using its assets. The figures in the table indicate positive but low values, which means a better return on the assets is expected. For the years with lower NP, a decreased ROA is registered, and any NP decline influences the ROA level.

ROE shows the rentability of using Equity, rendering the company's capacity to make profit using the available Equity. It is the percentage of Net income divided by Equity. ROE can be evaluated as having a good or bad level, depending on the average ROE for other companies in the same sector of activities. ROE indicates the company's ability to turn equity investments into profit. A high ROE indicates that the company has a good return on Equity, while a low ROE may indicate a low return or loss.

GPM is the percentage of Gross Profit divided by Turnover. Different strategies can increase GPM, such as reducing the cost of goods sold, adjusting prices, and increasing operational efficiency. A high GPM can be translated into an overall operational cost reduction while maintaining the effectiveness of the operational services.

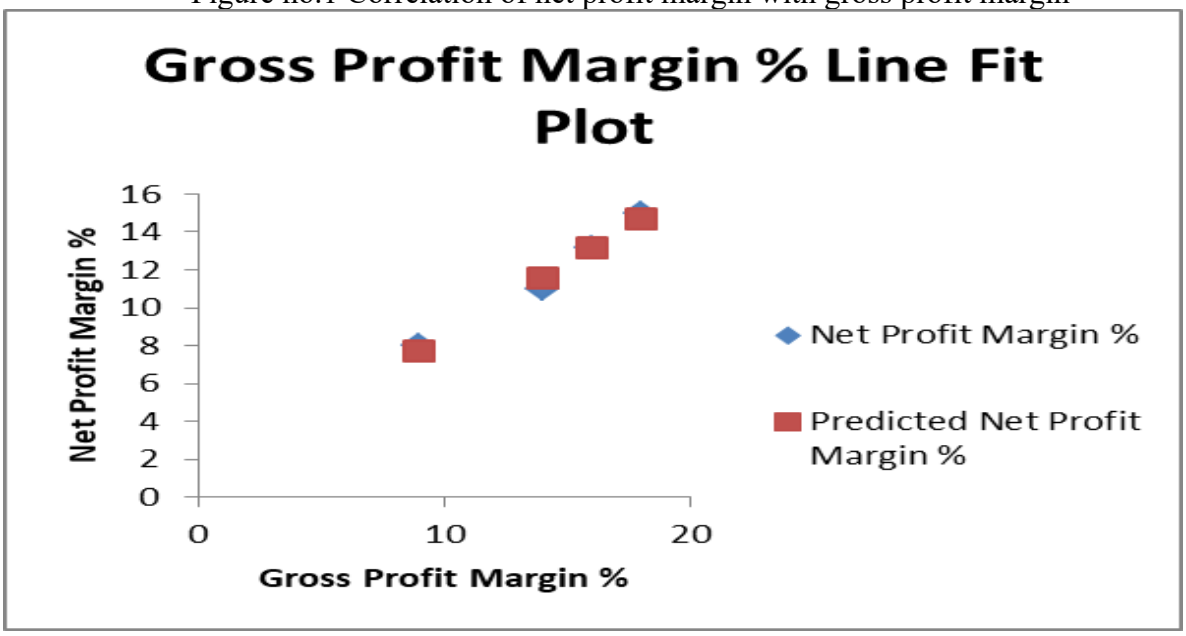
NPM is the percentage of Net Profit divided by Turnover.

To predict the profitability of the business, the correlation in between cause and effect is displayed bellow, whereas ETR and GPM are the causes, and the NPM is the effect.

Table no. 3 Variation of financial ratios

Year	ETR %	GPM %	NPM %
2023	16	9	8
2022	17	14	11
2021	16	18	15
2020	16	16	13

Figure no.1 Correlation of net profit margin with gross profit margin



The figures no. 1 shows the liniarity in between GPM amd NPM. Thus, a predicted net profit margin can be computed observing that any increase of GPM over the four years will determine an increase of NPM.

Figure no.2 Correlation of Net Profit Margin with Effective Tax Rate

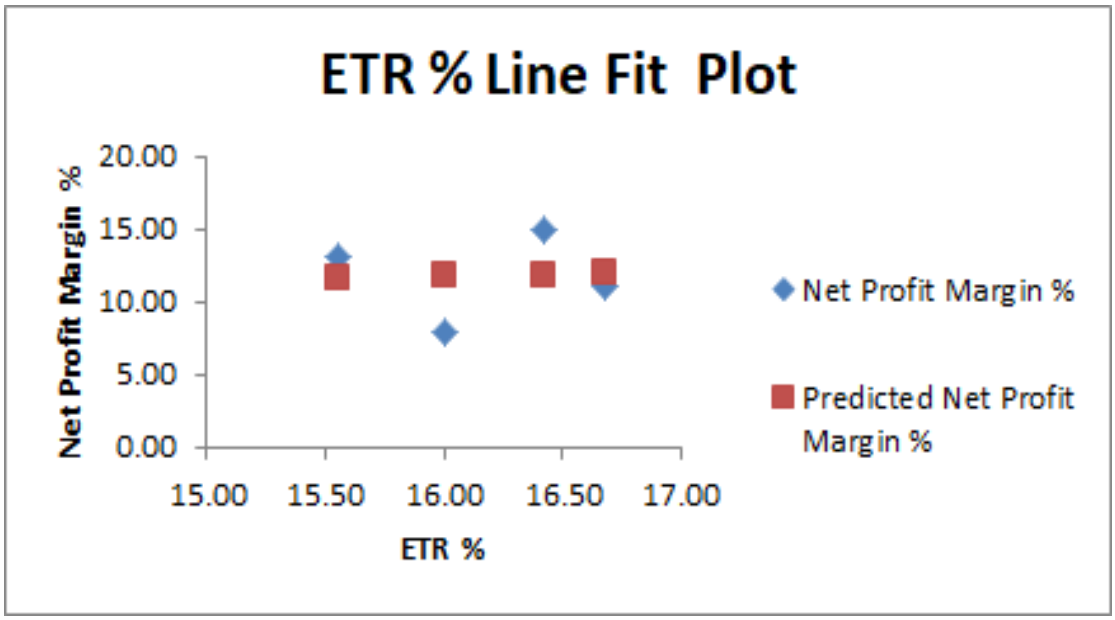


Figure no.2 suggests the invalidity of the linearity phenomenon, and the results indicate that other variables influence profitability, especially for the case introspected here. ETR for the company chosen has remained at the same level over the years but with different variations of NPM, meaning that the company's profitability is not influenced by tax optimization. The tax level of the company is the standard level tax, which can only be influenced a little if fiscal incentives are available for the period.

5. Conclusions

In this paper, we tried to understand the role of tax optimization better and its impact on a business's profitability. The understanding was rendered by an international literature review and a study case to discover if tax optimization significantly impacts profit margin enhancement. In many countries, tax optimization is seriously treated by the managers adopting tax planning and strategies by transferring profits to fiscal paradise, especially by the multinational corporations in Europe, which need to include legal competency.

Following the national practice, tax optimization is based mainly on accountancy policies and the influence of fiscal incentives on net results. The case study shows that the standard tax rate is kept, meaning that the optimization is not interfering; this is available for the cases where the effective tax rate exceeds the limit of the standard rate. Tax optimization's influence on profitability is significant when the gap between the standard and effective tax rates suggests an inappropriate management of the non-deductable expenses. Good management of expenses and a deep acknowledgment of the accountancy methods positively influence business profitability. Therefore, tax optimization is not a single tool for profitability growth; it is a relevant vector in increasing profitability, which is the gross margin enhancement by reducing unnecessary or inefficient operational costs. A good knowledge of cost structure and process improvement can achieve cost reduction.

In conclusion, the combined benefits of tax optimization and cost control create a synergy for profitability enhancement, allowing businesses to scale operations.

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THE INFLUENCE OF ARTIFICIAL INTELLIGENCE SUBFIELDS ON ACCOUNTING AND AUDIT SECTOR

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Abstract: *Artificial Intelligence solutions applications in accounting and audit are very broad. This paper responds to three research questions: which are the AI subfields used in the literature, which are their applicability, advantages and disadvantages and which are some AI based technologies used in accounting and audit sectors. Artificial Intelligence solutions applied in accounting and audit sectors are based on some technologies such as: Expert Systems, Machine Learning, Neural Networks, Deep Learning, Robotics Process Applications, Fuzzy Logic, Genetic Algorithm, Natural Language Processing, Intelligent Agents. Accounting and audit sector of activity is one of the most influenced sectors by Artificial Intelligence solutions. Usually, big companies have the necessary resources to develop or buy Artificial Intelligence solutions. This is why in this study are presented successfully implemented solutions by Big Four, applied in audit. But there are also developers who propose accounting companies' solutions based on Artificial Intelligence at good prices. The benefits of using such solutions are multiple, from time reduction with repetitive activities, cost reduction with personnel, increased data accuracy and more time to offer consultancy services for clients.*

Key words: Artificial Intelligence subfields, accounting, audit, advantages, disadvantages

Introduction

The purpose of this article is to present the main AI subfields and their characteristics such as applicability, advantages and disadvantages and some success stories of AI technologies applications.

This topic is of interest for accounting and audit companies, as well as for specialists in this activity field. It will help better understanding each AI subfields and their characteristics.

In order to provide the outcome to the research questions a comprehensive literature review of the most relevant papers for this topic will be considered, based on the most important business cases.

In a survey made by McKinsey in 2022 it was showed that five years ago, in 2017, only 40% of the respondents in organizations using AI reported that more than 5% of their digital budget was invested in AI solutions. In 2022 more than half of the respondents reported the same level of investment. More than this, 63% of the respondents expect that in the next three years their organizations will invest a higher percent (McKinsey, 2022).

AI solutions can be found in various business functions such as: production, procurement, distribution, accounting & finance, sales & marketing, audit, human resource management, research & development (Hasan, 2022). In 2022 the biggest revenue effects are in sales and marketing, service and product development, and corporate finance and strategy. A quarter of the

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respondents said that almost 5% of the organization's EBIT was the result of using AI, in 2021 (McKinsey, 2022). In the same study made by McKinsey, the tech talent shortage is shown to be constant. The respondents have difficulty in finding specialists in AI solutions. Instead of hiring AI specialists companies choose to rescale and upscale their existing employees. (McKinsey, 2022).

The AI technology basically helps the companies to achieve one or more of the following three objectives: getting insights using data analysis, automating business processes and connecting with workers and customers (Chukwuani and Egiyi, 2020).

This paper has four parts: literature review, methodology, results and discussions and conclusions.

Literature review part is analyzing the most relevant articles using specific key words combinations. Methodology presents the methods used to analyses and present the data. Results and discussions present the applicability of the technologies presented in literature review together with its advantages and disadvantages. Conclusions present the most relevant findings of the current study.

2. Literature review

2.1. Applicability of Artificial Intelligence in the accounting and audit sectors

AI solutions applied in accounting and audit are based on some technologies such as: Expert Systems, Machine Learning, Neural Networks, Deep Learning, Robotics Applications, Fuzzy Logic, Genetic Algorithm, Natural Language Processing, Intelligent Agents (Zhang et al., 2020, Mohammad, 2020).

Expert Systems

It appeared in the 1980s and is a computer program based on AI technology that can replace humans in decision-making processes in a specific domain. In the accounting and audit sector, expert systems can be used to automate various tasks and processes and also to assist auditors in the decision-making process (Chukwuani et al., 2020; Ukpong, 2019, Echempati et al., 2021; Reddy et al., 2019, Huang, 2018, Huq, 2014). Expert systems represent computer programs that have the ability of storytelling in expert story's and to simulate ones reasoning to solve problems with different topics. (Tomas, 1998, Kumar, Balasingam and Arumugam, 2020,Stancheva-Todorova, 2018)

Expert systems are used in financial accounting to design Accounting Information Systems with the main goal being the production of financial statements, but also to process invoices, assess standards, provide entries, develop KPI s reports. In management and cost accounting, expert systems have an application in inventory control, variance analysis and cost analysis, decision related to investments, management control systems diagnosis.

Machine Learning (ML)

ML is a subset of AI that imitates the human way of learning and gradually improves its accuracy. ML can learn if it is supervised or unsupervised. ML has the ability to learn from data and improve the way it performs. (Ukpong, 2019) ML focus on detecting patterns in data and creating systems from which they can learn. (Deloitte, 2018) ML refers to computers learning to act and think with minimal human intervention. Its goal is to instruct computers to perform tasks without explicit programming (Lee and Tajudeen, 2020; Ucoglu, 2020, Mohammad, 2020, Zemankova , 2019,Stancheva-Todorova, 2018).

Neural network (NN)

NN is known as artificial neural networks (ANNs) and simulated neuronal networks (SNNs). It represent a subset of MLand is mimicking the human brain in which neurons signal one to another (Zemankova, 2019, Echempati et al. 2021). It replicates the organization of the human brain and it is able to better accomplish the tasks that have been learnt. It represents a series of algorithms that mimic the human brain to recognize and understand relationships between vast amounts of data (Ukpong et al., 2019, Kosmas et. al., 2023, Huang , 2018).

Deep learning (DL)

A neuronal network with more than three layers is considered deep learning. DL represents a subset of machine learning (Pang, 2021) and simulates the way human brain behaves, which allows it to learn from large amount of data. DL can eliminate some data preprocessing, which is normally involved with machine learning. These algorithms can process and ingest unstructured data, such as images and text, and can automate feature extraction and in this way remove the dependency on human experts (Reddy et al., 2019).

Robot process automation (RPA)

Robotics based on artificial intelligence represent the technology used to produce robots. Work as humans based on the senses: touch and pressure sensors(hands), light sensors(eyes), chemical sensors (nose), task sensors (tongue), hearing, and sonar sensors (ears) (Zhang, 2020). RPA represents an automated and repetitive process developed from AI technology. It can be used to imitate human activities such as: complete spreadsheets, send e-mails, enter, and record data for other tasks. RPA functions on a prescribed procedure and it is not able to understand the changes in conditions as the external environment. The PwC 2019 RPA survey found that at least 50% of respondents have begun implementing RPA in their companies. In order to implement RPA, the company needs to focus on six components: standard setting and vision, identification of application scenarios, raising awareness and training, performance measurement, integration on the whole platform. (EY, 2018, Hwang et. al., 2021, Chukwuani and Egiyi, 2020, Mohammad, 2020, Reddy, Yasaswi and Kumar, 2019)

Fuzzy logic (FL)

Represents a technology that imitates the way humans take decisions using reasoning. It uses mathematical models to deal with uncertainty. It is used to work with the concept of ‘degrees of truth” or “partial truth”. (Huang, 2018) Fuzzy logic helps in dealing with the engineering and design of machine uncertainty in order to learn and exhibit intelligence. It represents a solution

for complex problems in different fields of life, such as accounting, because it resembles decision-making and reasoning. (Chukwudi et al., 2018, Stancheva-Todorova, 2018)

Genetic algorithm (GA)

Robust search method which does not require a large volume of data to find the answer of a problem. GA uses an evolutionary algorithm that mimics the process of natural selection to solve different problems. The GA is an example of an AI technique based on the theory of natural evolution and selection which has immense power to solve different problems. This algorithm balances the need for exploration and exploitation. Few studies related to this complex technological solution (Chukwudi et al., 2018).

Natural Language Processing (NLP)

NLP is a field of computer science that helps with the interaction between human language and computers. It helps in translation, classification, clustering, and information extraction. NLP focuses on teaching computers to understand and process human speech (Chukwudi el. Al., 2018). It is a tool that focuses on the replication of human language and communication methods. The focus is to understand unstructured data that come from human sources. NLP examples include manual text analysis, text mining, and reliability analysis. As compared to traditional auditing, NLP can process automatically unstructured text information, to retrieve systematically, and to review the main points of the analysis so the auditors will only look at the final data (Zhang, 2020).

Intelligent Agents (IA)

Intelligent agents are softwares that performs some operations for another program or user. IA are computer programs which can perform tasks autonomously such as learning from data, decision making, and communicating with other human agents. They can gather information on a programmed schedule or when asked by the user in real time. Intelligent agents are using the parameters provided by the user, search on the Internet, gather the information the user has requested, and present this information on a requested or periodic basis (Hasan, 2022).

Methodology

In the first-place authors have conducted a literature review of the most representative scientific articles using the following key words combinations: AI, expert systems, ML in accounting and audit sector, neural network, deep learning, robot process automation, Fuzzy Logic Genetic Algorithm, Natural Language Processing, Intelligent Agents in accounting and audit sector.

