Volume XXIII, Issue 1/2026

Economics and Management

SOUTH-WEST UNIVERSITY "NEOFIT RILSKY"
Faculty of Economics
Blagoevgrad

"ECONOMICS AND MANAGEMENT"
is a scientific journal of the Faculty of Economics at South-West University "Neofit Rilski". It publishes articles on current issues in economics and management at the global, regional and local level.

Founders:
Prof. Raya Madgerova, PhD, Prof. Nadezhda Nikolova, PhD and Prof. Chavdar Nikolov, PhD

♦♦♦ 2005 г. ♦♦♦

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ECONOMICS & MANAGEMENT

JOURNAL FOR ECONOMICS AND MANAGEMENT SCIENCE OF FACULTY OF ECONOMICS – SOUTH-WEST UNIVERSITY "NEOFIT RILSKI"– BLAGOEVGRAD

VOL. XXIII, № 1, 2026

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Each article published in the "Economics & Management" Journal, issued by the Faculty of Economics at the South-West University "Neofit Rilski", after an initial selection by the Editorial board, is subject to a preliminary review by two tenured reviewers who are specialists in the relevant scientific field.

Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: 1, Year: 2026, pp. 1-16
DOI: 10.37708/em.swu.v23i1.1

HUMAN CAPITAL, ECONOMIC GROWTH AND EMPLOYMENT: EMPIRICAL EVIDENCE FROM CENTRAL AND EASTERN EUROPE

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Received: 22.03.2026, Accepted: 06.04.2026

Abstract

The purpose of this article is to examine the impact of human capital systems (science, healthcare, and education) on economic growth and employment in the new Member States of the European Union from Central and Eastern Europe - Bulgaria, Romania, Czech Republic, Poland, Hungary, Slovakia, Slovenia, Croatia, Lithuania, Latvia, and Estonia. The empirical analysis uses regression by the method of least squares and annual data from Eurostat for the period 2013 – 2023. The results of the analysis show that the increase in expenditure on research and development increases the employment rate and the rate of real economic growth in the NMS-11. The increase in the share of the population with tertiary education increases the employment rate but does not affect the economic growth in the NMS-11. The increase in healthcare expenditure slows down the rate of economic growth but does not affect the employment rate in the new EU Member States from CEE.

Keywords: *economic growth; employment; human capital; science; healthcare; education; new Member States of the European Union from Central and Eastern Europe*

JEL Codes: *E24, F43, I23*

Introduction

The impact of human capital formation activities (science, healthcare, and education) on economic growth and employment is a serious problem in economic theory and practice, which concentrates the attention of business, the scientific community, politicians, the

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media, non-governmental organizations, and the whole society. There are many theoretical and empirical studies on this topic, whose results and recommendations vary depending on the methodology, time, and territorial scope.

Collectively, healthcare, tertiary education, and research and development emerge as essential components shaping the employment landscape. Investments in these domains strengthen individual employability, enhance workforce productivity, and drive innovation, leading to broader economic benefits. Policymakers are encouraged to adopt a holistic approach that intertwines these elements to foster robust employment growth and meet the evolving demands of a globalized labour market.

The purpose of this study is to analyse the impact of science, healthcare, and education on the rate of growth of real GDP and the employment rate in the NMS-11. The aim of the study is achieved through the accomplishment of the following tasks:

• Systematization of literary sources on the researched problem (point one);

• Empirical assessment of the impact of science, healthcare, and education on growth and employment in the NMS-11 (point two);

• Formulation of recommended policies for increasing economic growth and employment in the NMS with an emphasis on science, education, and healthcare (conclusion).

The methodology of the study includes regression analysis by the method of least squares and annual data from Eurostat for the NMS-11 in the period 2013 – 2023.

Literature Review

The relationship between healthcare, tertiary education, research and development (R&D), and their collective impact on economic growth and employment in New Member States (NMS-11) can be broadly characterized by a complex interdependence, where each of these sectors not only contributes individually to economic enhancement but also synergizes to bolster overall productivity and workforce participation.

Impact of human capital-forming activities on economic growth

Human capital-forming activities, particularly in healthcare, tertiary education, and research and development (R&D), significantly contribute to economic growth. An extensive body of literature supports the premise that investments in these sectors can profoundly enhance a nation's economic performance.

Healthcare is increasingly recognized as a vital component of human capital that significantly contributes to economic growth. Health expenditure is correlated with improved health outcomes, which enhance workforce productivity and longevity, thereby

fostering economic expansion. Wang (2015) emphasizes that higher health expenditure correlates positively with economic performance across OECD countries, illustrating that improved health outcomes boost productivity and overall economic output. This relationship is further supported by Bedir (2016), who discusses how investments in health can enhance human capital in developing countries, catalysing economic growth through improved health status and productivity. Furthermore, Khan et al. (2015) demonstrate in their analysis of SAARC countries that enhanced healthcare spending is associated with positive economic growth, reinforcing the notion of health investments as integral to human capital development.

Additionally, research by Piabuo and Tieguhong (2017) underscores the theoretical underpinnings of Barro's human capital models, which posit that health expenditure is fundamental for economic development. This is echoed in the findings by Alwago (2023), who highlights the connection between health expenditure, life expectancy, and economic growth in Kenya, asserting that the development of human capital is essential for sustained economic expansion. Wu et al. (2021) further contribute by employing a quantile-on-quantile analysis, revealing that the relationship between healthcare expenditure and economic growth varies across different economic contexts.

Piabuo and Tieguhong (2017) find that health expenditure is fundamental to economic advancement, as it enhances labour productivity by reducing morbidity and mortality rates, which in turn permits greater workforce participation. Studies focusing on the NMS-11 indicate that improving healthcare systems fosters a healthier populace, which is essential for the economic vigour of these economies (Bloom et al., 2001).

Furthermore, Hasyim et al. (2020) emphasize the importance of a coordinated approach to public expenditure in education and health to maximize economic growth potential. Their findings suggest that enhanced health outcomes contribute to better educational attainment, creating a virtuous cycle that further supports economic development. This underscores that while healthcare alone is a significant contributor to growth, its synergistic effect with educational investments is equally critical.