For the data related to the AI solutions used in business we have conducted an analysis using the data from the companies reports. For this study, we selected the Big Four companies both globally and in Romania, as well as an application developed in partnership with KPMG for accounting companies in Romania called Cassa. Studies of this kind have also been carried out that also include examples of AI-based applications in audit, one of them being carried out by Derya Ucoglu (2020) selling the following AI-based solutions which were also included in this study: Deloitte GRAPA and Argus, EY Helix, PwC GL.AI and Cash.AI.

The selected articles are from well-known databases such as: Elsevier, Taylor, Google Scholar. The selected articles were written on the last 10 years and the limited number is due to the key words' combination. This proves that the research on this topic is not so advanced yet leaving enough room for other studies.

The research questions for this article are:

RQ1: Which are the most important subfields of AI present in the literature?

RQ2: Which is the applicability, advantages and disadvantages of each of these AI subfields?

RQ3: Which is some successful AI based technologies used in audit and accounting?

Results and discussions

In the literature review we have described the most frequently used AI subfields in the literature.

In Table no. 1 it is presented the background for the first and second research questions which shows which are the AI subfields and their applicability, advantages and disadvantages.

T*able no. 1. Applicability of AI solutions, advantages and disadvantages*

AI solution	Applicability	Advantages	Disadvantages
Expert systems	Tax planning Financial Statement Analysis Fraud detection Internal Control Evaluation Audit Planning Risk assessment	Can be easily implemented, no memory limitations, high security, high efficiency, expertise in a domain, reduced production costs, lower error rate and high working speed, multiple expertise, ability to explain the generated data,	The inability and even lack of experts to train the system, difficult maintenance, and high development costs
Machine Learning (ML)	Fraud detection Tax Compliance Predictive analytics Financial Statement Analysis Internal Control Evaluation Audit planning	It is automatic, it can handle varieties of data, it can identify patterns and trends in datasets, decision making consistency, increased effectiveness and efficiency, data processing cycle shortening, financial information error reduction,	High data requirement, inaccuracy of data interpretation, and more space for data storage, ethical problems, potential security risks, need for a huge amount of data for to increase prediction

			accuracy, high development costs
Neural network	Predictive analytics, fraud detection, tax compliance, audit planning, financial statement analysis, internal control evaluation	Effective visual analysis, unorganized data processing, adaptive structure, user-friendly interface, is adaptable, and it is learning easily	Hardware requirement, incomplete results when they are left untrained for the entire process, data suitability - they depend on the data available for training, minimal control during the training process, slow converge speed
Deep learning	Predictive analytics, fraud detection, tax compliance, audit planning, financial statement analysis, internal control evaluation (Zhang, 2020).	End-to-end optimization, personalized representation learning, strong intricate relation learning.	High computational costs for training, perform poorly on new type of data, even if it is very well trained on another type of data (Pang, 2021).
Robot process automation	Bank reconciliations, accounts payable and receivable, general ledger entries, financial reporting, data analysis, audit trail creation	Increase productivity and efficiency, reduce overall costs, and improves quality assurance	Potential job reduction, high initial investments costs, less skilled staff to work with robots
Fuzzy logic	Audit planning, credit risk assessment, financial statement analysis, fraud detection, internal controls	The structure is easy and understandable; it is using an approximate reasoning.	It is not always accurate, has a lack of effective learning capacity, and is difficult to tune.
Genetic algorithm	Optimization of the investment portfolio, audit sampling, fraud detection, cost optimization, revenue management	It is faster than other algorithms, it is easier to find a solution, and it uses a random systematic search.	It has no convergence criterium, it is difficult to tune
Natural language	Financial reporting, fraud detection, compliance	Pattern recognition problems, in system construction it is not needed the domain knowledge,	It is dependable on a large set of data, the model is hard to understand, lacks of

processing (NLP)	monitoring, audit documentation,	but a possible cross-model processing, the learning algorithms is simple	theoretical foundation, and difficult to solve a long tail phenomenon
Intelligent Agents	Financial statement analysis, accounts payable automation, compliance monitoring, audit support, fraud detection	Increase autonomy and reasoning capacity for the company, has a wide applicability.	It is difficult to tune and reliable on simulation tool.

Source: Authors' representation based on Chukwuani et al., 2020, Ukpong, 2019, Echempati et al. 2021, Reddy, Yasaswi and Kumar, 2019, Huang, 2018, Huq, 2014, Ahmed 2022, Stancheva-Todorova, 2018

Big four AI based applications for audit and accounting respond to the third research question.

Deloitte - Chatbot

Characteristics: it is a tool used to search in an online technical library. The employees will play a question answer game, they will ask the questions and the chatbot will search for the answer in an immense database. (Deloitte, 2018)

Benefits: The chatbot will offer valuable data to the employees. The discussion is on an pop up window so the employees have the impression of speaking with another person so they will be encouraged to use natural sentences to find exactly what they are looking for.

Deloitte - Argus

Characteristics: it gives the possibility of analyzing the entire set of data. Argus is an AI based solution which compares documents fast and find the tiniest discrepancies and details. Used in Australia, Us and Canada currently negotiating to have licenses at global level. In the beginning the tool is used only to analyze the differences between contracts but on the future the owners want to use it for different documents such as invoices (Deloitte, 2018).

Benefits: Reviews of contracts are performed more efficiently ad have a higher accuracy rate and level of quality.

Deloitte- GRAPA (Guided risk assessment personal assistant)

Characteristics: GRAPA is an assistant for risk strategies. The AI based tool has a database of 10.000 cases each of them having around fifty risks. When the auditor makes a risk assessment can use this tool which can show all the risks assessments done before by their fellow colleagues.

Benefits: as a second reader. It can be used as a software by auditors to determine the risk strategy. It is as if the auditors have a second person to help them make a risk assessment,

benchmarking and planning. In order to make the tool perform better the company decided to feed the tool with the development data from the market from 2018 such as Brexit (Zhang et. al., 2020).

EY Helix GL Anomaly Detector

Characteristics: It meets all the needs of EY clients being an integral element for audits. It is a tool which provides 70,000 of their analytics cases used around the globe. Ey Helix is a global analytics platform which have included a set of captured data together with analytics tools. The library of analyzers of EY Helix supports the audit against risk assessment to execution and address the business entire operating cycle. It has the ability of handling the data of all the virtually size (EY, 2023). It is available for the entire teams across the world. It includes: GL (general ledger) analyzer, group scope analyzer, inventory analyzer, trade payable analyzer, revenue and trade receivable analyzer, mortgage analyzer (Zhang et. al., 2020).

Benefits: It helps the auditors to have access to deeper insights, better quality and more client relevant audits and to increase the professional skepticism. The tools help the audit process to be made with: a greater confidence, to have a fuller picture of the business activities, to clear identify the trends, to offer relevant feedback and insights and to increase efficiency for EY clients (EY, 2023).

PwC - GL.ai

Characteristics: Based on advanced AI technology and experience and knowledge of PwC top auditors the GL. Ai is a bot which detects anomalies from a company general ledger. GL. Ai algorithms are trained by experts from all the global network to identify unusual transactions with speed and precision. It is analyzing every line from every journal. It uses visualization to understand and to insight each issue identified and is ensuring the auditors and clients understand fully the issue and they can resolve it efficiently (PwC, 2019).

Benefits: It determines unusual account activity, unusual backdated invoices, unusual activity, it can also identify entries which have a particular risk of manipulation and error.

PwC - Cash.ai.

Characteristics: This application is using AI to read automatically, to understand and to test clients' documents such as: reported cash balances, bank confirmation letters, bank reconciliations, financial and foreign exchange condition of the bank. Is basically making a cash audit. It is used in Sweden, UK and Canada (Zhang et. al., 2020, PwC, 2019).

Benefits: it improves quality, reliability and accuracy of data used in client's analysis.

KPMG-Ignite

Characteristics: Ignite is a tool for risk profile, sales cycle optimization tool Intelligent Underwriting Engine, premium calculation or Sales Intelligence Engine (KPMG, 2023).

Benefits: It increases the data accuracy with 100% than the traditional sampling approaches. Increase transparency for audit because it shows how data was processed. Reduce the

costs and time needed to process the data. It helps the employees to manage and achieve precise consistency (Zhang et. al. 2020).

Romanian accounting application based on AI and ML Cassa respond to the third research question

Cassa is used by 4500 companies, 5000 users and generating 30K monthly documents.

Characteristics: it is a 100% digital platform. Communication type feed as Facebook where the clients can upload the documents. The documents are directed by the application in separate folders in cloud from Microsoft Azure or in accounting tools used by accountants. Automatic archiving of the issued invoices and real-time access to them by the assigned accountant (Mihai and Dutescu, 2022).

This application can turn the monthly balance sheet into an easy-to-read report for any entrepreneur with over 40 financial indicators. The new generated report is structured and easy to be interpreted, so the entrepreneur will be able to benefit from valuable information without advanced knowledge of accounting or finance.

Benefits: Secure Access. All the company's documents are protected against unauthorized access being stored in the cloud in a safe and confidential manner.

Reputation. The accounting companies using this application already have a good reputation being able to offer the entire services mentioned before using only one platform.

Easy of uses and accessible. The entrepreneurs will upload the documents in the platform having access to the database all the time so they can change the accountant if they need to. The data can be accessed from any device, laptop or smartphone (Mihai and Dutescu, 2022).

Conclusions

Artificial Intelligence solutions applied in accounting and audit sector are based on different technologies such as: Expert Systems, Machine Learning, Neural Networks, Deep Learning, Robotics Process Applications, Fuzzy Logic, Genetic Algorithm, Natural Language Processing, Intelligent Agents. This answers to the first research question.

In the near future if companies want to remain relevant for clients they need to adapt to the new technologies. AI solutions and their subfields have changed the way accounting and audit is done by: reducing the employees time spent on repetitive activities, reducing cost with personnel, increasing data processed efficiency, increasing data accuracy and by offering more details for business analysis, make better decisions, create new services and products, optimize internal business operations, pursue new markets, let employees to be more creative due to the automations of tasks. (Davenport and Ronanki, 2018)

Some of the challenges of AI are: it is hard to be integrated with company existing processes and systems, the expertise and technologies are too expensive, some technologies are immature, the managers are not able to understand how AI technologies work, and there are few

people with expertise in technology (Davenport and Ronanki, 2018). These answers to the second research questions.

For the results section in which we described the AI based solutions the lack of data disclosure was an impediment in classifying these solutions based on the type of AI subfields they are using. The only information available stated that those applications and business solutions are based on AI technology. This answer to the third research question.

Future research will be performed to make a much larger database with the successful stories of AI solutions implementation in accounting and audit.

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THE TRANSFORMATION OF RURAL COMMUNITIES THROUGH URBAN-RURAL RELOCATION MARKETING STRATEGIES IN SUSTAINABLE DEVELOPMENT

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Abstract: *Urban-rural relocation has become a growing trend in Europe and Romania, driven by the desire for healthier, more sustainable lifestyles and enabled by remote work technologies. This movement aligns with the EU's Sustainable Development Goals (SDGs), particularly SDG 3 (Health and Well-being), SDG 11 (Sustainable Cities and Communities), and SDG 15 (Life on Earth). Benefits include reduced stress, access to fresh food, increased physical activity, and the revitalization of rural communities through improved infrastructure, economic growth, and cultural diversity.*

However, challenges such as integration difficulties, limited infrastructure, and access to education and healthcare must be addressed. Solutions include investment in rural development, social programs for integration, and partnerships between government, non-profits, and private companies.

Effective marketing strategies, including segmentation, rural branding, and leveraging social media, play a crucial role in promoting rural life. Urban-rural relocation offers a sustainable path to revitalizing rural communities while easing urban congestion.

With coordinated efforts, this trend can transform rural areas into vibrant and sustainable communities that contribute significantly to achieving the EU's SDGs.

Keywords: rural transformation, marketing strategies, EU alignment, relocation trend
JEL: R11, Q56, M31

1: The trend of relocation

The trend of relocation from cities to rural areas has become increasingly common in Europe and Romania in recent years. This is driven by a number of economic, social, and environmental factors that encourage individuals and families to escape urban congestion and stress and adopt healthier lifestyles in harmony with nature. Migration from cities to rural areas has increased significantly in recent years, especially in the context of the COVID-19 pandemic, amplifying the desire for space and security, according to a 2024 Eurostat report.

This move has far-reaching implications for the development of rural communities and can play an important role in achieving the EU's Sustainable Development Goals (SDGs). In this article, we explore the impact of rural-urban relocation, marketing strategies for promoting rural life, and aligning these efforts with the EU's Sustainable Development Goals.

1.2. Trend background

The motivations for this change are varied. Many people are looking for a cleaner environment, a quieter life, and the opportunity to be closer to nature. Research shows that country living can reduce stress, improve physical and mental health, and provide a better work-life balance. In addition, modern technology now allows more people to work remotely, enabling relocation without sacrificing career opportunities.

In Romania, this trend is supported by a series of policies and initiatives aimed at rural development and attracting new residents to less populated areas. As noted by the European

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Commission (2024), rural development initiatives play a crucial role in supporting sustainable communities.

For example, the EU funding scheme for rural development provides support for infrastructure projects, sustainable agriculture, and rural entrepreneurship initiatives, all of which contribute to increasing the attractiveness of rural life.

2022 recorded several records regarding the migration of Romanians from the city to the village. One date is the total number of those who changed their residence from urban to rural: almost 145,000, according to official data from the National Institute of Statistics (INS).

Then there is the net difference between the two migration flows – city-village, village-city – which is in favor of the rural environment, with over 46,000 people, the highest value since 1990.

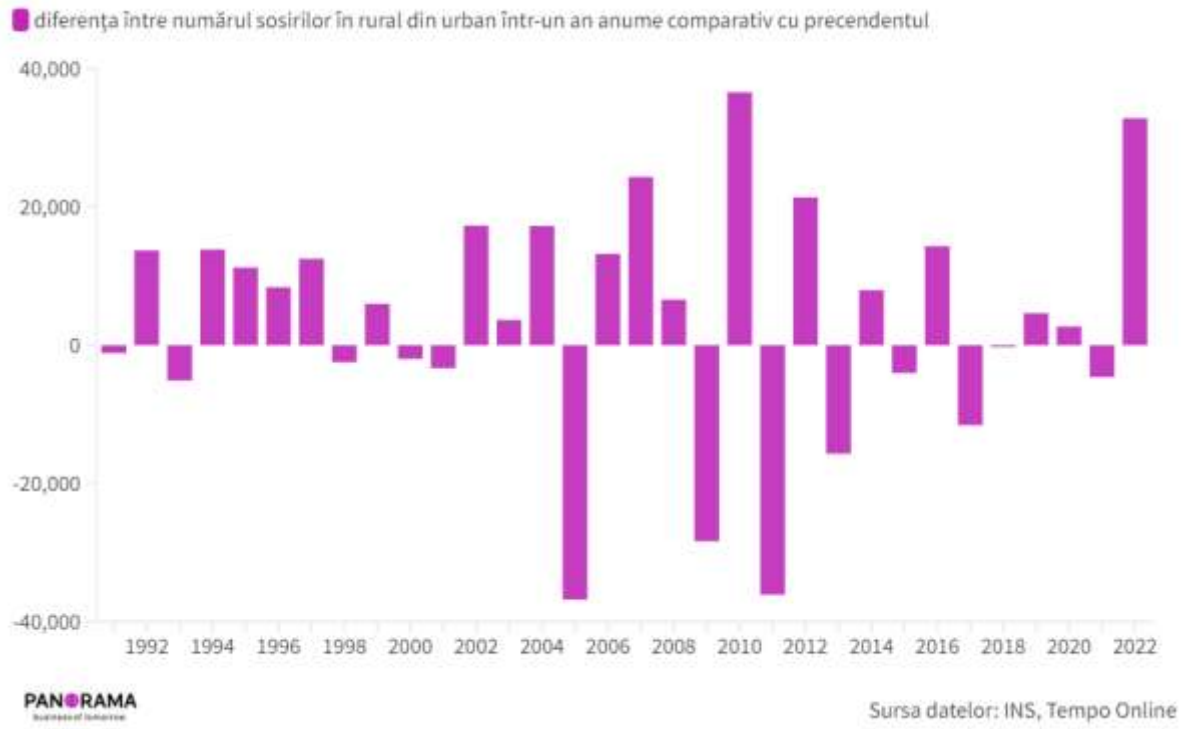

fig. nr. 1, Source: panorama.ro

And last but not least, compared to 2021, 2022 saw the largest increase in rural arrivals in the last decade: an increase of almost 33,000 people from one year to the next, according to Panorama (2022).

2. Relevance for Sustainable Development

Urban-rural relocation is not only a social trend but also an important aspect of sustainable development. This is in line with a number of United Nations Sustainable Development Goals (SDGs) that the EU has adopted and integrated into its development strategy. Among them, SDG 3 (Health and well-being), SDG 11 (Sustainable cities and communities), and SDG 15 (Life on Earth) are directly related to urban and rural resettlement.

2.1. SDG 3 (Health and Well-being)

Promoting rural life as a healthy lifestyle contributes directly to achieving SDG 3. Country life offers many benefits for health and well-being, including:

- Stress reduction: Compared to crowded and polluted urban environments, rural environments are characterized by tranquility and green spaces, which help reduce stress.

Research shows that exposure to nature has a positive impact on mental health and can reduce symptoms of anxiety and depression.

- Access to fresh food: Living in rural areas gives people easier access to fresh, healthy, locally grown food. This supports healthy eating and reduces the risk of chronic diseases such as obesity and diabetes.
- Physical Activity: Rural life often involves more physical activity, whether it's farming, gardening, or just nature walks. These activities help keep you healthy and prevent illnesses associated with sitting for long periods of time.

2.2. SDG 11 (Sustainable Cities and Communities)

Urban-rural relocation contributes to decongesting cities and supports the development of sustainable rural communities. Investments in rural infrastructure, as well as health and education services, are essential to make the countryside more attractive and sustainable in the long term. Smart city development initiatives in rural areas can also improve quality of life and create new economic opportunities.

Urban-rural resettlement supports the creation of sustainable and resilient communities. Benefits of this process include:

- Decongesting cities: Relocating part of the urban population to rural areas helps reduce congestion and pressure on urban infrastructure and services. This contributes to improving the quality of life both in cities and in the countryside.
- Development of rural infrastructure: The increase in the number of residents in rural areas prompts investment in infrastructure and essential services such as roads, water and sewage networks, schools, and medical facilities. These improvements are essential to ensuring the sustainability and attractiveness of rural life in the long term.
- Promoting resilient communities: By strengthening community ties and actively involving residents in local development projects, rural communities become more resilient to economic and climate change. Community self-help and cooperative initiatives are examples of success in this regard.

2.3. SDG 15 (Life on Earth)

Promoting sustainable agricultural practices and protecting the natural environment are the main benefits of urban-rural relocation. Organic farming and other sustainable practices can protect biodiversity and reduce negative environmental impacts. Rural communities can lead on protecting natural resources and introducing innovative solutions to environmental problems.

It is clear that resettlement has a positive impact on environmental protection and biodiversity in rural areas.

Key contributions include:

- Promoting organic agriculture: Urban and rural resettlement can promote sustainable agricultural practices that protect soil, water, and biodiversity. Organic farming reduces the use of pesticides and chemical fertilizers and contributes to the health of the environment.
- Conservation of natural landscapes: Many rural areas in Europe have special natural landscapes that can be conserved through ecotourism initiatives and sustainable management of natural resources. These practices help protect biodiversity and maintain healthy ecosystems.

- Combating climate change: By promoting renewable energy and energy efficiency in rural areas, urban-rural transfers can help reduce greenhouse gas emissions and combat climate change. Examples of such initiatives include solar and wind energy projects.

3. The impact of urban-rural relocation on rural communities

Urban-rural relocation brings many benefits to rural communities and contributes significantly to the revitalization of rural areas from economic, social, and cultural perspectives. One of the main effects of this trend is the revitalization of local economies.

As the rural population grows, the demand for local products and services will also increase, stimulating the development of existing businesses and facilitating the creation of new ones. According to a study carried out by the European Commission, migration from cities to villages can lead to a significant increase in local economic activity and the creation of new jobs.

Population growth can also lead to improvements in local infrastructure. Relocation from urban to rural areas often involves investment in infrastructure such as roads, water and sewage networks, electricity, and high-speed internet. These improvements are essential to make rural life attractive and sustainable in the long term. In addition, as demand from new residents increases, access to basic services such as education and health can be expanded and improved.

Europe has many examples of rural areas benefiting from urban-rural displacement. An example is the village of Brachay in France. The village has successfully attracted new residents by promoting an authentic and sustainable rural lifestyle. Here, rural tourism efforts and organic farming boost the local economy and create new opportunities for residents. In Spain, the rural areas of Asturias adopted a similar strategy, encouraging young people to migrate to the villages by providing subsidies for the establishment of businesses and daily life facilities.

Villages in Romania are beginning to see similar benefits. For example, in a village near Horezu, families who chose to migrate from the cities contributed to the revitalization of the community through sustainable agriculture initiatives and rural tourism projects. These initiatives not only improved the local economy but also promoted traditional values and a healthy lifestyle. Projects such as organic farms and agritourism guesthouses create jobs and attract tourists, thus providing additional income to local communities.

3.1. Social and cultural integration

Urban-rural relocation leads to social and cultural improvements in addition to financial improvements. To help diversify and grow the community, new residents bring new perspectives, concepts, and skills. The success of the transition depends on the social integration of the newcomers.

Volunteering initiatives, community programs, and local events can help with integration and give people a sense of social cohesion and belonging.

However, relocating from an urban to a rural area also presents challenges. Adapting new residents to rural life, which can be very different from urban life, is a major obstacle.

Major difficulties may come from the lack of certain facilities and services, as well as the greater distances to urban centers. In addition, cultural integration can require time and energy from both parties.

Coordinated support from local and national governments, as well as non-governmental organizations, is needed to address these issues, as highlighted by Code for Romania (2024). A quick transition and long-term success in urban-rural resettlement can be ensured through social integration programs, entrepreneurship support, and vocational training programs.

4. Marketing strategies for promoting country life

Well-thought-out marketing strategies are necessary to promote life on a national level. These approaches must highlight the benefits of rural life and provide an attractive image. Below are some effective marketing strategies to promote urban-rural relocations.

4.1. Market segmentation

The success of a marketing campaign depends on identifying and targeting key demographics. There may be target groups that include:

Young families: looking for a safe and healthy place to raise their children.

People who work at a distance (remote): Many people are interested in moving to a quieter place because of the flexibility that remote work offers.

Retirees: People looking for a quieter and more convenient life.

Nature and agriculture enthusiasts: Those who are attracted to the possibility of living close to nature and participating in sustainable agriculture.

Marketing messages should be tailored for each segment.

4.2. Rural branding

In order to attract new residents, it is essential to present an attractive image of rural life. Rural branding is based on the following main elements:

Verifiability: emphasizes authenticity and local customs. Personal stories and real experiences can create emotional connections with audiences.

The benefits of country living: promoting advantages such as clean air, peace, safety, and community. These advantages are essential to convincing people to move from the city to the village.

Ecology: Encourages a sustainable lifestyle such as organic farming, renewable energy, and environmental protection.

4.3. Promotion channels

To reach the target audience, it is essential to use online platforms, PR campaigns, and social media.

Social Media: Social media like Facebook, Instagram, TikTok and YouTube help promote national life. For example, the Stan family, who moved from Bucharest to a village in Vâlcea, follows and promotes the life in the village on the social media sites like TikTok and YouTube, thus reaching a wider and diverse audience.

Publicity campaigns: Promoting country living, such as guided tours, local festivals, and agricultural fairs, can attract media and public attention.

Internet platforms: promoting rural life by creating websites and blogs that provide new residents with useful information about resettlement, work opportunities, and local activities.

4.4. Collaborations and partnerships

Forming partnerships with private companies, government agencies, and non-profit organizations can enhance marketing efforts and provide additional resources for promotion.

- **Government**: Working with local and national authorities to develop programs to help new residents and improve infrastructure and services in rural areas.
- **Non-profit organizations**: Partnerships with organizations that support environmental sustainability and conservation can help highlight the benefits of urban-rural relocation.

- **Private companies**: involvement of businesses that provide relevant products and services, such as agricultural equipment, renewable energy technologies, and high-speed Internet services; Rotakt, a local farm equipment distributor, is one example.

4.5. Using personal stories

Authentic and inspirational stories are a powerful marketing tool. Real-life photos of individuals and families who have made the transition to rural life can inspire and motivate other residents. For example, a lot of families who moved from cities to villages use sites like TikTok, Facebook, and YouTube to promote country life. They inspire other families to follow suit by noting the daily experiences and benefits of rural life. This certainly increases interest in urban-rural relocation. Similar stories can be found in dedicated groups such as Moved to the Country with over 350,000 members.

5. Challenges and solutions

To ensure an effective and sustainable transition between urban and rural areas, a number of challenges associated with this process must be considered. These issues include social and economic aspects as well as basic infrastructure and services. To ensure the long-term success of rural communities, identifying and solving these problems is essential.

Challenge: Integration of new residents

There are numerous difficulties in integrating residents into local communities. They are often met with skepticism or may encounter difficulties in adapting to the new lifestyle. Cultural differences and local customs make this process even more complicated.

Solution: Integrating programs and organizing community events can facilitate this process. Social events such as local fairs, festivals, and community groups can help new community members feel welcome and integrate more quickly.

Challenge: Infrastructure and basic services

In many rural areas, infrastructure can be underdeveloped, which is a major obstacle to attracting new residents. There are many common problems, such as poor quality roads, limited access to water and electricity, and low or no internet speed.

Solution: Government investment and public-private partnerships are critical to improving rural infrastructure. Projects to upgrade roads, expand water and sewer networks, and improve internet connectivity have the potential to make village life more attractive and efficient.

Challenge: Access to health and education

Many rural communities face limited access to high-quality education and health services. People may have to travel considerable distances to reach hospitals, clinics, and schools.

Solution: Development of health and education infrastructure in rural areas by creating clinics, medical centers, and modern schools at the local level. Online education and telemedicine can also play an important role in providing access to these essential services.

Challenge: Social isolation

People who move to rural areas face a significant problem of social isolation. Those who live long distances from cities and do not have good means of transport may find it difficult to maintain an active lifestyle and social connections.

Solution: Public transport networks and the facilitation of personal transport can reduce social isolation (for example, the purchase of electric buses through the Regional Operational Program

(2017) under Priority Axis 3 supports sustainable urban mobility.). Encouraging social activities and virtual communities can also provide opportunities for support and interaction.

Conclusions

Urban-rural resettlement requires an integrated and collaborative strategy. Rural communities can be vibrant and sustainable, attracting new residents and contributing to the sustainable development of rural areas if appropriate solutions are implemented and supported by all parties.

One significant trend, urban-rural relocation, has the potential to revitalize rural communities and help achieve the European Union's Sustainable Development Goals (SDGs). This movement not only provides solutions for decongesting cities and improving the quality of urban life but also benefits rural areas economically, socially, and environmentally. It is possible to turn the obstacles that arise when people move to rural towns into good, sustainable long-term opportunities, using success stories like the Stan family and good marketing and integration practices.

Well-planned marketing strategies are essential to improve country living and attract new residents. To emphasize the benefits and attract the interest of the target audience, personal stories, using social media platforms, and creating an attractive and authentic image of rural life are effective methods.

To ensure that the growth and development of rural communities is sustainable in the long term, these efforts must be coordinated with the Sustainable Development Goals.

Urban-rural resettlement can become an effective approach for the sustainable development of rural communities by addressing challenges and providing appropriate solutions. To turn this trend into a long-term success, it is essential that policies supporting sustainable development work together with effective marketing campaigns. Rural communities in Romania and Europe can be revitalized through investments in infrastructure, social integration programs, public-private partnerships, and promotion campaigns.

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SCIENTIFIC RESEARCH UNDER THE LENS OF ETHICS

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Abstract

This article analyzes the fundamental mechanisms of academic integrity within Romanian higher education, exploring the intersection between conceptual benchmarks and current legislative rigor. The paper begins by outlining essential deontological values, such as honesty and meritocracy, followed by an examination of the role and responsibilities of University Ethics Committees, in accordance with the provisions of Law no. 199/2023. Particular attention is given to standards of good conduct in scientific research, investigating forms of serious misconduct with an emphasis on the phenomenon of plagiarism and conflicts of interest. The analysis highlights that, while the regulatory framework and the sanctions system are necessary tools for maintaining quality, long-term success depends on internalizing a culture of integrity. The conclusions emphasize the importance of shifting from an exclusively punitive approach toward a preventive one, rooted in ethical education. The article offers an integrated perspective on how universities can protect their prestige against contemporary challenges of intellectual imposture.

Keywords: *academic integrity, university ethics, Ethics Committee, good conduct in research, plagiarism, Law no. 199/2023.*

JEL Classification: A11, B41, I23.

1. Introduction

Academic integrity represents the very essence and the fundamental condition for the existence of the academic world, guaranteeing the validity of the research process and the prestige of the awarded degrees. In the current context, marked by the pressure of scientific productivity, compliance with ethical norms becomes an imperative condition for the credibility of knowledge.

This article aims to analyze the ethical architecture in higher education, highlighting the connection between the legislative framework, the jurisdictional role of ethics committees, and the standards of good conduct.

The objective of this endeavor is to highlight the manner in which deontological values are operationalized to prevent and sanction serious misconduct, particularly plagiarism, thereby ensuring a climate of equity and honesty.

2. Conceptual Approaches to Ethics and Academic Integrity. Contemporary Legislative Challenges

Ethics represents one of the forms of social consciousness, as it addresses the ability of individuals to distinguish what is legitimate and acceptable in the pursuit of their goals.

While theoretical ethics reflects the philosophical theory of morality, normative ethics refers to the grounding of individual and collective behavior on a system of norms, principles, values, and moral categories.

Moral norms (general, particular, or specific) emerge as a result of objective needs generated by the specific nature of relationships between individuals, as well as between individuals and the community. Consequently, the existence of a system of norms to regulate human activity (particularly scientific research) represents an indispensable requirement.

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The legislative and institutional system in Romania provides the necessary premises for conducting research activities within a controlled and ethical environment, by ensuring the tools required to prevent and sanction breaches of academic integrity. This fact transforms the regulation of scientific research activities into a guarantee of scientific prestige.

Although often used as synonyms, the terms "*ethics*" and "*integrity*" carry different nuances in the academic environment. **Academic ethics** represents a system of moral principles and norms (defining what is "right" and what is "wrong") that guides the conduct of the university community members; it constitutes the theoretical and philosophical dimension. In contrast, according to the *Guide for Integrity in Scientific Research*, **academic integrity** represents the adherence to values that satisfy both researchers and research institutions through principles, practices, and products of knowledge. Essentially, the Guide is built upon four core values: ***honesty***, ***accountability***, ***verifiability***, and ***the validity of knowledge***.

The Higher Education Law no. 199/2023 stipulates, in Chapter XX entitled "*University Ethics and Deontology*," the mandatory compliance with ethical and deontological norms in teaching and scientific research activities. Under this law (Art. 162, Art. 166), the responsibility for upholding these norms entails the establishment of university ethics committees and the existence of codes of university ethics and deontology as part of the university charter, in accordance with legal provisions. Furthermore, the present law specifies the breaches of ethical and deontological norms in teaching and scientific research (Art. 168), as well as the corresponding sanctions (Art. 171).

The vision of the present law is centered on the following values:

a) *Equity*, by ensuring equal educational opportunities for young people, regardless of their background or other risk factors;

b) *Excellence*, by supporting and motivating it throughout the educational process;

c) *Integrity*, by establishing value benchmarks and promoting ethics in education.

Although it is an older regulation, *Law no. 206/2004 on good conduct in scientific research, technological development, and innovation* clearly defines the concepts of "*data fabrication*," "*falsification*," and "*plagiarism,*" as well as "*conflict of interest in research*." Furthermore, it establishes the role of the National Council for Ethics in Scientific Research, Technological Development, and Innovation (CNECSDTI).

The university ethics and deontology norms provided by the present law are complemented by: a) The Framework Code of University Ethics and Deontology, adopted by Government Decision (GD no. 305/2024); b) The Framework Regulation on the Organization and Functioning of University Ethics Committees at the level of higher education institutions, approved by Order of the Minister of Education (OM no. 6869/2024); c) Standards and Guidelines for Ethics Management, as part of the External Evaluation Methodology, standards, reference standards, and the list of performance indicators, approved by Government Decision; d) The Code of University Ethics and Deontology (at the institutional level).