The role of education, particularly tertiary education, is similarly vital for economic growth. The impact of tertiary education on economic growth has been extensively documented, emphasizing its role in enhancing human capital. Dangal's (2022) analysis demonstrates that higher education increases labour market productivity and innovation capabilities, which are indispensable for economic expansion. This aligns with the broader human capital theory, as outlined by scholars like Becker, where education is deemed an investment that enhances productivity and contributes directly to economic outputs (Öztürk, 2008). In their meta-regression analysis, Benos and Zotou (2014) consolidate evidence from various studies indicating that education has a significant positive impact on

economic growth, suggesting that the return on investment in education is widely confirmed across economic contexts.

Moreover, research by Hussaini (2020) emphasizes that increased government expenditure on higher education directly fosters economic growth by enhancing the qualifications and productivity of the labour force. Glewwe et al.(2014), examining Sub-Saharan Africa specifically, reaffirm the critical role of education in economic growth, emphasizing its necessity in creating a skilled workforce that can adapt to economic demands.

The endogenous growth model indicates that educational attainment directly correlates with increased levels of technological innovation, which plays a pivotal role in fostering economic growth (Mariana, 2015). Additionally, Dhrifi et al. (2020) note that improvements in educational outcomes are fundamental for the competitiveness of emerging economies in the NMS-11, as they enhance human capital necessary for sustaining growth.

Research and development also play a pivotal role in enhancing human capital and, subsequently, economic growth. The innovation generated from R&D activities contributes to productivity improvements and can lead to new technologies and processes that advance economic performance. Ramesh (2021) discusses how healthcare management strategies, which integrate R&D findings, can align health improvements with economic growth. Similar studies emphasize that technological advancements resulting from R&D expenditures increase productivity levels, thereby driving economic expansion.

R&D activities are vital for fuelling economic growth through innovation and technological advancements. Research shows that countries that invest in R&D tend to have higher productivity growth, as new technologies stimulate economic activity by enhancing efficiency across various sectors (Beztelesna et al., 2022). This is particularly relevant in the context of NMS-11, where fostering R&D can lead to the commercialization of new solutions and products that can drive economic growth.

Voyvoda and Yeldan (2015) suggest that public policy frameworks that prioritize R&D spending can lead to significant long-term economic benefits, as these investments lay the groundwork for robust and sustainable economic growth. Furthermore, the role of government intervention in promoting R&D activities is pivotal, as public funding can leverage private sector investments and lead to innovative outcomes that impact economic performance positively (Rehman et al., 2020).

In summary, healthcare, tertiary education, and research and development pose significant effects on economic growth through the lens of human capital formation. The empirical and theoretical literature underscores the multifaceted nature of how health investments, educational advancement, and R&D efforts are interlinked with improved

economic performance, validating the necessity of these sectors in policy and economic planning.

Impact of human capital-forming activities on employment

The impact of human capital-forming activities such as healthcare, tertiary education, and research and development (R&D) on employment is a critical area of investigation in the context of economic development. There are various studies that highlight how investments in these domains contribute to improving employability rates, enhancing workforce skills, and facilitating job creation in the NMS-11 countries.

Investment in healthcare is associated with improved employability and job sustainability. Mahajan et al. (2022) discuss how employability skills are crucial in enhancing individual contributions to the labour force, suggesting that better health outcomes can facilitate higher employment levels. The argument rests on the premise that healthier individuals exhibit greater productivity, a vital criterion for employers seeking to enhance workforce efficiency. Furthermore, Gao et al. (2010) highlight that advanced technology relies on a workforce equipped with education, training, and health, indicating that investments in healthcare align with economic needs and improve employment opportunities.

Additionally, the mental health component of healthcare provision can significantly influence employability. Findings from Habicht suggest that psychosocial health impacts perceived employability, indicating that investments in mental health resources could enhance opportunities for individuals re-entering the job market (Habicht, 2023). A focus on both physical and mental health ensures that individuals are not only employed but also equipped and motivated to succeed in their roles.

Healthcare plays a critical role in employment rates, as it directly affects an individual's ability to participate in the labour force. Gao et al. (2010) emphasize that a healthy workforce enhances productivity, which is crucial for businesses requiring skilled labour to adapt to the demands of advanced technology. The connection between health and employment is particularly significant in the NMS-11, where transitioning economies rely on a productive workforce to support economic growth and stability.

Moreover, the psychological aspects of health are equally important. Mahajan et al. (2022) highlight that mental health improvements lead to enhanced employability, as individuals who feel well physically and mentally are more likely to seek and succeed in employment opportunities. The implications for employment policies are profound, as investing in healthcare not only supports individual well-being but also cultivates a more

reliable and capable workforce. This is particularly relevant for the NMS-11, where economic transitions can lead to increased job uncertainties, requiring a stable workforce.

Tertiary education plays a pivotal role in enhancing employability through skill acquisition and competency development. Leshoro's analysis (2014) shows a positive correlation between educational attainment and employment elasticity, indicating that areas with higher levels of education tend to experience greater employment growth. Education provides individuals with technical skills and the soft skills necessary for career advancement.

Clarke (2017) argues for a redefinition of employability, encompassing various forms of capital—human, social, and individual attributes—which enhances the employability landscape. This holistic approach positions education as more than mere skill acquisition; it incorporates broader individual attributes contributing to career success. Such an integrated view allows graduates to navigate the labour market effectively, matching their skills with employer expectations.

The relevance of higher education extends beyond initial job placement; it significantly influences career longevity and advancement. Nimmi et al. (2021) assert that developing employability perceptions is closely tied to lifelong learning opportunities stemming from educational experiences. This lifelong learning approach complements formal education, enabling individuals to adapt to changing employment conditions and maintain relevance in their fields.

Tertiary education is a pivotal human capital investment that significantly influences employability rates. Studies indicate a clear relationship between educational attainment and labour market outcomes. Jackson and Bridgstock (2020) contend that curricular, co-curricular, and extracurricular learning activities within higher education significantly enhance graduate employability. This is vital in the context of NMS-11, where disparities in educational access and quality can lead to variation in employment rates across the region.