By *Ministerial Order no. 6085/2016,* the Council for University Ethics and Management (CEMU) was established as a consultative body of the Ministry of Education. The mission of CEMU is to develop a culture of ethics and integrity within Romanian universities. In this regard, the council determines and supports universities in implementing university ethics and integrity policies in an organized, transparent, and efficient manner, in accordance with the relevant legal provisions.

To underscore the importance of complying with university standards in scientific research, the Ministry of Education, through *Order no. 3131/2018*, mandated the inclusion of ethics and

academic integrity courses in the curricula of all university study programs organized by higher education institutions within the national education system.

Current legislative challenges in this field focus on the following:

- *Higher Education Law no. 199/2023*, part of the "Educated Romania" project, ***standardizes sanctioning*** procedures for university misconduct, addressing subjectivity in internal ethics committees. The new law introduces improved centralization and monitoring mechanisms, replacing the ambiguous regulations of the previous *Law no. 1/2011*. Furthermore, the law requires each university to have its own code of ethics, aligned with a Framework Code of University Ethics and Deontology approved by ministerial order. This ensures that the commission of a serious misconduct (such as plagiarism) will be defined and treated consistently, regardless of the university. CEMU becomes the oversight body that verifies whether universities actually enforce their own regulations. If a university attempts to "cover up" a misconduct or demonstrates subjectivity, CEMU can intervene with severe administrative sanctions against the institution. By strengthening the role of national bodies (such as CEMU and CNATDCU), the legislator aims to standardize sanctions and analysis procedures, ensuring that academic integrity standards are applied uniformly across all institutions. Subjectivity is countered through the new procedures for analyzing plagiarism allegations.
- ***Digitalization***, ***AI, and Transparency***: Current legislation is being challenged by the emergence of generative artificial intelligence. To reduce the margin of interpretation behind "closed doors," the law mandates the compulsory publication of all decisions made by Ethics Committees and the use of national platforms for verifying the originality of academic works.
- ***The "Publish or Perish" Pressure***: The race for academic points (required for promotion according to CNATDCU standards) often pushes the boundaries of ethics, leading to phenomena such as "paper mills" or coerced reciprocal citations.

Despite increasingly strict laws, the major challenge remains their implementation and the resistance to political or administrative pressures.

3. The Role of the Ethics Committee in Maintaining Academic Values

According to the Higher Education *Law no. 199/2023*, the University Ethics Committee (CEU) is the supreme internal control structure.

The University Ethics Committee operates independently of any other structure or individual within the higher education institution. Within the committee, a subcommittee dedicated to research ethics is established. It monitors the implementation of research ethics policies in accordance with scientific research ethics regulations, which must cover the following aspects: a) *publication and authorship*; b) *respect for the dignity of research participants*; c) *research data management*; e) *collaboration*; d) *conflicts of interest*; e) *fraud*; f) ensuring effective research environments, namely *the prevention of harm in research and innovation*.

The composition of university ethics committees (consisting of faculty members and students) is proposed by the administrative boards, endorsed by the senate, and approved by the rector's decision. The members of the committee must be individuals of professional prestige who have not violated the norms of university ethics and deontology.

Individuals holding the following positions are ineligible to serve on university ethics committees: rector, president of the senate, vice-rector, dean, vice-dean, administrative director,

deputy administrative director, head of department, or director of a research-development, design, or micro-production unit, as well as branch directors within the higher education institution.

According to Article 162, *the prerogatives of university ethics committees* are as follows:

- to monitor compliance with the codes of university ethics and deontology;
- to ensure the implementation of the Minister of Education's orders regarding the legal framework of university ethics and deontology;
- to analyze and resolve breaches of ethical and deontological norms, based on third-party complaints or through *ex officio* (self-initiated) procedures;
- to contribute to the drafting of the Code of University Ethics and Deontology by submitting proposals to the University Senate for adoption and inclusion in the University Charter;
- to produce an annual report on the state of compliance with ethical and deontological norms, which is presented to the Rector and the University Senate and constitutes a public document;
- to conduct preventive activities regarding the violation of ethical and deontological norms;
- to monitor the delivery of ethics and academic integrity courses;
- to propose the Organization and Functioning Regulation for adoption by the University Senate;
- to collaborate with national-level advisory commissions;
- other duties provided by the present law or established according to the University Charter.

A pertinent example is *the Code of Ethics and Professional Deontology of "Constantin Brâncoveanu" University of Pitești*, which stipulates *the prerogatives of the ethics committee* (Art. 44):

- „analyzes and resolves breaches of university ethics, based on third-party complaints or through *ex officio* (self-initiated) procedures, in accordance with the Code of University Ethics and Deontology;
- produces an annual report on the state of compliance with university ethics and research ethics, which is presented to the Rector and the University Senate and constitutes a public document;
- contributes to the drafting of the Code of University Ethics and Deontology, which is proposed to the University Senate for adoption and inclusion in the University Charter;
- exercises the prerogatives set forth in Law no. 206/2004 on good conduct in scientific research, technological development, and innovation;
- monitors compliance with the specific codes of ethics of the field;
- investigates cases of professional ethics misconduct and proposes the necessary measures to the leadership of the unit or institution;
- immediately informs the university leadership of cases falling under criminal law and provides all relevant information regarding the respective case;

- exercises other prerogatives provided by law or established within the University Charter".

The Ethics Committee does not operate in isolation. Its decisions can be contested or monitored by: the National Council for the Attestation of University Titles, Diplomas, and Certificates (CNATDCU) and the National Council for Ethics in Scientific Research, Technological Development, and Innovation (CNECSDTI).

A major challenge for Ethics Committees is the avoidance of conflicts of interest (when a committee member must investigate a colleague from the same department) and the necessity for total transparency in publishing decisions to deter future misconduct.

4. An Analysis of the Code of Ethics and Responsibility in Research

The code of ethics is not merely an administrative document, but also serves an educational and normative role. From this perspective, the purpose of the code of ethics is to direct the activities of the academic community members, defining the moral-professional relationships among them, as well as between them and external collaborators.

The Code of Ethics and Professional Deontology of "Constantin Brâncoveanu" University of Pitești regulates the conduct of the academic community members, promoting the norms and principles of university ethics and deontology. *The values promoted by this Code* include: justice, equity, equal opportunities, dignity, individual and academic freedom, intellectual property, professional and moral integrity, honesty, truthfulness, fairness, duty, public responsibility etc., values that are correlated with the universal principle of non-maleficence. "Constantin Brâncoveanu" University of Pitești protects these values and sanctions any restriction on their promotion, under the conditions of university autonomy, transparency, and public accountability (Art. 3 of this document).

Among the principles addressed in *the Code of Ethics of UCB Pitești* are the following:

„1) the principle of ensuring academic freedom, provided that every member of the academic community respects scientific truth, ethical truth, individual and group dignity, and refrains from damaging the institution's image;

2) the principle of ensuring intellectual property rights, both at the individual and institutional levels, correlated with public accountability for damages caused to third parties through the illegal and immoral exploitation of these rights. Intellectual property includes inventions, innovations, and copyrights for various categories of scientific, psycho-pedagogical, or didactic works;

3) the principle of avoiding situations of incompatibility and conflicts of interest, as regulated by Law no. 199/2023 and other relevant legislation in the field;

4) the principle of joint liability of authors and supervisors of bachelor's theses, master's dissertations, and doctoral theses for inaccuracies affecting scientific content, as well as for acts of plagiarism and the commercialization of content to third parties interested in the drafting of such works;

5) the principle of individual liability of authors of studies, articles, monographs, treatises, guides, educational works, etc., for the scientific quality, data accuracy, and originality of the content, in accordance with the law;

6) the principle of evaluation transparency and accountability for incorrect evaluations. "Constantin Brâncoveanu" University of Pitești sanctions plagiarism, as well as the entrustment of

published scientific products by any author to another person to be republished under names other than those of the primary author(s). Such an act constitutes complicity in plagiarism;

7) the principle of stimulating creativity and ensuring appropriate remuneration for high-performance activities."

Academic freedom (the right to research without censorship, yet with responsibility), ***intellectual honesty***, and ***meritocracy*** (respect for intellectual property and copyright, the recognition of value based exclusively on performance and competence), ***transparency*** (clarity in evaluation and funding processes), ***confidentiality***, and the implementation of values within the professor-student relationship represent the core ethical principles addressed in a university code of ethics.

There is an interdependent relationship between conflicts of interest and the integrity of evaluation. A conflict of interest arises when the personal, financial, or professional interests of a researcher may influence (or appear to influence) the objectivity of the research or evaluation process:

- *In the Peer-Review Process***:** A reviewer who evaluates the work of a close friend, a rival, or a former student without declaring the relationship violates ethical norms**Research Funding:** Failure to disclose the funding source.

- *Disclosure Obligation*: According to *Law no. 206/2004*, researchers are mandated to declare any potential conflict of interest to maintain the transparency of the scientific process.

- *Undeclared Conflict of Interest (COI*).

5. From the Code of Ethics to Good Conduct: Mechanisms for Preventing and Combating Plagiarism

The Guide for Integrity in Scientific Research (12.11.2020) serves as the foundation for developing a Code of Ethics and Deontology in Research. It can function as a core for integrating and stimulating the structuring of Ethics Guides/Codes within research and educational institutes. The drafting of the Guide was based on key Romanian legislation, national ethics/integrity guidelines (such as the Danish Code of Conduct for Research Integrity), the European Code of Conduct for Research Integrity, as well as specialized literature mentioned in the reference list.

Essentially, the Guide is built upon four core values: 1) ***honesty;*** 2) ***responsibility*** (proper resource management and care for research subjects); 3) ***verifiability***; 4) ***the validity of knowledge***. These values must be effectively applied in scientific research practice through specific conducts of integrity.

Honesty in research entails:

1) Rejecting and preventing all forms of intellectual theft (plagiarism) by misappropriating or inadequately citing text, ideas, data, methods, or original analysis results;

2) Rejecting and preventing all forms of data fabrication and their presentation as if they were real;

3) Rejecting and preventing all forms of falsification or manipulation of research data;

4) Explicitly recognizing the contributions made by authors to a collective work presented in the public sphere through specifications regarding the order of names in the authorship list;

5) Coordinating the work within the author team;

6) Specifying the distinct contributions of particular authors, where applicable, within the body of the work;

7) Explicitly acknowledging the reuse of the author's previously published texts to avoid self-plagiarism;

8) Respecting the joint ownership resulting from participation as a co-author in collective volumes or articles. The subsequent use of parts from co-authored works in solo-authored publications or with different co-authors, without proper citation of the primary reference work, constitutes a breach of research integrity;

9) Explicitly mentioning authorship even for works produced under contract, ensuring that the contract beneficiary does not undeservedly claim a role in the authorship team;

10) Complete and accurate reporting of research results.

In *the Higher Education Law no. 199/2023* (Art. 167), the following breaches of ethical and deontological norms in teaching and university research activities are stipulated: a) including a person in the authorship list of a scientific publication without their consent; b) the unauthorized publication or dissemination by authors of unpublished scientific results, hypotheses, theories, or methods; c) the fabrication of results or data which are not the actual outcome of a research-development activity; c) the falsification of results or data for the purpose of distorting scientific truth; d) ***plagiarism***; e) ***self-plagiarism***.

According to the present law (Art. 171), based on the rulings of the university ethics committees, higher education institutions apply sanctions to teaching, auxiliary teaching, and research staff, including those in leadership positions. ***The sanctions*** are enforced through the Rector's decision. The types of sanctions provided for the violation of university ethical and deontological norms are: a) *A written warning***;** b) *The withdrawal and/or correction* of all works published in violation of university ethical and deontological norms; c) *Dismissal from a leadership position***;** d) *Prohibition*, for a determined period, of access to funding from *competitive public funds*; e) *Suspension*, for a determined period of *1 to 5 years*, of the right to apply for a higher position, a leadership position, or to serve as a member of examination committees; f) *Dismissal* from the teaching or research position.

Regarding **plagiarism**, the *Guide for Integrity in Scientific Research (2022)* presents the general principles and best practices for diagnosing this form of fraud. According to this document, **plagiarizing** is defined as "an author taking elements from the intellectual creation of another author and presenting them in the public sphere as components of their own work." In a simplified, yet accurate phrasing, "**plagiarism is intellectual theft**."

Furthermore, it is also considered plagiarism to "use a portion of a text signed as a co-author without clearly specifying the collective source work." This "appears as the **misappropriation of a collective asset** for personal interest. "

According to the same document, ***a form of plagiarism*** is considered to be the appropriation without proper citations from works signed as a co-author, if conducted on a large scale, repeatedly, and in a manner that may cause reputational damage to the other co-authors**.**

A form of intentional plagiarism also includes **"***the translation of any type of text from a foreign language and presenting it-either as a compact block or in a mosaic style-as one's own text*.**"**

Regarding **self-plagiarism**, the guide specifies that "it is not plagiarism in the strict sense adopted by the given definition, but it is a **breach of research ethics**. In this case, the appropriation is not made from another author's work, but from the author's own previous works, without specifying that the current work reproduces, in whole or in part, an older work by the same author."

Since self-plagiarism can lead to **undeserved professional recognition**, the Guide discourages the possibility of claiming it as "a new intellectual production."

According to the *Guide for Integrity in Scientific Research (2020),* plagiarism within a scientific work can have varying degrees of severity. In this regard, four defining criteria are specified for diagnosing the **severity of plagiarism**: 1) **The extent** of the illegitimate appropriations; 2) **Their placement** within the architecture of the work; 3) **The truly voluntary or involuntary nature** of the acts of plagiarism; 4) **The repeatability** of the author's fraudulent acts across different works.

A fifth criterion for the gravity of plagiarism is **extrinsic in nature** and refers to the **undeserved advantages** obtained by the author as a result of the plagiarism.

In practice, plagiarism occurs in several forms, such as:

- ✓ **"***copy-paste plagiarism,"*
- ✓ *"mosaic or fragmented plagiarism,"*
- ✓ *"involuntary plagiarism,"*
- ✓ *"incorrect paraphrasing,"*
- ✓ *"translation plagiarism,"*
- ✓ *"cyberplagiarism***"** or internet-based plagiarism (Ștefan, 2018, pp. 152-155).

Conflicts of interest and ***authorship issues*** (*ghost* or *honorary/guest authorship*) are more subtle but extremely widespread forms of ethical misconduct, which often precede or accompany plagiarism.

The suspicion of ***ghostwriter*** involvement is difficult to verify, but it may result from: a. *listing a large number of bibliographic references* that do not appear explicitly used within the work, despite the fact that correct citations appear frequently throughout the same paper; b. *repeated errors in the text,* indicative of a ghostwriter's involvement (who is far from understanding elementary particularities of drafting a scientific text).

In evaluating plagiarism suspicions, according to the guide, expertise must be multiple and transparent; this can be achieved through:

a) ***The involvement of independent specialists in diagnosing plagiarism cases.*** The evaluation groups for works suspected of plagiarism must, first and foremost, include experts from the specific field to which the analyzed work primarily belongs. Secondly, it is advisable to include a specialist from a field different from that of the evaluated work within the evaluation group, in order to avoid the emergence of misguided professional solidarity.

b) ***Software applications*** that estimate the weight of text similarities between the reference work and other authors' texts available online cannot replace expert evaluations through qualitative analysis. Both the extent of the plagiarism and the nature of the misappropriated content are what truly matter.

According to *Ministerial Order no. 3,692/2024* (Art. 2), the list of nationally recognized programs for establishing the degree of similarity in graduation theses includes:

- „iThenticate;
- Turnitin;
- Plagiarism detector + PDAS (PDAS-Plagiarism Detector Accumulator Server);
- SafeAssign;
- SEMPLAG;
- www.sistemantiplagiat.ro."

Textual similarity identification software must fulfill the following requirements: 1) ensures verification against databases owned by the developer (including subscriptions held by the developer to various magazines, journals, publishing houses etc.); 2) ensures verification against the internet/web content; 3) ensures the creation of an internal database and allows cross-referencing with these documents; 4) allows the uploading and verification of files in the following formats: *.doc, *.docx, and .pdf;* 5) allows the recognition of Romanian characters; 6) generates analysis reports.

"The list of nationally recognized programs may be supplemented, at the request of higher education institutions, doctoral schools, or the Romanian Academy, with software purchased by them, provided they comply with the requirements set forth in Art. 2" of the present law (Art. 3).

A low similarity coefficient does not guarantee the absence of plagiarism, just as a high one does not automatically confirm fraud; the final interpretation always belongs to the human expert within the Ethics Committee.

6. Conclusions

Therefore, academic integrity represents a commitment by any educational institution to five fundamental values that aspire to excellence: honesty, trust, fairness, respect, and responsibility.

The analysis of the regulatory framework (particularly the provisions of the Higher Education Law no. 199/2023) demonstrates that Romanian society is moving toward a culture of integrity and accountability for social actions. It currently possesses the necessary instruments to monitor and sanction research ethics misconduct. The existence of ethics committees and anti-plagiarism software represents only part of the solution. The effectiveness of these mechanisms depends on the transition from a culture of punishment to one of prevention and assumed fairness. Furthermore, it is essential that the principles stated in the code of ethics do not remain mere declarative statements but are integrated into both research and teaching activities.

Respect for intellectual property and its protection represent guarantees of the quality of the academic act. The future of scientific research depends on the academic community's ability to value meritocracy and to reject intellectual imposture.

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INTERACTIVE EFFECTS OF EXTERNAL DEBT AND INFLATION RATE ON ECONOMIC DEVELOPMENT IN WEST AFRICA

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Abstract: *This study examined the interactive effect of external debt and inflation on economic development in West Africa from 1980 to 2020. The dependent variable was economic development, proxied with per capita income (PCI) and human development index (HDI). Two models were built, with external debt (EXD) and inflation (INF) as independent variables, and external debt service (EDS), interest rate (INT) and exchange rate (EXR) as the control variables.*

The study used panel data from secondary sources, including World Development Indicators, International Debt Statistics, IMF International Financial Statistics and United Nation Development Programme Report Office. The result showed that the interactive effect of LEXD and INF on both LPCI and HDI are negative and statistically significant ($\beta = -.31, \alpha = .00$; $\beta = -.04, \alpha = .00$).

It was recommended, amongst others, that governments in West Africa promote fiscal discipline, and diversify revenue sources to prevent accumulation of excessive debt in the future. Governments should also collaborate with regional organizations like the West African Economic and Monetary Union to coordinate inflation control efforts and maintain exchange rate stability.

Keywords: External debt, inflation, external debt service, human development index, per capita income, Correlation analysis, Panel ARDL: PMG technique and Panel Dynamic Least Square.

1. Introduction

Countries in West Africa have widely adopted development strategies that rely heavily on external loans. Furthermore, the acquisition of additional foreign loans to service outstanding debt have made debt a greater problematic financing instrument than necessary. For example, the recently approved budget by the Senate in Nigeria allocated over 8 trillion naira to service debt (Debt Management Office, 2024). High external debt-service can deplete foreign exchange that could have been used in the provision of social services (El Aboudi and Khanchaoui, 2021).

While external debt is high in West Africa, it is important to note that when compared to developed countries, including USA, UK, Japan, Netherlands, and France external debt in West Africa is exponentially lower (WB, 2022). Countries, including Cabo Verde, Ghana and The Gambia have the highest debt-to-GDP ratio in the sub-region at 160.7%, 83.5% and 82.3% respectively, while the average for developing countries is 60% (Bank of Ghana, 2022).

Issues around price stability, as shown by the level of inflation are dicey ones, the same as its impacts on the economy. First, monetary authorities all over the world target inflation level to maintain and prevent the economy from problems posed by the downside of deflation. Second, inflation causes harm to the economy through the uncertainty it creates; economic decisions such as investment, borrowing, buying and selling are highly determined by the current price and expected future price, fluctuating and increased inflation causes doubt about future prices. As to

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these causes, economic decisions are influenced negatively and having dangerous effects on development of the economy.

In West Africa, policies had been adopted and developed to tackle these macroeconomic issues. For instance, in the early 1980s, the two Bretton Woods institutions- the IMF and World Bank, responded to debt crisis faced in Africa by creating adjustment programmes in from of financial assistance for countries in the region to strengthen their export earnings, reduce imports and as well control the rising inflation. To tap into these funds, African countries had to embark on structural adjustment policies, which stipulated certain economic pre-conditions (IMF, 2021).

Greene (1989) indicated that these conditionality-based financial assistance programmes catalyzed the granting of debt relief by bilateral creditors and commercial banks. Adeniran et al, (2018) estimated that from 1980 to 1984, the Paris and London Clubs granted $10 billion in debt relief to some African countries that followed the Structural Adjustment Programmes (SAPs). Unfortunately, the structural-adjustment-loans-debt-relief initiatives by the creditors did not translate into economic fortunes for African countries (IMF, 2021).

In 1996, the IMF and World Bank in another bid to tackle debt crisis established the Heavily Indebted Poor Countries initiative to ensure that no poor country faces a debt burden it cannot manage. In addition, the IMF in 2005 introduced the Multilateral Debt Relief Initiative (MDRI) to support the continent in achieving the Millennium Development Goals (MDGs) through 100% relief on eligible debts owed to the IMF, World Bank and the African Development Fund (AfDF) for countries that completed the HIPC initiative process (IMF, 2021).

The link between inflation and debt is complex and a discourse in various theories, including Modern Monetary Theory (MMT). Proponents argue that as long as inflation is contained, a country with its own currency does not need to worry about accumulating too much debt through deficit spending because it can always print more money to pay for it (Sarwat et al., 2014).

Theoretically, Keynesian and Neoclassical theories posit the need for capital scarce countries to borrow to increase their capital accumulation so as to boost their economy. Similarly, Structuralist theorists presents a positive relationship between inflation and the economy, they argue that increase in prices as a result of inflation reduces the real wages and tends to increase the profits when wages lag behind (Enejoh and Tsauni, 2017).

A number of previous studies support the positive assertions mentioned above (Antoine et al. 2021; Agyapong and Bedjabeng, 2020; Musibau et al. 2018; Raza et al. 2013; Umaru and Zubairu, 2012; Hussain and Malik, 2011; Xiao, 2009). However, there are also several other literatures that present mixed and contrary opinions (Debt overhang; Debt crowding-out; Awan and Qasim (2020), Getinet and Ersumo, 2020; Tefera, 2019; Idris and Suleiman, 2019) from both developed and developing countries. Thus, this study intends to conduct a robust research based on the identified gaps in literature. Further, we aim to investigate the combined influence of external debt and inflation on economic development in West Africa, drawing from the postulations of MMT.

2. Literature Review

Relevant theories on our subject matter and variables of interest were reviewed, these includes; Neoclassical theory on capital accumulation, Keynesian theory on deficit financing, Debt overhang hypothesis, Debt crowding-out hypothesis, Modern Monetary Theory (MMT), Structural theory of inflation, Keynesian theory of inflation, and Quantity theory of money (QTM).

2.1 Neoclassical Theory on Capital Accumulation

This is an economic theory that outlines how growth comes from adding more capital and labour inputs, and also ideas and new technology. It was first introduced by Robert Solow and Trevor Swan in 1956. The theory posits that capital accumulation, which could be decomposed to capital deepening and capital widening, within an economy and how people use that capital plays a great role in determining its economic growth. The more capital accumulated in an economy, the more there are new investments in land, physical equipment, and human resources. The model assumed that output (Y) is produced by employing technology, labour, and physical capital.

The model is expressed as Y = f (A, K, L);

Where: Y = output;

A = technology;

K = capital; and

L = labour.

From the model above, it can be deduced that increasing capital relative to labour creates economic growth, since people can be more productive given more capital. Accordingly, poor countries with less capital per person grow faster because each investment in capital produces a higher return than rich countries with little capital. Neoclassical theorists prescribe the need for capital scarce countries to borrow to increase their capital accumulation and steady-state level of output per capital (Madow et al., 2021).

2.2 Keynesian Theory of Inflation

According to J. M. Keynes, inflation comes in two varieties- demand-pull and cost-push. The former occurs when consumer demand goods, possibly because of larger money supply, at a rate faster than production, and the latter occurs when the input prices for goods tend to rise, possibly because of larger money supply, at a rate faster than consumer preferences change. In the 1930s, Keynes challenged the QTM, saying that increases in money supply actually leads to a decrease in velocity of money in circulation and that real income; the flow of money to the factors of production increases. Therefore, the velocity of money could change in response to changes in the money supply. In the years since Keynes made this argument, other economists have proved that Keynes' contention with the QTM is accurate.

Keynesians believe that prices and wages are not so flexible; they believe that prices and wages are sticky or rigid, especially downward. The stickiness of prices and wages in the downward direction prevents the economy's resources from being fully employed and thereby prevents the economy from returning to the natural level of real gross domestic product (GDP). Thus, the Keynesian theory is a rejection of "Say's law" and the notion that the economy is self-regulating. Also, from a more Keynesian perspective, optimal economic performance can be achieved and economic slumps could be prevented through active intervention by the government by influencing the level of demand (increase in expenditure) so as to raise the purchasing power and to subsequently increase demand which will translate to companies producing more outputs and absorbing more workers to meet up with increase in demand. These economists justify such intervention because of its policies that aim to achieve full employment and price stability.

3.0 Research Methodology.

3.1. Model Specification

To achieve objective four which was the interactive effect of external debt and inflation rate in West Africa, the Panel Dynamic Least Square Method (PDOL) was employed. Karim and Akter (2019) provided framework for dynamic OLS in estimating interactive effect of two independent variables in a longitudinal study:

$$LPCI_{it} = \alpha_{0t} + \beta_{1t}LEXD_{it} + \beta_{2t}INF_{it} + \beta_{3t}LEDS_{it} + \beta_{4t}EXR_{it} + \beta_{5t}INT_{it} + \beta_{6t}LEXDINF_{it} + \sum_{j=-p}^{p}\gamma_{1j}\,\Delta LEXD_{it-j} + \sum_{j=-q}^{q}\gamma_{2j}\,\Delta INF_{it-j} + \sum_{j=-r}^{r}\gamma_{3j}\,\Delta LEDS_{it-j} + \sum_{j=-s}^{s}\gamma_{4j}\,\Delta EXR_{it-j} + \sum_{j=-u}^{u}\gamma_{5j}\,\Delta INT_{it-j} + \sum_{j=-v}^{v}\gamma_{6j}\,\Delta LEXDINF_{it-j} + \varepsilon_{i1t} - - - - - (24)$$

$$HDI_{it} = \alpha_{1t} + \beta_{7t}LEXD_{it} + \beta_{8t}INF_{it} + \beta_{9t}LEDS_{it} + \beta_{10t}EXR_{it} + \beta_{11t}INT_{it} + \beta_{12t}LEXDINF_{it} + \sum_{j=-p}^{p}\gamma_{7j}\,\Delta LEXD_{it-j} + \sum_{j=-q}^{q}\gamma_{8j}\,\Delta INF_{it-j} + \sum_{j=-r}^{r}\gamma_{9j}\,\Delta LEDS_{it-j} + \sum_{j=-s}^{s}\gamma_{10j}\,\Delta EXR_{it-j} + \sum_{j=-u}^{u}\gamma_{11j}\,\Delta INT_{it-j} + \sum_{j=-v}^{v}\gamma_{12j}\,\Delta LEXDINF_{it-j} + \varepsilon_{i2t} - - - -(25)$$

The lead and lag difference terms for augmentation are used to control endogenous feedback. The appropriate lead and lag length ([–p, +p], [–q, +q], [–r, +r], [–s, +s], [–u, +u], [–v, +v]) in Equations (24) and (25) are selected by the Akaike Information Criterion (AIC).

3.2 Sources and Measurement of Data

Secondary panel data was used in the study. This paper extracts individual country-specific annual data to accommodate the data of West African countries for the period of forty-one (41) years (1980 to 2020).

Table 1: Sources and Measurement of Data

Variable	Measurement	Source
Economic development (PCI and HDI)	Annual per capita income and human development index values of individual countries in the sub-region.	World Development Indicator (WDI) of World Bank and United Nations Development Programme Report Office.
External debt (EXD)	End-of-period exchange rates of each country against the U.S. dollars are used for the compilation of countries' external debt stock figures.	International Debt Statistics, World Bank's Debtor Reporting System (DRS)
Inflation (INF)	Annual consumer price index (CPI) values of countries in the sub-region.	WDI
External debt service (EDS)	End-of-period exchange rates of each country against the U.S. dollars are used for the compilation of external debt payments made by countries in West Africa.	WDI and IMF International Financial Statistics
Exchange rate (EXR)	Annual exchange rate flows of each country in West Africa against the U.S. dollars are used for the compilation of exchange rate figures.	WDI
Interest rate (INT)	Annual real interest rates of countries in the sub-region are extracted for data values.	WDI

Source: Author's compilation, 2023

Data Interpretation

4.0 Result and Interpretation

4.1 Interactive Influence of External Debt and Inflation Rate on PCI

In a bid to investigate the interactive effect of the external debt and inflation rate in West Africa, the Panel Dynamic Least Square Method (PDOL) was employed. PDOL assumes that response variable follows the same level of stationarity of panel data and do not interfere with the dynamism of the long run (McCullagh and Nelder, 1989). The Table 9 below showed the result of panel dynamic least square method employed for estimating the interactive influence of external debt and inflation rate on economic development in West Africa. The interactive influence was taken as deviations of external debt and inflation rate from their respective means; upon this was the statistics estimation conducted. The result showed insignificance of individual external debt (LEXD) ($\beta = -5.76, \alpha = .15$) and inflation rate (INF) ($\beta = -0.96, \alpha = .3$) at 5% significance level. However, the combined effect of external debt and inflation rate (LEXDINF) was negative and statistically significant ($\beta = -.31, \alpha = .00$) at 5% significance level.

Table 2: Result of the Panel Dynamic Least Square

Dependent Variable: LPCI			
Method: Panel Dynamic Least Squares (DOLS)			
Variable	*B*	t-Statistic	α
LEXD	-5.763352	-4.109858	0.1519
INF	-0.963752	-2.121971	0.2804
LEXDINF	-0.312492	-1.358247	0.0040
EXR	0.212155	3.088891	0.1993
INT	-0.085542	-1.079257	0.4757
LEDS	-0.175706	-2.549797	0.2379
R-squared	0.973762	Mean dependent var	6.425878
Adjusted R-squared	0.658910	S.D. dependent var	0.271534

Source: Author's computation, 2023

4.2 Model II: Human Development Index (HDI) as Dependent Variable

The second model specifies that economic development in West Africa was measured by the human development index (HDI) in sub-region. Subsequently, the optimal lag length was also shown to be 1 as indicated by Table 10 below.

4.3 Pedroni Residual Cointegration Test

Also, Pedroni (1999, 2004) proposal of seven tests statistics for testing the null hypothesis of no cointegration in non-stationary panel data was equally employed in this estimation. It allows for heterogeneity in the longitudinal data in short run and in long run slope and intercept. The Pedroni (2004) panel cointegration test was capable of revealing cointegration analysis of the ten

(10) sampled countries in within and between groups. The groups are in two parts. The first four test statistics are calculated by the within group of the panel statistics while the second part was calculated between group. The result in Table 10 showed that null hypothesis of no cointegration was rejected as indicated by the panel PP-statistics and panel ADF-statistics at 5% statistical significance level for both the within and between group respectively. This suggests the presence of cointegration between the dependent variable (HDI) and the explanatory variables in the ten (10) sample countries.

Table 3: Pedroni Residual Cointegration Test Results

Alternative hypothesis: common AR coefs. (within-dimension)					
				Weighted	
		Statistic	Prob.	Statistic	Prob.
Panel v-Statistic		1.830260	0.0336	-0.619811	0.7323
Panel rho-Statistic		1.841170	0.9672	2.534903	0.9944
Panel PP-Statistic		-2.278927	0.0113	-3.162348	0.0008
Panel ADF-Statistic		-0.564000	0.2864	-1.245583	0.0165
Alternative hypothesis: individual AR coefs. (between-dimension)					
		Statistic	Prob.		
Group rho-Statistic		3.776559	0.9999		
Group PP-Statistic		-5.472373	0.0000		
Group ADF-Statistic		-0.855971	0.1960		

Source: Author's computation, 2023

4.4 Panel ARDL

Given the presence of cointegration, we present both the long and the short run results of the panel ARDL (1,1,1,1,1,1) in Table 11 with optimal lag length of one using the SC information criterion. The ARDL (1, 1, 1, 1, 1, and 1) was the accepted and optimal distributed lags at the estimation level. Estimation could not be done with any other chosen lags. This parsimonious model confirms the conclusion of Koyck (1958), a scholar in ARDL, that more recent lags exert significant effects on the dependent variable than more remote lags. Also, from econometric point of view, lower lags are more parsimonious because higher lags usually result to loss of degree of freedom, information and over parameterization of the ARDL models.