Furthermore, Forrier et al. (2015) explore the dynamic nature of perceived employability, which is influenced by educational attributes and the ability to transition between jobs. In understanding employability beyond mere qualifications, this perspective reflects the changing nature of work environments in the NMS-11, where adaptability and continuous learning are increasingly important.

Aliu and Aigbavboa (2020) stress that university-industry collaborations enhance graduate employability, making graduates more appealing to employers by aligning educational outcomes with industry needs. Such collaborations are essential in the NMS-11, where economic structures are evolving, necessitating a workforce adept in relevant skills and knowledge areas.

R&D activities are intrinsically linked to innovation, which drives job creation and transformation across industries. Link and Scott (2013) assert that public subsidies for R&D facilitate employment growth, particularly in entrepreneurial settings where innovation leads to new job opportunities. This notion underscores how government policies can foster an environment conducive to employment through the support of innovative initiatives.

Moreover, the interplay between high-skilled immigration and employment in STEM occupations exemplifies the crucial role of R&D in workforce development. Jaimovich and Siu (2017) illustrate that high-skilled migrants, often engaged in R&D roles, contribute disproportionately to job creation and technological advancement in their host countries. Therefore, fostering a skilled workforce through education and R&D not only meets immediate labour demands but also contributes to long-term economic health.

The dynamic between human capital and employment, particularly through R&D pathways, represents a significant growth opportunity. Mushtaq et al. (2022) emphasize the importance of promoting human capital development in harnessing globalization benefits for employment. By investing in R&D and associated human capital, economies can effectively position themselves to exploit global opportunities while enhancing domestic job growth.

Investments in R&D are instrumental in creating employment opportunities, particularly in sectors reliant on innovation. R&D facilitates new business development and the growth of existing businesses through technological advancements. Link and Scott (2013) assert that public R&D subsidies significantly promote employment growth, particularly in entrepreneurial firms. This assertion is particularly applicable in the NMS-11, where fostering innovation is a key strategy for enhancing economic resilience and creating jobs.

In addition, the global competition landscape underscores the importance of R&D in sustaining employment. As economies in the NMS-11 strive to adapt to global market changes, the innovative capacities fostered through R&D investments contribute to job creation and retention in critical industries. The transition to knowledge-based economies requires a workforce well-equipped with the latest skills, directly linking R&D investments to strategic employment outcomes.

Integrating insights from healthcare, education, and R&D can amplify employment benefits significantly. Studies emphasize that improving health outcomes enables individuals to pursue higher education and engage in lifelong learning, which in turn positions them favourably in the labour market. Moreover, fostering a culture of R&D and linking educational curricula to technological advancements can enhance employability prospects for graduates (Nimmi et al., 2021).

In summary, the impact of healthcare, tertiary education, and R&D on employment in the NMS-11 is multifaceted and profound. Investments in healthcare ensure a healthier, more productive workforce; tertiary education enhances the qualifications and employability of individuals, while R&D drives innovation and job creation. To foster a robust employment landscape, policymakers in the NMS-11 should prioritize human capital investments that align with industry needs and economic goals, facilitating sustainable growth and workforce stability

Empirical Analysis

Influence of science, healthcare, and education on economic growth in the NMS-11

Methodology

The effects of science, healthcare, and education on economic growth in the NMS-11 are studied through regression by the method of least squares (OLS), which includes the following variables:

GDPGRij – rate of change of real GDP of country i in year j compared to year j-1 (in percent);

GERDij – gross domestic expenditure on R&D of country i in year j (percentage of GDP);

HCEij – total healthcare expenditure in country i in year j (percentage of GDP);

TEPij – share of the population with tertiary education in country i in year j (percentage of the population aged between 15 and 64 years).

The dependent (target) variable is GDPGR. GERD, HCE, and TEP are independent (explanatory) variables that reflect the influence of science (R&D), healthcare, and education on economic growth in the NMS-11.

The Hausman tests indicate probabilities above 5 percent (0.82 and 0.18), which means that the pooled mean group (PMG) estimator should be preferred to the mean group (MG) or dynamic fixed effects (DFE) estimators. The optimum number of lags for each variable in the PMG ARDL is selected automatically by EViews based on the Akaike Information Criterion.

Data

The study uses annual data from Eurostat for real economic growth, R&D expenditure, healthcare expenditure, and the share of the population with tertiary education in the NMS-11 for the period 2013 – 2023.

Results

The results of the stationarity tests (see Table 1) show that GDPGR, GERD, HCE, and TEP are integrated of order zero, which allows for the direct application of OLS.

The results of the econometric evaluation of the OLS regression (see Table 2) indicate two statistically significant variables – GERD (at a critical significance level of 10%) and HCE (at a critical significance level of 5%). The sign and absolute value of the coefficient in front of GERD indicate that, all other things being equal, a 1% change in the share of R&D expenditure in GDP will lead to a 0.74% change in real economic growth in the same direction. The sign and absolute value of the coefficient in front of HCE suggest that, all other things being equal, a 1% change in the share of healthcare expenditure in GDP will lead to a 0.57% change in real economic growth in the opposite direction.

Table 1. Stationarity tests on the baseline values of GDPGR, GERD, HCE and TEP

Variable	*Probability*
GDPGR	0.0000
GERD	0.0177
HCE	0.0228
TEP	0.0052

Source: Own calculations

Table 2. Econometric estimation of the OLS regression

Variable	*Coefficient*	*Standard error*	*t-statistic*	*Probability*
GERD	0.741357	0.402885	1.84012	0.0687
HCE	-0.565315	0.220702	-2.56144	0.0119
TEP	0.005213	0.024467	0.21306	0.8317
C	5.744364	1.403158	4.09388	0.0001

Source: Own calculations

The adjusted coefficient of determination is 0.75, which means that the OLS regression explains 75% of the variation of real economic growth in the NMS-11 through changes in the shares of R&D and healthcare expenditures in GDP and the share of the population with tertiary education in the total population aged between 15 and 64 years. The probability of the F-statistic is 0.00, which allows accepting the alternative hypothesis

that the OLS model adequately reflects the relationship between GDPGR, GERD, HCE, and TEP.

The analysis reveals a statistically significant positive relationship between R&D expenditure and economic growth. A 1% increase in the share of R&D expenditure in GDP leads to a 0.74% increase in real economic growth, holding other factors constant. This underscores the critical role of innovation and technological advancement in driving economic growth in the NMS-11 countries.

Healthcare expenditure has a statistically significant negative impact on economic growth. A 1% increase in healthcare expenditure as a share of GDP is associated with a 0.57% decrease in real economic growth. This counterintuitive result may reflect inefficiencies in healthcare spending or the possibility that higher healthcare costs divert resources from more productive investments.

The share of the population with tertiary education does not show a statistically significant impact on economic growth in this analysis. This could indicate that the benefits of higher education take longer to materialize or that other factors, such as the quality of education or labour market alignment, play a more critical role.

The OLS regression model explains 75% of the variation in economic growth, indicating a strong fit. The F-statistic confirms the overall significance of the model.

Influence of science, healthcare, and education on employment in the NMS-11

Methodology

The effects of science, healthcare, and education on employment in the NMS-11 are studied through regression by the method of least squares (OLS), which includes the following variables:

EMPLij – employment rate in country i in year j (in percent);

GERDij – gross domestic expenditure on R&D of country i in year j (percentage of GDP);

HCEij – total healthcare expenditure in country i in year j (percentage of GDP);

TEPij – share of the population with tertiary education in country i in year j (percentage of the population aged between 15 and 64 years).

The dependent (target) variable is EMPL. GERD, HCE, and TEP are independent (explanatory) variables that reflect the influence of science (R&D), healthcare, and education on employment in the NMS-11.

Data

The study uses annual data from Eurostat for the employment rate, R&D expenditure, healthcare expenditure, and the share of the population with tertiary education in the NMS-11 for the period 2013 – 2023.

Results

Table 3. Stationarity tests on baseline values of EMPL, GERD, HCE and TEP

Variable	*Probability*
EMPL	0.0000
GERD	0.0177
HCE	0.0228
TEP	0.0052

Source: Own calculations

The results of the stationarity tests (see Table 3) show that GDPGR, GERD, HCE, and TEP are integrated of order zero, which allows for the direct application of OLS.

The results of the econometric evaluation of the OLS regression (see Table 4) indicate two statistically significant variables – GERD (at a critical significance level of 1%) and TEP (at a critical significance level of 1%). The sign and absolute value of the coefficient in front of GERD indicate that, all other things being equal, a 1% change in the share of R&D expenditure in GDP will lead to a 4.81% change in the employment rate in the same direction. The sign and absolute value of the coefficient in front of TEP suggest that, all other things being equal, a 1% change in the share of the population with tertiary education will lead to a 0.39% change in the employment rate in the same direction.

Table 4. Econometric estimation of the OLS regression

Variable	Coefficient	Standard error	t-statistic	Probability
GERD	4.811467	0.879101	5.47317	0.0000
HCE	-0.351733	0.481575	-0.73038	0.4668
TEP	0.385356	0.053388	7.21806	0.0000
C	54.26815	3.061712	17.7248	0.0000

Source: Own calculations

The adjusted coefficient of determination is 0.67, which means that the OLS regression explains 67% of the variation of the employment rate in the NMS-11 through changes in the shares of R&D and healthcare expenditures in GDP and the share of the population with tertiary education in the total population aged between 15 and 64 years. The probability of the F-statistic is 0.00, which allows accepting the alternative hypothesis that the OLS model adequately reflects the relationship between GDPGR, GERD, HCE, and TEP.

It can be concluded that R&D expenditure has a strong positive impact on employment. A 1% increase in the share of R&D expenditure in GDP leads to a 4.81% increase in the employment rate. This highlights the job-creating potential of innovation and research-driven industries.

The share of the population with tertiary education also has a statistically significant positive effect on employment. A 1% increase in the share of the population with tertiary education leads to a 0.39% increase in the employment rate. This suggests that a more educated workforce contributes to higher employment levels, likely due to improved skills and productivity. Healthcare expenditure does not show a statistically significant impact on employment in this analysis. This could imply that healthcare spending does not directly influence labour market dynamics in the NMS-11 countries. The OLS regression model explains 67% of the variation in employment, indicating a good fit. The F-statistic confirms the overall significance of the model.

Both economic growth and employment benefit significantly from increased R&D expenditure. Policymakers in the NMS-11 countries should prioritize investments in science, technology, and innovation to foster sustainable economic development and job creation. The negative relationship between healthcare expenditure and economic growth warrants further investigation. It may be necessary to improve the efficiency of healthcare spending or reallocate resources to more productive sectors. While tertiary education does not significantly impact economic growth in the short term, it positively affects employment. This suggests that education policies should focus on aligning skills with labour market needs to maximize economic benefits.

It is recommended that:

- R&D funding be raised in order to stimulate economic growth and employment;
- Healthcare spending be re-assessed to make sure it contributes positively to economic outcomes;
- The link between education and labour market demands be strengthened to enhance the economic impact of higher education.

Conclusion

The paper underscores the interlinked nature of healthcare, tertiary education, and R&D in shaping human capital and their collective impact on economic growth in the NMS-11 As economies evolve, it is imperative to adapt human capital development strategies continually to meet industry demands and support sustainable employment growth. Ensuring that policies align with the needs of both workers and employers will be crucial for fostering a resilient labour market.

The increase in the share of R&D expenditure in GDP and the share of the population with tertiary education increase employment in the NMS-11, while the impact of healthcare expenditure is statistically insignificant.

The effects of science, healthcare, and education on real economic growth in the NMS-11 are fundamentally different. While the increase in R&D expenditure accelerates economic growth, the increase in healthcare expenditure slows down the growth of real GDP, and the change in the share of the population with tertiary education does not affect the percentage change in the aggregate product in the NMS-11.

It can be concluded that, among the human capital-forming activities, science in the face of R&D has the strongest favourable effects on the employment rate and economic growth in the NMS-11. The economic effects of healthcare and education vary, which indicates the need for reforms in these sectors to utilize their full economic potential. Policymakers in the NMS-11 must thus prioritize these areas to sustain and accelerate economic growth effectively.