4.5 Long and Short Run Interpretations in Model II

The ARDL long run result in Table 4 below showed that external debt and inflation rate were found to have significant impact on human development index. The result suggest that 1% increment in external debt leads to 0.062% decrease in HDI at 5% significance level. Also, the result suggest that 1% increment in inflation leads to 0.0061% decrease in HDI. Further, other variables had negative but insignificant impact on HDI; LEDS ($\beta = -.0003;\ \alpha = .92$); EXR ($\beta =$

$-.0001;\ \alpha = .12$); INT ($\beta = -.0008;\ \alpha = .48$). The result showed that, in the long run, external debt had the highest impact on HDI in West Africa at 0.062%.

In the short run table, estimate showed that only inflation rate had significant negative impact on human development index (HDI) in West Africa ($\beta = -.0003;\ \alpha = .00$). Other regressors had insignificant negative relationship with HDI. External debt had insignificant negative impact on HDI ($\beta = -.0006;\ \alpha = .79$). LEDS was not significant but however had a negative impact on HDI ($\beta = -.0004;\ \alpha = .19$), the same as EXR with negative impact but insignificant on HDI ($\beta = -.00001;\ \alpha = .37$). Lastly, interest rate (INT) also had insignificant negative impacts on human development index (HDI) ($\beta = -.0003;\ \alpha = .42$). The error correction term (ECT) was negative and statistically significant ($ECT = -.0006;\ \alpha = .04$). The speed adjustment of 6% showed that variation in human development index in the long run was corrected in the present period at 6% speed of adjustment.

Table 4: PMG Long and Short Run Results in Model II

Long Run Estimate				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEXD	-0.062	0.009	6.94**	0.00
LEDS	-0.0003	0.003	-0.10	0.92
INF	-0.0061	0.003	2.00**	0.04
EXR	-0.0001	0.000	-1.60	0.12
INT	-0.0008	0.001	-0.71	0.48
Short Run Estimate				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ECT	-0.06	0.035	-2.80**	0.04
ΔLEXD	-0.0006	0.0024	-0.27	0.79
ΔLEDS	-0.0004	0.0003	-1.31	0.19
ΔINF	-0.0003	0.0001	-2.70**	0.00
ΔEXR	-0.00001	0.00002	-0.89	0.37
ΔINT	-0.0003	0.0003	-0.81	0.42
C	-0.023	0.012	-1.44	0.16

Source: Author's computation, 2023

4.6 Interactive Influence of External Debt and Inflation Rate on HDI

A further investigation with HDI as proxy for economic development showed different result. The Table 5 below showed the result of panel dynamic least square method employed for estimating the interactive influence of external debt and inflation rate on human development in West Africa. The interactive influence was taken as deviations of external debt and inflation rate from their respective means; upon this was the statistics estimation conducted. The result showed insignificance of individual external debt (LEXD) ($\beta = .02, \alpha = .22$) and inflation rate (INF)

($\beta = .002, \alpha = .23$) at 5% significance level. However, just like the result with PCI, the combined effect of external debt and inflation rate (LEXDINF) was negative and statistically significant ($\beta = -.04, \alpha = .00$) at 5% significance level.

Table 5: Panel Dynamic Least Square Result

Dependent Variable: HDI			
Method: Panel Dynamic Least Squares (DOLS)			
Variable	*B*	t-Statistic	A
LEXD	0.018261	1.294489	0.22
INF	0.002416	1.278601	0.23
LEXDINF	-0.035717	-5.957965	0.00**
EXR	0.000452	5.002595	0.00**
INT	-0.001122	-0.531491	0.61
LEDS	0.000766	0.248731	0.81
R-squared	0.967611	Mean dependent var	0.47
Adjusted R-squared	0.906072	S.D. dependent var	0.04**

** indicates .05 significance level

Source: Author's computation, 2023

4.7 Diagnostic Tests: Lag Criteria, Model Selection Criteria and Residual Normality Test

For Model I, the selection of optimal lag length was critical to estimation of cointegration among variables under investigation. Vector Autoregressive (VAR) was employed to find the optimal lag length and the result present in Table 13 below. The Table 13 showed the deterministic trend assumption of the Pedroni Cointegration to be consistent with the assumption of PMG; the information criterion that conform with 1 lag for dependent and independent variable is the SC. It has the minimum information at lag. This was adopted for estimating the panel Pedroni residual cointegration and the lag length was 1 (SC = 26.56112).

4.8 Panel ARDL Model

Given the presence of cointegration, we present both the long and the short run results of the panel ARDL (1,1,1,1,1,1) in Table 6 with optimal lag length of one using the SC information criterion. The ARDL (1, 1, 1,1,1 and 1) was the accepted and optimal distributed lags at the estimation level. Estimation could not be done with any other chosen lags. This parsimonious model confirms the conclusion of Koyck (1958), a scholar in ARDL, that more recent lags exert significant effects on the dependent variable than more remote lags. Also, from econometric point of view, lower lags are more parsimonious because higher lags usually result to loss of degree of freedom, information and over parameterization of the ARDL models.

Table 6: Optimal Lag Length

ag	LogL	LR	FPE	AIC	SC	HQ

	-1371.362	NA	2.850000	38.79892	38.99013	38.87496
	-853.4033	933.7842	3638.119	25.22263	26.56112*	25.75490
	-822.5698	50.37584	4298.242	25.36816	27.85393	26.35667
	-786.2864	53.14758	4505.461	25.36018	28.99322	26.80492
	-732.0104	70.32943	3001.868	24.84536	29.62567	26.74634
	-626.6360	118.7317	513.3797	22.89115	28.81874	25.24837
	-549.9203	73.47416	220.9806	21.74423	28.81909	24.55768
	-461.5188	69.72517*	81.22555*	20.26813	28.49027	23.53782
	-403.7773	35.78346	92.33665	19.65570*	29.02510	23.38161*

Note: * indicates optimal lag order selected by the criteria, where Logl is Loglikelihood, LR is Likelihood Ratio, FPE is Final Prediction Error, AIC is Akaike Information Criterion, SC is Schwarz Criterion and HQ is Hannan Quinn.

Source: Author's computation, 2023

4.8.1 Model II: Optimal Lags Selection

Similar to Model I above, the Vector Autoregressive (VAR) was employed to find the optimal lag length and the result presented in Table 14 below. The lag length was 1 (SC = 19.92877).

Table 7: Optimal Lags Length for PMG Estimation

Lag	LogL	LR	FPE	AIC	SC	HQ
	-1103.104	NA	45456161	34.65951	34.86190	34.73924
	-550.3841	984.5327	4.437146	18.51200	19.92877*	19.07014
	-517.8401	51.86695	5.089194	18.62000	21.25114	19.65654
	-481.3116	51.36820	5.402134	18.60349	22.44900	20.11843
	-428.0089	64.96266	3.663666	18.06278	23.12266	20.05612
	-346.8044	83.74214	1.167181	16.65014	22.92439	19.12188
	-280.0865	56.29321	0.698475	15.69020	23.17883	18.64035
	-193.8165	56.61470	0.300996	14.11927	22.82226	17.54782
	-82.10191	52.36622*	0.095794*	11.75318*	21.67055	15.66014*

Source: Author's computation, 2023

The selection of maximum lag for PMG in Model I in Table 15 showed that AIC had the lowest value and therefore most appropriate for estimation (-1.67). This was shown to be lower compared to BIC (-.32, and HQ (-1.13), while for Model II, the selection of maximum lag for PMG showed that AIC had the lowest value and therefore most appropriate for estimation (-7.99). This was shown to be lower compared to BIC (-6.58, and HQ (-7.42).

Table 8: Model I and II Selection Criteria

ARDL (1,1,1,1,1,1) models					
Models	LogL	AIC *	BIC	HQ	Specification
I	168.17	-1.67	-0.32	-1.13	ARDL(1, 1, 1, 1, 1, 1)
II	540.90	-7.99	-6.58	-7.42	ARDL(1, 1, 1, 1, 1, 1)

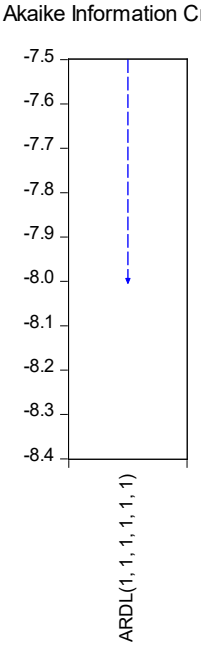
* indicates optimal lag order selected by the criteria

Source: Author's Computation, 2023

4.8.2 Selected Information Criterion for Model I and II

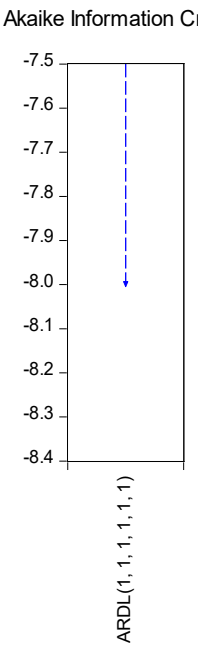
The graph of the selected information criteria for Model I and II are shown in Figure 8 and 9 below.

Figure 8: Model I Optimal Lag Length of the Estimated ARDL (1,1,1,1,1,1) Model



Source: Author's Computation, 2023

Figure 9: Model II Optimal Lag Length of the Estimated ARDL (1,1,1,1,1,1) Model



Source: Author's Computation, 2023

Residuals are the differences between the observed and predicted values of the response variable, and they reflect how well the model fits the data. Normality of residuals means that they are distributed symmetrically around zero, with no skewness or kurtosis. This assumption implies that the model captures the main patterns and sources of variation in the data, and that the errors are random and independent. Normality of residuals is important for several reasons. First, it affects the accuracy and confidence of the hypothesis tests and confidence intervals for the regression coefficients as they are based on the standard errors of the estimates which depend on the normality of residuals. Second, it affects the validity of the model selection criteria, such as the R-squared, the adjusted R-squared, and the Akaike information criterion (AIC); which measure the goodness of fit and the trade-off between complexity and simplicity of the model. Third, it affects the detection and treatment of outliers and influential points which are observations that have a large impact on the model fit and the parameter estimates. It indicates that the model was adequately capturing the 'signal' in the data and leaving the 'noise' in the residuals.

In Table 9 below, the normality test results are presented. The mean statistic values in the figures below are absolutely zeros and positive. The standard deviation values are approximately zeros, indicating no dispersion around its mean values. The skewness statistics values of -.09 and -.83 are close to zero, showing absence of skewness and a normality distributed series. The J-B statistics values (1940.07; 400.07) are very high and significant at the conventional statistical level based on the associated p-value of 0.000. This suggests that the residual was normally distributed and stable. Given all the statistics, the table suggests that the PMG models are stable and indicate normal distribution.

Table 9: Summary of Residual Normality Tests for Models I and II

Normality tests ARDL (1,1,1,1,1,1) Models						
Model	Mean	Mean Std. Dev.	Skewness	Kurtosis	J-B Stat.	Prob.
Model I	.000	.000	-.09	22.05	1940.07	.000**

M	.0	.	-.83	11.7	400.	.0
odel II	00	003	9	07	0**	

** indicates significance at .05

Source: Author's Computation, 2023

The interaction of external debt and inflation rate was a great defining indicator of level of economic development in West Africa. At alpha value of 0.05, the combined effect of inflation and external debt in Model I and II are negative and statistically significant $[(\beta = -.31, \alpha = .00);(\beta = -.04, \alpha = .00)]$. This means that if West Africa economy will develop, government must curb the external debt and control inflation to the minimum level.

5.0. Conclusion

This study investigated the influence of interactive effects of external debt and inflation rate on economic development in West Africa. Economic development in the sub-region was proxies by per capita income and human development index across two models built for the purpose of investigating these influences and effects. Results showed that the interactive effects of external debt and inflation rate have significant impacts on economic development in the sub-region.

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APPENDIXES

DATA ON EXTERNAL DEBT, EXTERNAL DEBT SERVICE, INFLATION, INTEREST RATE, EXCHANGE RATE, HDI AND PCI FOR THE 10 SAMPLED COUNTRIES IN WEST AFRICA

EXTERNAL DEBT SERVICE (US $)

YEAR	BENIN	BURKINA FASO	COTE D'IVOIRE	THE GAMBIA	GHANA	MALI	NIGER	NIGERIA	SENEGAL	SIERRA LEONE
1980	20185.3	22162.35	1407089.82	4132.47	159050.87	16367.83	141138.53	1150777.02	259407.28	75829.84
1981	22612.8	19636.62	1532770.66	6843.59	118545.46	20794.89	173079.44	1790645.5	182827.15	75951.28
1982	25060.33	19773.18	1539807.67	16904.08	111044.62	19526.33	245125	2090338.33	123404.76	41029.32
1983	32956.14	18049.22	1267481.17	13928.04	145234.16	20279.08	143897.27	2565375.21	116424.14	33735.51
1984	47382.24	21628.08	1138813.92	12862.82	132870.05	30859.65	94141.44	4067491.74	161476.99	44234.13
1985	49150.91	29459.1	1114214.28	8962.9	159395.84	53094.8	107449.74	4428665.43	189459.59	23817.01
1986	61897.66	36784.11	1320858.22	31106.12	227935.86	61679.63	128803.51	2050752.9	299649.03	60588.56
1987	40798.95	36125.96	1368252.92	25485	415014.37	69485.16	161341.79	1106408.45	387010.38	16422.61
1988	28301.88	42713.34	1074868.57	22931.84	545659.71	78196.83	169006.9	2210430.89	388492.78	18498.28
1989	25903.06	38551.43	1076042.01	23776.41	453880.56	69588.35	122262	2117492.33	381120.66	7456.51
1990	37098.97	34300.37	1261898.08	37730.51	368040.25	67830.21	98701.97	3335551.06	324151.06	21281.87
1991	30256.24	46388.86	1279557.14	30887.57	301432.62	45321.88	107175.76	2944761.13	313221.23	15383.47
1992	27534.42	33430.34	1159597.61	29654.86	319047.13	58484.06	53162.1	2414572.77	209388.34	34670.34
1993	31599.97	37969.38	1093853.44	27976.46	308194.89	78721.22	89739.67	1490998.01	126707.38	31304.4
1994	39640.89	43584.71	1244180.89	31115.45	368905.57	88198.82	66146.35	1871673.35	234248.21	158946.11
1995	48077.77	48444.53	1046130.17	28053.04	405865.16	86761.48	55814.58	1832902.39	282887.16	82929.3
1996	43897	48535.93	1374690.28	27975.88	482544.86	116433.88	56414.58	2228632.52	292541.02	65693.39
1997	52000.18	51432.49	1166663.53	26651.98	559036.28	84852.35	64266.29	1415894.56	251122.22	15682.51
1998	58980.81	54157.94	1383485.22	25743.61	582311.79	82019	62020.09	1331987.64	323458.2	25598.73
1999	69763.79	64955.74	1451114.59	21374.59	526160.04	106550.96	31942.39	1072056.3	240890.36	30567.57
2000	76105.92	47481.19	1022458.71	21845.05	467600.9	93739.08	26562.84	1854815.17	225683.54	47697.61
2001	47795.96	38370.32	619331.61	14507.5	312287.32	80313.97	28876.62	2524310.18	213257.12	96305.78
2002	57223.62	44451.44	830946.01	15038.36	222097.58	81462.79	26438.48	1476875.9	221526.62	15704.76