The empirical analysis highlights the importance of science (R&D) and education in driving economic growth and employment in the NMS-11 countries, while raising questions about the role of healthcare expenditure. Policymakers should leverage these insights to design targeted strategies for sustainable development.

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Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: 1, Year: 2026, pp. 17-35
DOI: 10.37708/em.swu.v23i1.2

ECOSYSTEM PERSPECTIVES IN TOURISM: THEORETICAL ROOTS, CONCEPTUAL EVOLUTION, AND RESEARCH FRAMEWORKS

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Received: 22.01.2026, Accepted: 07.05.2026

Abstract

The tourism sector is undergoing significant transformation driven by intensified competition, growing uncertainty, and accelerated digitalization. In this context, long-term competitiveness increasingly depends not only on firm-level resources, but also on collaboration, knowledge exchange, network interdependencies, and institutional arrangements connecting multiple actors involved in shaping the tourist experience. Consequently, the concept of the "ecosystem" has gained prominence in tourism research. However, its widespread adoption has also resulted in conceptual ambiguity and inconsistent application, particularly when used interchangeably to describe destinations, digital platforms, business networks, or innovation environments.

This paper examines the theoretical relevance and analytical validity of the ecosystem concept within tourism-related economic and management research. It traces the emergence of the business ecosystem metaphor and discusses its conceptual roots, including debates concerning biological analogies and alternative interpretations linked to the notion of oikos. Drawing on organizational ecology, neo-institutional perspectives on coordination beyond the traditional "market–hierarchy" dichotomy, and the dynamic capabilities framework, the study demonstrates the suitability of the ecosystem perspective for analyzing tourism as a multi-actor, modular, and increasingly platform-mediated industry. The paper further systematizes the main ecosystem-related research streams relevant to tourism—business, innovation, entrepreneurial, and platform ecosystems—and outlines key implications for research design, ecosystem boundary definition, and measurement.

Keywords*: ecosystem approach; tourism management; business ecosystems; digital transformation; collaboration networks; platform economy*

JEL Codes: *Z30, L20, O33*

Introduction

The contemporary world is undergoing a profound transformation of social and economic relations, which directly affects the development of tourism as well. Under

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conditions of high turbulence in the business environment and increasing competition, the sustainable competitive advantages of tourism enterprises are increasingly less often based solely on individual resources and capabilities. Instead, they are formed through various forms of collaboration, including the sharing of resources and knowledge, access to markets, the use of network effects, and specific institutional conditions (D'Aveni, Dagnino, & Smith, 2010). In the tourism industry, these processes are particularly evident due to the high degree of interdependence among the actors involved in the creation of the tourism experience.

Digital transformation is taking place in all spheres of the modern economy, creating prerequisites for more efficient processes for generating economic value (Zlateva, 2020, p. 179). The development of breakthrough digital technologies is leading to a qualitatively new type of information exchange between tourism enterprises and their external environment. Digital platforms, online reservation systems, social media, and data analytics tools are transforming the way tourism services are designed, offered, and consumed. This creates prerequisites for rethinking traditional organizational models in tourism and for transitioning toward more flexible, network-based, and platform-oriented forms of coordination among the participants in the sector (Gretzel et al., 2015).

In this context, there emerges a need for a research concept that goes beyond the boundaries of the individual tourism firm and the immediate participants in the value creation chain. Such a concept should allow for the analysis not only of direct, but also of indirect effects arising from the interaction among various organizations, institutions, and consumers participating in the tourism system. It is precisely these conditions that lead to increased academic interest in the ecosystem approach, which offers an analytical framework for the study of complex, interconnected, and dynamic economic structures characteristic of tourism.

At the same time, the excessive popularity of the term "ecosystem" in academic and practical research has led to its frequent uncritical use and to a blurring of its content. In tourism studies, the term is applied to denote phenomena of differing nature—from tourism destinations and platforms to business networks and innovation environments—which raises the question of its conceptual clarity and scientific rigor (Oh et al., 2016).

The aim of the present study is to substantiate the appropriateness and scientific validity of using the concept of the "ecosystem" as an object of economic and management research in tourism. In this sense, the study seeks to contribute to a clearer conceptualization of the ecosystem approach and to its adequate application in the analysis of tourism-related interactions.

To achieve the stated aim, the following research objectives are formulated:

• to examine the origin and development of the “ecosystem” metaphor in its application to economics and business, and to assess the appropriateness of the use of the prefix “eco-” in the context of tourism;

• to substantiate the theoretical foundations of the ecosystem concept through an analysis of key theoretical approaches relevant to the tourism industry;

• to conduct a bibliographic analysis of the use of the “ecosystem” concept in tourism-related research, with the aim of identifying the main research approaches and interpretations.

Origin and meaning of the Concept of “Ecosystem”

James F. Moore (1993) is generally regarded as the pioneer of the application of the concept of “ecosystem” in the economic and managerial context. Moore proposes examining the interdependence among firms and the complex nature of the interaction between competitive and cooperative strategies. He defines an ecosystem as “an economic community supported by a foundation of interacting organizations and individuals” (Moore, 1997, p. 26).

This definition finds direct application in tourism, where the final tourism product is created through the coordination of numerous autonomous yet interrelated participants, including tourism enterprises, public institutions, local communities, and end consumers.

Over the past decade, against the backdrop of profound changes in the business environment and accelerated digitalization, there has been a sharp increase in academic publications devoted to the ecosystem concept. The popularity of this metaphor has grown not only among business practitioners and representatives of the public sector, but also within academic circles. One of the main explanations for its widespread adoption lies in its conceptual breadth and interdisciplinary nature, which allows for the integration of economic, social, institutional, and technological dimensions within a single analytical framework (Autio et al., 2018). In tourism, this approach is particularly relevant, as the sector by its very nature represents a complex system of interdependent activities and interests.

At the same time, the use of the metaphor “ecosystem” has given rise to a number of academic debates and critical discussions. The main concerns relate to the appropriateness of employing the prefix “eco-,” the validity of direct analogies with biological ecosystems, and the level of scientific rigor in applying the term within economic and management research. In tourism studies, the concept is often used to describe phenomena of a very different nature—such as tourist destinations, digital platforms, business networks, or innovation environments—which further contributes to its conceptual ambiguity.

The source of these concerns lies in the observed tendency toward bio- and eco-mimicry within the conceptual apparatus of the economic sciences. On the one hand, this tendency stems from the effort to reinterpret established objects of analysis from a new perspective, while on the other hand it reflects the desire to emphasize socially significant issues through the use of concepts with a positive normative connotation. In a substantial share of the literature, the ecosystem approach is constructed through analogies with biological ecosystems, without sufficiently accounting for the specific characteristics of socio-economic systems, such as the tourism industry.

The classical definition of a natural ecosystem describes it as a set of co-functioning organisms that interact with the physical environment within a specific territory. In this sense, the prefix "eco-" refers to the environment, while "system" denotes a set of interconnected elements functioning as a whole. Transferred to the economic and tourism context, this understanding implies viewing the tourism ecosystem as a combination of exogenously given environmental elements (institutions, infrastructure, regulations, natural and cultural resources) and endogenously acting actors (tourism enterprises, intermediaries, consumers) that coordinate their actions and derive benefits from their mutual interrelations (Acs et al., 2017).

In a critical review of the application of the ecosystem metaphor in innovation management, it is emphasized that in many cases the use of the prefix "eco-" is redundant, and that the ecosystem is not sufficiently clearly distinguished from already established analytical concepts such as networks, clusters, or value chains (Oh et al., 2016). These critiques are also applicable to tourism research, where there is often a lack of clarity regarding the boundaries, participants, and coordination mechanisms within so-called tourism ecosystems.

Proponents of the analogy with natural ecosystems justify its applicability by pointing to the presence of interdependence and co-evolution among participants in artificial ecosystems, including those in tourism (Ritala & Almpanopoulou, 2017). They emphasize the need to simultaneously account for micro- and macro-level interactions among actors, as well as for the coexistence of cooperation and competition within the same system. In the tourism sector, this is manifested through the simultaneous collaboration and rivalry among hotels, restaurants, tour operators, and digital platforms within a single destination.

At the same time, the differences between natural and artificial business ecosystems are substantial. Research highlights the teleological nature of business ecosystems and the necessity of deliberate management and coordination. Additional characteristics are also emphasized, such as the intentional design and structuring of artificial ecosystems, their potential lack of spatial localization, the dynamic change of participant roles over time, and

the limitations of innovation policy as a tool for continuous co-evolutionary adaptation (Oh et al., 2016). These arguments are particularly relevant for tourism, where digital ecosystems often transcend the territorial boundaries of destinations.

In an effort to provide a more convincing justification for the use of the "ecosystem" metaphor in economic and tourism contexts, a number of authors turn to the historical roots of the prefix "eco-" in the works of the ancient Greek philosopher Hesiod (Audretsch et al., 2019). The concept of oikos (οἶκος) describes the autonomous household as the basic economic unit, within which resources are allocated in order to create value and maximize economic, technological, and social benefits. It is precisely from oikos that the terms "ecology" and "economics" are derived, which lends deeper meaning to the use of the prefix "eco-" in contemporary economic and tourism research.

From this perspective, viewing tourism ecosystems as systems for the joint use and allocation of resources, knowledge, and competencies appears more theoretically grounded than the direct application of a biological metaphor. Nevertheless, the biological analogy may still serve as a valuable source of conceptual inspiration, supporting the search for alternative models of interaction and coordination within the tourism industry.

Theoretical foundations of the use of the "Ecosystem" Concept in tourism

The ecosystem concept makes it possible to analyze agglomeration interactions and network interdependencies in a new way, which are particularly characteristic of tourism as a complex system of services and actors. Within the ecosystem perspective, agglomeration processes can be examined through several complementary dimensions:

– regional, including national, sectoral, and municipal ecosystems, as well as tourism ecosystems at the destination level;

– sectoral, referring to ecosystems within different industries, including tourism and hospitality as closely related sectors;

– activity-based, encompassing entrepreneurial, innovation, and digital ecosystems, which in tourism are manifested through networks of suppliers, intermediaries, complementary services, and digital platforms.

The attempt to explain the effects of agglomeration interaction has a long tradition in economic thought. As early as Alfred Marshall drew attention to the benefits of concentration and the mutual "reinforcement" of economic activities within specific territories. Later, the idea of competitive advantages arising from regional and sectoral concentrations was further developed in research on clusters and competitiveness (Porter, 1990), while the evolutionary perspective on technological change and organizational development emphasized the role of routines, knowledge, and innovation trajectories (Nelson & Winter, 1982). Ideas of purposeful cooperative adaptation and coordination are

also linked to early contributions on the role of organizational cooperation and coordination mechanisms under conditions of dispersed knowledge.

In tourism, this line of reasoning is particularly applicable because tourism value is rarely "produced" by a single actor. Instead, it is created through the coordinated actions of multiple organizations operating within a shared environment and drawing on common infrastructural, institutional, and informational resources.

The theory of ecosystems is currently in a stage of active development, with ongoing efforts to establish clearer definitions, boundaries, and coordination mechanisms (Jacobides, Cennamo, & Gawer, 2018). Although a large share of the research on business ecosystems remains predominantly theoretical, in the context of tourism this approach provides a productive analytical framework for examining multilateral interactions that cannot be reduced either to purely market-based relations or to hierarchical integration.

From a theoretical perspective, the emergence and development of the business ecosystem concept have been most strongly influenced by three major streams of thought: organizational ecology, neo-institutional theory, and the theory of dynamic capabilities of the firm. The selection of these theoretical approaches is also well justified in tourism research, as they make it possible to analyze: (1) the conditions for the "survival" and development of tourism organizations in a competitive environment; (2) the institutional constraints and incentives shaping coordination among actors; and (3) the capacity for adaptation and renewal of competencies in response to technological change.