2003	50367.55	47162.21	570907.06	20507.08	502193.61	76095.36	37992.77	1631346.32	244332.79	18854.53
2004	41076.68	52801.76	391871.48	37653.46	277254.09	98166.19	40202.05	1710306.19	341452.09	22160.65
2005	48441.19	46365.49	307109.44	28608.7	340493.09	99123.23	40492.78	8807112.72	203538.58	18355.67
2006	42023.7	45474.02	270053.01	30209.63	289000.35	84369.34	169673.01	6710132.52	186358.4	24672.29
2007	36772.44	115878.77	431263.47	33965.7	234871.04	63694.01	30596.6	1010500.55	190168.05	10673.18
2008	30136.09	203546.34	1048013.37	17023.35	231063.66	69119.09	28972.26	686065.47	181223.57	5911.05
2009	47678.94	311442.01	1133085.4	19498.6	258586.04	68491.13	37497.8	757174.39	197408.86	7945.16
2010	43826.23	442793.61	751408.11	25124.67	320403.89	68949.76	25679.2	1256894.68	186364.04	11614.04
2011	50212087	614217747.3	730991382.3	26737252.5	352337004.7	70426908.8	32825238.5	525160678.4	346431301.7	18666727.3
2012	58958.36	800565.64	721335.89	26274.15	505601.03	60354.1	41340.4	1337352.02	394429.53	20766.53
2013	84040.92	1026861.73	1049782.22	30456.05	704109.08	110595.45	73897.25	495418.49	504467.12	27440.49
2014	79195.42	1254419.05	1009370.88	47926.53	807071.01	108983.14	114153.58	4545796.4	361046.44	35217.18
2015	78183.41	1607980.48	809279.47	40111.33	1054144.1	113636.04	87943.8	1601889.31	1000889.31	51868.18
2016	98641.58	1235351.5	1566964.73	40574.12	1686799.41	132849.39	111524.75	2491673.04	420800.4	37506.5
2017	104064.43	1582534.34	2248507.54	39638.73	2085874.25	163312.31	133200.94	3530080.53	614185.2	57422.22
2018	231423.5	2999515.69	1654523.78	44492.14	2706629.73	183749.93	124848.68	5368395.56	859858.44	61244.65
2019	515280.29	2314763.4	3002566.07	43483.62	2555547.98	213413.75	141354.11	5130899.27	1377879.81	74357.21
2020	240667.55	2166761.44	2453462.69	34140.17	2744754.26	254240.19	195791.77	5542754.3	1783883.39	96914.97

Source: World Development Indicator (WDI) and IMF International Financial Statistics

EXTERNAL DEBT (US $)

YEAR	BENIN	BURKINA FASO	COTE D'IVOIRE	THE GAMBIA	GHANA	MALI	NIGER	NIGERIA	SENEGAL	SIERRA LEONE
1980	474871.02	330416.66	7462430.66	136794.65	1398364.95	727065.95	865702.26	8938210.28	1473265.67	484856.46
1981	543224.06	328156.61	8140846.17	176028.51	1538834.5	830271.15	1024767.76	11445499.56	1670746.38	603585.82
1982	758283.07	351832.58	8961395.04	207092.7	1484226.95	875182.6	960416.77	11992466.65	1859912.16	648424.26
1983	798438.97	397717.11	8858429.06	211728.67	1666180.36	988418.28	972233.74	17576996.15	2072975.34	648742.64
1984	762600.51	409962.57	8545882.46	230291.92	1963074.3	1237315.02	978440.33	17783310.91	2197164.47	620429.06
1985	902878.84	511100.96	9658933.26	245076.85	2256468.11	1456134.36	1223458.49	18665375.06	2559359.02	712222.5
1986	1038615.91	639696.85	11449812.39	270132.61	2766891.48	1743115.16	1443389.3	22215781.65	3230709.27	872673.74
1987	1244496.82	827502.13	13577082.33	326670.31	3313222.74	2049076.48	1651886.7	29024891.23	4036586.05	1036088.19
1988	1170205.81	845249.6	13342278.91	325153.97	3131102.82	2019888.08	1700418.78	29624118.54	3893072.27	1036485.43
1989	1070152.45	717259.8	14820639.27	337733.39	3402456.46	2127515.9	1528025.99	30121991.49	3278516.02	1089991.4
1990	1110830.14	833673.42	17251135.16	369107.81	3880932.79	2467995.9	1757574.15	33458483.42	3750339.03	1196563.74
1991	1149708	967441.45	18174034.18	383161.88	4380166.48	2599264.27	1526204.77	33526931.29	3589290.72	1271189.26
1992	1198996.39	1039802.41	18546521.96	403393.64	4508061.7	2900472.55	1548857.82	29018663.73	3684277.26	1390152.94
1993	1270610.52	1118907.23	19070886.31	425974.58	4886542.11	2903213.19	1574772.62	30699263.75	3843451.73	1556470.57
1994	1382104.4	1135033.98	17395169.46	422977.25	5469152.46	2694518.43	1542542.79	33092276.82	3697792.45	1557983.21
1995	1396447.48	1274258.08	18898425.49	426068.75	5935777.12	2958170.81	1603602.19	34094439.06	3915938.3	1249606.74
1996	1377472.57	1301463.55	19523620.34	451989.84	6442990.35	3006602.91	1554793.03	31414754.64	3786088.62	1241837.54
1997	1411114.79	1307801.53	15608687.76	424645.55	6347327.63	3152281.17	1588957.27	28467535.6	3805574.68	1200047.5
1998	1445070.72	1470373.38	14851815.13	459520.62	6969089.36	3204813	1686927.57	30313714.71	4096776.59	1314139.19
1999	1498651.6	1608245.53	13221902.54	471742.64	7103705.18	3217973.12	1716840.77	29095550.94	4000850	1319225.62
2000	1408369.54	1446330.17	12059905.38	490135.71	6743341.66	2981177.57	1721127.52	33514256.08	3653475.93	1248363.71
2001	1478686.37	1516006.6	11620368.63	494508.6	6860995.88	2878077.84	1633337.03	33749025.76	3700965.27	1256749.34
2002	1617365.36	1564526.41	11708673.98	583775.77	7640294.83	2774307.28	1847978.01	35984951.35	4118750.35	1408416.91
2003	1483862.66	1757847.85	11680518.56	643381.44	8301000.84	3058861.29	2149675.77	41114859.87	4397912.29	1575774.38
2004	1618065.35	1944506.31	13178855.34	679691.27	7239727.09	3272986.41	1975337.92	44559883.69	3940274.9	1683344.08
2005	1557801.17	2011339.01	12010684.93	661743.79	7334787.21	3179661.84	1961937.15	29099132.31	3861745.16	1804606.61
2006	660190.32	1142927.9	13644008.87	709322.15	3699920.2	1588624.98	760592.82	12961870.58	1936520.87	1528631.48
2007	902675.89	1965861.23	14385487.8	690822.19	4298139.56	1834626.84	1090578.8	15488724.68	2585777.65	551066.96

2008	998180.2	2669318.92	12967578.6	391072.72	4718475.86	2039671.53	948320.31	16472696.89	2850930.59	633810.3
2009	1325336.57	3715932.44	14895852.33	530648.68	6610060.99	2194580.11	1248816.31	19285647.64	3720886.24	856852.31
2010	1596498.35	4799877.86	11703427.49	543241.41	8365239.76	2438634.7	1533781.92	18821584.01	4649791.2	931127.14
2011	1864410.78	5973120.09	12791036.14	514878	10411713.58	2907439.38	2213013.66	21003387.15	5804988.08	1050427.53
2012	1673174.37	7434757.34	9543206.49	560750.28	11992642.18	3070313.14	1783792.45	21466867.54	7108292.99	1335279.66
2013	1997570.05	8941849.03	9855297.63	575616.79	16115216.92	3483872.89	1982335.4	24482374.42	8180882.07	1399720.82
2014	2041339.87	10298023.83	9805804.58	552083.64	17838883.64	3521672.82	2002738.49	28628765.48	10761477.26	1433230.47
2015	2170545.28	12597759.9	11387731.27	578743.12	20079743.6	3747044.96	2228591.63	32413459.87	10478611.83	1558269.9
2016	2258154.53	10248405.38	11457186.65	561305.28	21323164.66	3847760.14	2524960.39	35717779.49	11466164.92	1627146.24
2017	2798768.71	12768155.92	13449134.23	694915.49	22519494.7	4326265.94	3049843.66	45780013.17	14246124.89	1752872.46
2018	3589620.96	10621434.78	16197579.1	723438.4	23575181.47	4604206.21	3190601.43	54202577.78	18981750.74	1757230.85
2019	3919943.01	9156789.2	19831484.54	801622.57	27081567.33	5009198.01	3598296.83	60041046.4	19243016.3	1855825.34
2020	5304192.1	9757079	25107042.09	919067.26	31871093.08	5833911.28	4567383.18	70524292.16	23286424.55	2109218.66

Source: International Debt Statistics, World Bank's Debtor Reporting System (DRS)

EXCHANGE RATE

YEAR	BENIN	BURKINA FASO	COTE D'IVOIRE	THE GAMBIA	GHANA	MALI	NIGER	NIGERIA	SENEGAL	SIERRA LEONE
1980	211.28	211.28	211.28	1.72	0	211.28	211.28	0.55	211.28	1.05
1981	271.23	271.23	271.73	1.99	0	271.73	271.73	0.62	271.73	1.16
1982	328.61	328.61	328.61	2.29	0	328.61	328.61	0.67	328.61	1.24
1983	381.07	381.07	381.07	2.64	0	381.07	381.07	0.72	381.07	1.89
1984	436.96	436.96	436.96	3.58	0	436.96	436.96	0.77	436.96	2.51
1985	449.26	449.26	449.26	3.89	0.01	449.26	449.26	0.89	449.26	5.09
1986	346.31	346.31	346.31	6.92	0.01	346.31	346.31	1.75	346.31	16.09
1987	300.54	300.54	300.54	7.07	0.02	300.54	300.54	4.02	300.54	34.04
1988	297.85	297.85	297.85	6.71	0.02	297.85	297.85	4.54	297.85	32.51
1989	319.01	319.01	319.01	7.55	0.03	319.01	319.01	7.36	319.01	59.81
1990	272.26	272.26	272.26	7.88	0.03	272.26	272.26	8.04	272.26	151.45
1991	282.11	282.11	282.11	8.73	0.04	282.11	282.11	9.91	282.11	295.34
1992	264.69	264.69	264.69	8.09	0.04	264.69	264.69	17.3	264.69	499.44
1993	283.16	283.16	283.16	9.11	0.06	283.16	283.16	22.07	283.16	567.46
1994	555.2	555.2	555.2	9.58	0.1	555.2	555.2	22	555.2	586.74
1995	499.15	499.15	499.15	9.54	0.12	499.15	499.15	21.9	499.15	755.24
1996	511.55	511.55	511.55	9.8	0.16	511.55	511.55	21.88	511.55	920.73
1997	583.67	583.67	583.67	10.2	0.2	583.67	583.67	21.89	583.67	981.48
1998	589.95	589.95	589.95	10.64	0.23	589.95	589.95	21.89	589.95	1563.62
1999	615.47	615.47	615.47	11.4	0.27	615.47	615.47	92.34	615.47	1804.19
2000	710.21	710.21	710.21	12.79	0.54	710.21	710.21	101.7	710.21	2092.13
2001	732.4	732.4	732.4	15.69	0.72	732.4	732.4	111.23	732.4	1986.15
2002	693.71	693.71	693.71	19.92	0.79	693.71	693.71	120.58	693.71	2099.03
2003	579.9	579.9	579.9	28.53	0.87	579.9	579.9	129.22	579.9	2347.94
2004	527.34	527.34	527.34	30.03	0.9	527.34	527.34	132.89	527.34	2701.3
2005	527.26	527.26	527.26	28.58	0.91	527.26	527.26	131.27	527.26	2889.59
2006	522.43	522.43	522.43	28.07	0.92	522.43	522.43	128.65	522.43	2961.91
2007	478.63	478.63	478.63	24.87	0.93	478.63	478.63	125.81	478.63	2985.19

2008	446	446	446	22.19	1.05	446	446	118.57	446	2981.51
2009	470.29	470.29	470.29	26.64	1.4	470.29	470.29	148.88	470.29	3385.65
2010	494.79	494.79	494.79	28.01	1.43	494.79	494.79	150.3	494.79	3978.09
2011	471.25	471.25	471.25	29.46	1.52	471.25	471.25	153.86	471.25	4349.16
2012	510.56	510.56	510.56	32.08	1.82	510.56	510.56	157.5	510.56	4344.04
2013	493.9	493.9	493.9	35.96	1.98	493.9	493.9	157.31	493.9	4332.5
2014	493.76	493.76	493.76	41.73	2.9	493.76	493.76	158.55	493.76	4524.16
2015	591.21	591.21	591.21	42.51	3.71	591.21	591.21	192.44	591.21	5080.75
2016	592.61	592.61	592.61	43.37	3.91	592.61	592.61	253.49	592.61	6290.3
2017	580.66	580.66	580.66	46.61	4.35	580.66	580.66	305.79	580.66	7384.43
2018	555.45	555.45	555.45	48.15	4.59	555.45	555.45	306.08	555.45	7931.63
2019	585.95	585.91	585.91	50.06	5.22	585.91	585.91	306.92	585.91	9010.22
2020	574.29	575.59	575.59	51.5	5.6	575.59	575.59	358.81	575.59	9829.93

Source: World Development Indicator (WDI)

PER CAPITA INCOME (US $)

YEAR	BENIN	BURKINA FASO	COTE D'IVOIRE	THE GAMBIA	GHANA	MALI	NIGER	NIGERIA	SENEGAL	SIERRA LEONE
1980	370	290	1120	340	390	240	390	760	820	370
1981	400	290	1100	340	380	230	380	980	820	360
1982	350	280	940	300	330	190	340	1260	750	360
1983	280	230	710	270	290	170	280	1460	590	300
1984	260	200	650	250	320	160	210	1130	550	300
1985	250	200	630	260	330	180	210	970	550	240
1986	260	230	730	270	370	200	240	790	640	180
1987	300	260	820	290	400	230	260	710	820	180
1988	350	310	920	280	410	280	310	680	950	180
1989	330	320	830	280	380	280	310	550	940	210
1990	360	320	780	280	380	270	320	560	920	190
1991	370	340	750	360	400	310	350	510	930	170
1992	360	360	780	480	420	310	410	510	980	130
1993	370	350	750	650	400	310	370	360	940	160
1994	320	270	680	630	360	270	290	310	770	160
1995	350	250	690	630	360	260	260	310	740	180
1996	340	240	540	640	370	260	230	380	710	200
1997	370	250	660	630	380	270	230	440	710	190
1998	370	240	740	600	380	270	240	440	700	170
1999	410	260	720	590	390	280	230	450	690	150
2000	470	260	640	270	330	280	220	460	670	140
2001	520	270	580	510	290	290	220	530	660	150
2002	520	260	560	410	270	280	220	630	630	200
2003	590	310	610	370	310	340	240	700	730	260
2004	720	370	750	430	370	390	280	860	880	270
2005	810	440	900	480	450	450	330	1020	1000	290
2006	840	470	900	600	580	480	350	1330	1040	300
2007	900	490	930	650	770	520	380	1600	1110	370

2008	1010	550	1060	750	1110	590	440	1950	1260	420
2009	1060	590	1150	810	1150	640	470	2030	1340	440
2010	1050	630	1190	820	1200	670	510	2130	1350	420
2011	1060	660	1080	700	1340	710	520	2180	1320	420
2012	1090	710	1220	700	1480	710	540	2450	1330	530
2013	1180	550	1320	670	1780	750	570	2700	1360	650
2014	1230	740	1990	600	1820	780	580	2970	1390	680
2015	1140	680	2010	580	1870	770	550	2850	1330	540
2016	1070	660	2010	580	1750	750	520	2440	1300	480
2017	1050	650	2000	610	1820	730	510	2070	1300	500
2018	1150	730	2140	670	2050	800	570	1980	1420	470
2019	1200	750	2260	700	2150	820	590	2050	1460	520
2020	1230	750	2240	700	2230	790	550	2020	1460	490

Source: World Development Indicator (WDI)

CONSUMER PRICE INDEX (CPI) (%)

YEAR	BENIN	BURKINA FASO	COTE D'IVOIRE	THE GAMBIA	GHANA	MALI	NIGER	NIGERIA	SENEGAL	SIERRA LEONE
1980	-	12.2	14.7	6.8	50.1	-	10.3	10	8.7	12.9
1981	-	7.6	8.8	5.9	116.5	-	22.9	20.8	5.9	23.4
1982	-	12.1	7.6	10.9	22.3	-	11.6	7.7	17.4	26.9
1983	-	8.2	5.6	10.6	122.9	-	-2.5	23.2	11.6	68.5
1984	-	4.8	4.3	22.1	39.7	-	8.4	17.8	11.8	66.6
1985	-	6.9	1.9	18.3	10.3	-	-0.9	7.4	13	76.6
1986	-	-2.6	9.7	56.6	24.6	-	-3.2	5.7	6.2	80.9
1987	-	-2.7	6.9	23.5	39.8	-	-6.7	11.3	-4.1	178.7
1988	-	4.3	6.9	11.7	31.4	-	-1.4	54.5	-1.8	34.3
1989	-	-0.5	1	8.3	25.2	-0.1	-2.8	50.5	0.4	60.8
1990	-	-0.5	-0.8	12.2	37.3	0.6	-0.8	7.4	0.3	110.9
1991	-	2.2	1.7	8.6	18	1.8	-7.8	13	-1.8	102.7
1992	1	-2	4.2	9.5	10.1	-6.2	-4.5	44.6	-0.1	65.5
1993	0.4	0.6	2.2	6.5	25	-0.3	-1.2	57.2	-0.6	22.2
1994	38.5	25.2	26.1	1.7	24.9	23.2	36	57	32.3	24.2
1995	14.5	7.5	14.3	7	59.5	13.4	10.6	72.8	7.9	26
1996	4.9	6.1	2.5	1.1	46.6	6.8	5.3	29.3	2.8	23.1
1997	3.5	2.3	4	2.8	27.9	-0.4	2.9	8.5	1.8	14.9
1998	5.8	5.1	4.6	1.1	14.6	4	4.5	10	1.2	35.5
1999	0.3	-1.1	0.7	3.8	4.9	-1.2	-2.3	6.6	0.8	34.1
2000	4.2	-0.3	2.5	0.8	40.2	-0.7	2.9	6.9	0.7	-0.8
2001	4	5	4.4	4.5	41.5	5.2	4	18.9	3	2.1
2002	2.5	2.2	3.1	8.6	9.4	5	2.6	12.9	2.3	-3.3
2003	1.5	2	3.3	17	29.8	-1.3	-1.6	14	-0.1	7.6
2004	0.9	-0.4	1.5	14.2	18	-3.1	0.3	15	0.5	14.2
2005	5.4	6.4	3.9	4.8	15.4	6.4	7.8	17.9	1.7	12.1
2006	3.8	2.3	2.5	2.1	11.7	1.5	0	8.2	2.1	9.5
2007	1.3	-0.2	1.9	5.4	10.7	1.4	0.1	5.4	5.9	11.6
2008	7.9	10.7	6.3	4.4	16.5	9.2	11.3	11.6	7.3	8.2

2009	0.9	2.6	1	4.6	19.2	2.5	0.6	12.6	-2.2	7.5
2010	2.2	-0.8	1.2	5	10.7	1.1	0.8	13.7	1.2	7.2
2011	2.7	2.8	4.9	4.8	8.7	3	2.9	10.8	3.4	6.8
2012	6.7	3.8	1.3	4.3	11.2	5.3	0.5	12.2	1.4	6.6
2013	0.4	0.5	2.6	5.7	11.7	-0.6	2.3	8.5	0.7	5.5
2014	-0.5	-0.3	0.4	5.9	15.5	0.9	-0.9	8.1	-1.1	4.6
2015	0.2	0.7	1.3	6.8	17.1	1.5	-0.6	9	0.1	6.7
2016	-0.8	0.4	0.7	7.2	17.5	-1.8	1.7	15.7	0.8	10.9
2017	1.8	1.5	0.7	8	12.4	1.8	2.8	16.5	1.3	18.2
2018	0.6	2	0.4	6.5	7.8	0.3	3	12.1	0.5	16
2019	-0.7	-3.2	-1.1	7.1	7.1	1.7	-2.5	11.4	1.8	14.8
2020	3	1.9	2.4	5.9	9.9	0.4	2.9	13.2	2.5	13.4

Source: World Development Indicator of World Bank

HUMAN DEVELOPMENT INDEX (HDI)

YEAR	BENIN	BURKINA FASO	COTE D'IVOIRE	THE GAMBIA	GHANA	MALI	NIGER	NIGERIA	SENEGAL	SIERRA LEONE
1980	-									
1981	-	-	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-	-	-
1987	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-
1990	0.359	-	0.427	0.343	0.46	0.237	0.216	-	0.373	0.312
1991	0.364	-	0.428	0.35	0.466	0.245	0.218	-	0.374	0.305
1992	0.369	-	0.43	0.357	0.47	0.249	0.222	-	0.375	0.305
1993	0.375	-	0.433	0.363	0.475	0.257	0.227	-	0.374	0.312
1994	0.38	-	0.436	0.369	0.477	0.264	0.232	-	0.374	0.312
1995	0.386	-	0.442	0.376	0.483	0.27	0.238	-	0.375	0.314
1996	0.391	-	0.448	0.382	0.487	0.277	0.243	-	0.376	0.312
1997	0.397	-	0.456	0.385	0.492	0.289	0.248	-	0.377	0.307
1998	0.402	-	0.461	0.392	0.497	0.299	0.256	-	0.379	0.305
1999	0.409	0.293	0.459	0.398	0.502	0.311	0.259	-	0.382	0.301
2000	0.416	0.296	0.457	0.404	0.507	0.317	0.262	-	0.388	0.318
2001	0.428	0.299	0.456	0.41	0.505	0.329	0.268	-	0.394	0.331
2002	0.436	0.303	0.454	0.412	0.512	0.338	0.274	-	0.398	0.347
2003	0.443	0.31	0.453	0.419	0.515	0.35	0.278	0.45	0.405	0.357
2004	0.45	0.32	0.455	0.428	0.521	0.357	0.289	0.462	0.412	0.361
2005	0.457	0.331	0.456	0.431	0.533	0.366	0.298	0.469	0.419	0.372
2006	0.464	0.339	0.478	0.436	0.54	0.375	0.306	0.477	0.427	0.382
2007	0.472	0.334	0.461	0.442	0.55	0.382	0.311	0.48	0.439	0.397

2008	0.48	0.349	0.464	0.45	0.561	0.39	0.32	0.484	0.451	0.409
2009	0.486	0.36	0.469	0.455	0.566	0.397	0.327	0.484	0.459	0.42
2010	0.492	0.372	0.473	0.46	0.574	0.404	0.338	0.482	0.468	0.427
2011	0.499	0.384	0.472	0.46	0.585	0.409	0.346	0.492	0.482	0.433
2012	0.509	0.395	0.477	0.467	0.592	0.407	0.354	0.499	0.49	0.447
2013	0.52	0.402	0.483	0.471	0.6	0.407	0.362	0.506	0.496	0.459
2014	0.524	0.408	0.502	0.473	0.6	0.415	0.37	0.512	0.502	0.461
2015	0.529	0.418	0.513	0.478	0.607	0.416	0.376	0.516	0.505	0.453
2016	0.53	0.427	0.524	0.484	0.611	0.421	0.383	0.521	0.507	0.457
2017	0.53	0.438	0.534	0.489	0.616	0.426	0.39	0.526	0.509	0.466
2018	0.53	0.449	0.542	0.495	0.62	0.43	0.399	0.531	0.512	0.47
2019	0.53	0.452	0.55	0.503	0.631	0.433	0.406	0.538	0.513	0.48
2020	0.524	0.449	0.551	0.501	0.632	0.427	0.401	0.535	0.513	0.475

Source: Human Development Report of UNDP

INTEREST RATE (%)

YEAR	BENIN	BURKINA FASO	COTE D'IVOIRE	THE GAMBIA	GHANA	MALI	NIGER	NIGERIA	SENEGAL	SIERRA LEONE
1980	-	-	-	-	-21.26	-	-	-3.55	-	18.1
1981	-	-	-	-	-32.23	-	-	-65.86	-	5.8
1982	-	-	-	-	-6.95	-	-	-4.59	-	-2.95
1983	-	-	-	-	-46.65	-	-	-8.02	-	-1.83
1984	-	-	-	-	-10.45	-	-	4.34	-	-15.57
1985	-	-	-	-	0.43	-	-	1.59	-	2.34
1986	-	-	-	-8.91	-15.32	-	-	4.31	-	-34.35
1987	-	-	-	7.95	-9.84	-	-	-4.77	-	-51.62
1988	-	-	-	18.08	-5.86	-	-	-2.96	-	-22.09
1989	-	-	-	11.51	-	-	-	-6.61	-	-19.71
1990	-	-	-	12.98	-	-	-	17.47	-	-10.61
1991	-	-	-	-45.9	-	-	-	1	-	-31.7
1992	-	-	-	24.3	-	-	-	-15	-	-10.5
1993	-	-	-	19.9	-	-	-	-7.1	-	18.7
1994	-	-	-	20.5	-	-	-	-15.9	-	1.8
1995	-	-	-	20.3	-	-	-	-31.5	-	-3.6
1996	-	-	-	15.8	-	-	-	-5.3	-	2
1997	-	-	-	33.5	-	-	-	12.1	-	21.1
1998	-	-	-	18.9	-	-	-	11.5	-	0
1999	-	-	-	27.1	-	-	-	6	-	8.2
2000	-	-	-	21.3	-	-	-	-1.1	-	22.2
2001	-	-	-	21.8	-	-	-	12.1	-	-28.5
2002	-	-	-	12.3	-	-	-	3	-	27.1
2003	-	-	-	14.6	-	-	-	9.9	-	6.1
2004	-	-	-	-29.7	-	-	-	-2.6	-	8.2
2005	3.6	4.9	5.8	29.6	-	1.1	2	-1.6	2.2	6.8
2006	2.6	5.4	3.3	28.1	-	0.1	3.2	-5.6	1.8	10.4
2007	4.3	2.2	1.6	22.5	-	0.2	-2.1	9.2	-1.7	17

2008	-1.4	-3.8	-0.4	23.9	-	-2.1	-4.7	6.7	-3	13.2
2009	2.4	2.5	3.7	21.5	-	0.3	0.8	18.2	6.8	13.3
2010	4.2	1.3	3.5	20.2	-	0.7	1.6	1.1	3.5	3.5
2011	1.5	-1.4	-0.4	22.4	-	-6.2	1.2	5.7	1.3	3.1
2012	-2.5	-0.7	5.5	23.3	-	0.4	-0.3	6.2	1.7	8
2013	3.8	7.6	2.3	20.8	-	4.6	5.7	11.2	4.1	12.8
2014	5.6	6	0.9	22.1	-	4	5.8	11.4	7	17.3
2015	4.3	7.5	0.4	-	-	2.2	2.8	13.6	4	-0.1
2016	4.6	2.6	7.5	-	-	3.9	3.4	6.7	4.3	14.2
2017	7.3	5	6.2	24.1	-	3.1	4.8	5.8	4.5	1.4
2018	6.1	5.6	-	19.7	-	-	-	6.1	-	1.7
2019	7.1	5	-	20.5	-	-	-	4.5	-	9.5
2020	3.6	-0.3	-	25.3	-	-	-	5.4	-	6.3

Source: World Development Indicator (WDI)

Panel Pedroni Residual Cointegration Test in Model I

Alternative hypothesis: common AR coefs. (within-dimension)					
				Weighted	
		Statistic	Prob.	Statistic	Prob.
Panel v-Statistic		1.381294	0.0836	-2.474883	0.9933
Panel rho-Statistic		2.851862	0.9978	3.570778	0.9998
Panel PP-Statistic		-1.916169	0.0277	-3.705518	0.0001
Panel ADF-Statistic		-1.778354	0.0377	-1.572369	0.0579
Alternative hypothesis: individual AR coefs. (between-dimension)					
		Statistic	Prob.		
Group rho-Statistic		4.711825	1.0000		
Group PP-Statistic		-5.508275	0.0000		
Group ADF-Statistic		-0.992225	0.1605		
Cross section specific results					
Phillips-Peron results (non-parametric)					
Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
NIG	-0.016	6898.392	7103.897	1.00	17
GHA		Dropped from Test			
COT	-0.260	9092.998	9523.626	2.00	12
BEN	-0.216	652.2356	90.18533	10.00	15
BUR	-0.233	1294.117	137.0048	10.00	15
SEN		Dropped from Test			
SIE	-0.211	508.7560	109.9363	6.00	13
GAM	0.285	6243.563	6243.563	0.00	24
MAL	0.001	626.2364	474.3049	4.00	12
NIR	-0.102	255.2801	164.8300	3.00	12
Augmented Dickey-Fuller results (parametric)					
Cross ID	AR(1)	Variance	Lag	Max lag	Obs
NIG	-0.016	6898.392	0	1	17
GHA		Dropped from Test			
COT	-0.260	9092.998	0	0	12
BEN	-0.216	652.2356	0	1	15
BUR	-0.911	976.9492	1	1	14
SEN		Dropped from Test			

SIE	-0.211	508.7560	0	1	13
GAM	0.285	6243.563	0	3	24
MAL	0.001	626.2364	0	0	12
NIR	-0.102	255.2801	0	0	12

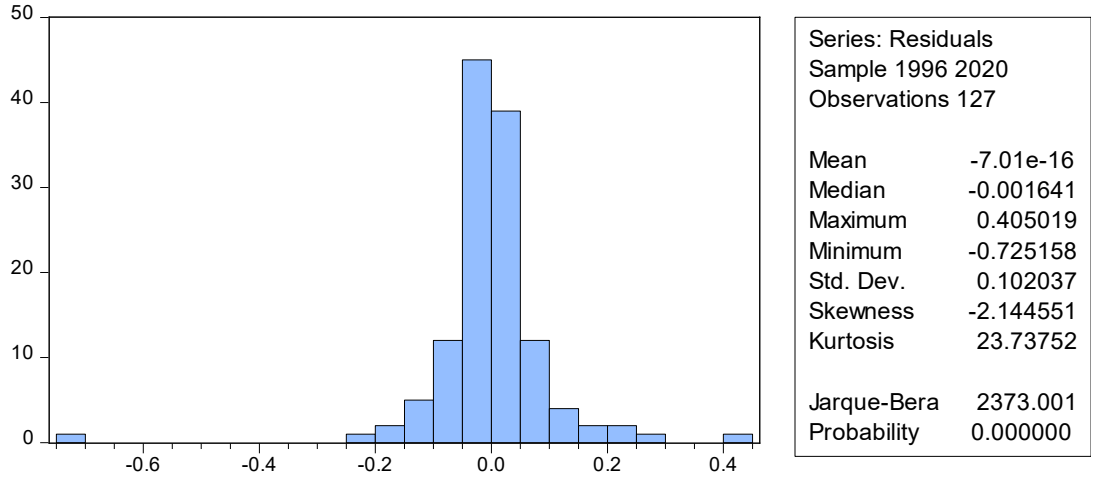
Pedroni Residual Cointegration Test in Model II

Alternative hypothesis: common AR coefs. (within-dimension)					
				Weighted	
		Statistic	Prob.	Statistic	Prob.
Panel v-Statistic		1.830260	0.0336	-0.619811	0.7323
Panel rho-Statistic		1.841170	0.9672	2.534903	0.9944
Panel PP-Statistic		-2.278927	0.0113	-3.162348	0.0008
Panel ADF-Statistic		-0.564000	0.2864	-1.245583	0.0165
Alternative hypothesis: individual AR coefs. (between-dimension)					
		Statistic	Prob.		
Group rho-Statistic		3.776559	0.9999		
Group PP-Statistic		-5.472373	0.0000		
Group ADF-Statistic		-0.855971	0.1960		
Cross section specific results					
Phillips-Peron results (non-parametric)					
Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
NIG	0.451	0.005802	0.006010	1.00	24
GHA		Dropped from Test			
COT	-0.209	0.005475	0.003428	3.00	12
BEN	-0.138	0.000873	0.000885	1.00	15
BUR	-0.441	0.003072	0.000314	8.00	15
SEN		Dropped from Test			
SIE	-0.078	0.004182	0.001284	4.00	13
GAM	0.174	0.031641	0.029548	1.00	24
MAL	-0.027	0.001525	0.001170	3.00	12
NIR	-0.072	0.003077	0.003063	1.00	12
Augmented Dickey-Fuller results (parametric)					
Cross ID	AR(1)	Variance	Lag	Max lag	Obs

NIG	0.451	0.005802	0	4	24
GHA		Dropped from Test			
COT	-0.209	0.005475	0	1	12
BEN	-0.138	0.000873	0	1	15
BUR	-1.183	0.002235	1	1	14
SEN		Dropped from Test			
SIE	-0.078	0.004182	0	1	13
GAM	-0.266	0.026708	3	4	21
MAL	-0.027	0.001525	0	1	12
NIR	-0.072	0.003077	0	1	12

Diagnostic Tests

Normality Test in Model I



Normality Test in Model II