Organizational Ecology and Ecosystems in Tourism

The concept of ecosystems initially developed within the organizational-ecological tradition, but gradually acquired an independent status. Indicative in this respect is its connection with ideas of population dynamics, including the reference in the title of J. F. Moore's seminal work to "predator–prey" models developed in mathematical biology (Moore, 1993). Organizational ecology as an approach to describing the dynamics of organizational communities emerged in the 1970s, with its theoretical foundations laid by Hannan and Freeman. At its core are processes such as the emergence, stabilization, and "death" of organizations, analyzed within populations and ecological niches.

Applied to tourism, this perspective makes it possible to analyze how, within a given tourism destination or market segment, different types of enterprises (e.g., hotels, tour operators, providers of complementary services) emerge and are subsequently "selected out," sharing a common resource space and competing for access to tourist flows. Key propositions that support the ecosystem logic include:

- viewing the organization and its environment as a decisive factor for strategy formulation and survival in a competitive environment;

• the use of the concept of an "ecological niche" as a resource space that sustains the reproduction of a population, and the possibility of describing evolutionary processes through characteristics such as population density and niche width.

Within the framework of organizational ecology, the ecosystem concept can be further enriched through the analysis of hybrid forms of interorganizational relationships, mechanisms of selection and pressures toward consolidation, as well as through a rethinking of the role of niches in strategic management. These themes have clear analogues in tourism, manifested in partnerships between enterprises, jointly developed service packages, and network-based organizational forms that reduce risk and improve access to resources.

Neo-institutional perspective: "market–hierarchy" and ecosystems in tourism

Neo-institutional theory makes it possible to explain why ecosystems emerge as sustainable forms of coordination and what their distinctive characteristics are. Within the "market–hierarchy" paradigm, the ecosystem is viewed as an intermediate coordination mechanism that is not merely an unstable hybrid between the firm and the market, but rather possesses a specific and distinctive set of properties. Scholarly debates on the existence of multiple coordination mechanisms beyond the market and hierarchy—including stable forms such as networks—have a long tradition. The emergence of new, sustainable coordination mechanisms that respond to contemporary conditions (for example, "bazaar" governance) further demonstrates that coordination can take diverse institutional forms.

In tourism, such an intermediate position is clearly observable in stable partnerships and networks among hotels, restaurants, tour operators, transport services, and other actors. These participants remain organizationally autonomous, yet they share rules, standards, and infrastructure in order to achieve joint value creation. In this context, the concept of coopetition—simultaneous cooperation and competition among actors who collaborate in certain areas while competing in others—becomes particularly important. Ecosystems are characterized by a relatively higher density of cooperative relationships, which generate network effects that exceed purely individual benefits, while competition for resources and customers is not eliminated.

From this perspective, an ecosystem can be defined as a set of autonomous organizations that produce complementary components of value and establish coordination mechanisms without the need for vertical integration (Adner, 2017; Jacobides et al., 2018). This definition is highly applicable to tourism, where the final value for the tourist is "assembled" from multiple complementary services—accommodation, food and beverage, transport, and experiences—provided by different organizations.

Dynamic capabilities and platform-oriented tourism ecosystems

The theory of dynamic capabilities focuses on how firms build and sustain competitive advantages by adapting to changes in the external environment. Dynamic capabilities reflect a firm's ability to modify its competencies in response to environmental change and differ from "operational" or "ordinary" capabilities, which primarily support day-to-day activities. From this perspective, the ecosystem represents the environment that firms must monitor, and their responses to it directly influence their competitiveness (Teece, 2009).

Within platform-based ecosystems, dynamic capabilities are particularly important, as platform leaders are able not only to create but also to "capture" value through the formation of ecosystems and the development of appropriate business models, while providers of complementary services also extract significant value within the system (Teece, 2017, 2018). Helfat and Raubitschek highlight several key capabilities that are critical for platform leaders, including innovative capabilities, capabilities for scanning and sensing changes in the external environment, and integrative capabilities for coordinating and "orchestrating" interactions among ecosystem participants (Helfat & Raubitschek, 2018). Applied to tourism, this perspective provides a theoretical framework for analyzing platform-based intermediation and the modular organization of complementary services.

Modularity represents an important structural principle of ecosystems: organizations can operate autonomously on individual "modules" (products or services) that are connected through shared standards, interfaces, and rules (Baldwin, 2008). This logic enables the co-creation of value, whereby value for the customer is generated beyond the boundaries of a single product through the coordination of complementary components (Adner, 2017; Jacobides et al., 2018).

Despite the differences between the organizational-ecological, neo-institutional, and dynamic capabilities perspectives, these approaches should not be viewed as mutually exclusive. Rather, it is more appropriate to speak of their convergence in the process of constructing a comprehensive analytical framework for ecosystems—one that is highly applicable to tourism as a complex, network-organized, and increasingly digitalized industry (Jacobides et al., 2018; Teece, 2018).

Main approaches to defining the Ecosystem in the context of tourism

The interpretation of the concept of an "ecosystem" in the academic literature is characterized by considerable heterogeneity and inconsistency. This simultaneously demonstrates the flexibility and high explanatory potential of the concept, but also complicates its precise application in economic and management research. This is particularly evident in tourism, where interactions among participants are multi-layered and

the boundaries of the system are often defined by the destination, technological infrastructure, or the consumer experience. In the tourism context, the term "ecosystem" may refer either to a local network of organizations within a destination or to a digital environment in which platforms integrate services and data, which creates additional grounds for terminological ambiguity (Gretzel et al., 2015; Xiang, Magnini, & Fesenmaier, 2015).

The literature reveals different approaches to the classification and differentiation of ecosystems. Some researchers use the terms "business ecosystem" and "innovation ecosystem" as closely related or interchangeable concepts. In tourism, such overlap is observed when an ecosystem is described simultaneously as a coordination environment for participants (a business perspective) and as an environment for the creation and diffusion of new solutions (an innovation perspective), for example through the implementation of digital services, new distribution channels, or new experience-based business models. In other studies, these terms are clearly distinguished by emphasizing different objectives and coordination mechanisms—such as ecosystems built around a specific value proposition, around an innovation project, or around a platform serving as a coordination infrastructure (Adner & Kapoor, 2010; Valkokari, 2015).

A distinct focus in the debate concerns the platform-based foundation of ecosystems. In the study by Valkokari (2015), so-called focal ecosystems are examined, in which a "core" (a focal actor or solution) exists around which complementary participants and activities are organized. In tourism, this perspective is particularly relevant when analyzing ecosystems in which a specific integrator plays a leading role—such as a dominant digital platform or a key actor within a destination—setting standards, interfaces, and rules for interaction. At the same time, a substantial body of literature treats platform-based ecosystems as a separate research stream, since platforms function not merely as participants but as infrastructures for coordination, information exchange, and service aggregation. In the tourism industry, this is reflected in digital ecosystems that integrate booking systems, payments, recommendations, reputation management, and the personalization of offerings (Gretzel et al., 2015; Xiang et al., 2015).

Numerous attempts have been made to systematize the wide range of interpretations of the ecosystem concept. Adner (2017) proposes a distinction between an "ecosystem as structure" and an "ecosystem as affiliation." The first perspective directs attention to the architecture of complementary components and the coordination required to deliver a specific value proposition. In tourism, this can be associated with the "structure" of the tourist experience as a set of complementary services—such as accommodation, transport, attractions, and events—whose coordination directly affects quality and customer satisfaction. The second perspective, "affiliation," conceptualizes the ecosystem as a

community or environment to which an actor belongs and within which it interacts and co-creates value (Adner, 2017). This logic is applicable to tourism destinations understood as "environments" in which firms operate under shared institutional and infrastructural conditions and are mutually interdependent with respect to tourist flows and destination reputation.

Jacobides, Cennamo, and Gawer (2018, pp. 2256–2258) identify three main research streams: business ecosystems, innovation ecosystems, and platform-based ecosystems. This distinction is particularly useful in tourism, as the sector simultaneously:

- functions as a network of interdependent business actors (business ecosystem);
- is transformed through the adoption of innovations (digital solutions, new service and experience models) (innovation ecosystem);
- is increasingly coordinated through platform infrastructures (platform ecosystem), which alter the logic of intermediation and competition (Gretzel et al., 2015; Xiang et al., 2015).

In the tourism context, such a distinction is also important for practical reasons, as the different discourses imply different units of analysis and different performance criteria. For example, in the case of a destination ecosystem, the analytical focus may be placed on coordination and the sustainable management of resources, whereas in a platform-based tourism ecosystem the emphasis may be on network effects, participation rules, and the dependencies between platforms and service providers. Precisely because of this polysemy, tourism research requires clearer specification of "in which sense" the ecosystem concept is being used, as well as clearer delineation of its boundaries and participants (Baggio & Del Chiappa, 2014; Jacobides et al., 2018; Valkokari, 2015).

Main discourses of the Ecosystem Concept in tourism

Business Ecosystem in Tourism

The "business ecosystem" stream in economic and management research focuses on how an individual firm interacts with its environment in order to achieve sustainable competitive advantages and maximize economic performance. In this context, the ecosystem is viewed as a community of interconnected actors that mutually influence one another and, through their actions, exert a direct impact on customers, resources, and value creation mechanisms (Teece, 2009).

In tourism, this approach is particularly relevant, as the tourism product is inherently complex and cannot be created and delivered by a single firm alone. Value for the tourist emerges as a result of interaction among multiple economic actors—hotels, restaurants, tour operators, transport companies, providers of complementary services, cultural and entertainment institutions, as well as digital intermediaries. Consequently, the

competitiveness of an individual tourism enterprise is closely linked to the effectiveness of the ecosystem within which it operates.

Participants (actors) in a tourism business ecosystem include all entities that influence, or are influenced by, the value proposition of the tourism firm. This group comprises service and resource suppliers, distributors and intermediaries, outsourcing companies, producers of complementary products, technological and digital partners, regulatory and public institutions, as well as mass media, which shape the image of the destination and tourism enterprises. According to Zlateva (2021, p. 119) the growing direct access to audiences is accompanied by intensified strategic and communicative challenges for firms, as the digital environment reshapes and broadens business opportunities. In support of this, we can say that in the context of digitalization, online booking platforms, marketplaces, and social media are increasingly becoming part of the ecosystem, fundamentally transforming traditional models of interaction between companies and consumers.

G. B. Kleiner's approach further expands the understanding of the ecosystem by including, alongside actors, business processes, individual projects, and infrastructural systems that "interact with one another in the process of creating and circulating material and symbolic goods and values." In a tourism context, this means that the ecosystem encompasses not only firms, but also transport, communication, and tourism infrastructure, destination marketing, the institutional framework, and mechanisms for managing tourist flows. Of particular importance is the ability of these elements to function autonomously and sustainably over the long term through the reproduction of resources, knowledge, and stable partnerships.

Within this discourse, research focuses on how the overall effectiveness of the tourism ecosystem influences the performance of its individual participants, as well as on processes of joint co-evolution among them. It is emphasized that, much like an individual's development depends on their social and economic environment, tourism enterprises likewise share the "common fate of the community" in which they are embedded (Iansiti & Levien, 2004, p. 69). In this sense, weaknesses in a single element of the ecosystem—such as transport, service quality, or regulation—can negatively affect the overall tourism experience and the competitiveness of the destination.

At the same time, the key role of the ecosystem leader in maintaining stability and coordination is highlighted. In tourism, this leadership function may be performed by leading tourism companies, destination management organizations, or public institutions that set the strategic framework and stimulate cooperation among participants.

An analysis of academic publications indicates a decline in the number of studies explicitly labeled as "business ecosystem" after 2015. However, this trend is more plausibly

interpreted as a result of increasing depth and specialization of research within more specific areas—such as tourism ecosystems, digital platforms, and destination management—rather than as a decline in the relevance of the ecosystem concept itself.

Innovation Ecosystem in Tourism

Within the innovation discourse, attention is focused on examining how interdependent actors interact in order to create, implement, and commercialize innovations. The primary focus is not on the individual firm, but rather on the system or environment that creates the conditions for the emergence and realization of innovation projects. This approach is particularly applicable to tourism, where innovations are rarely the result of the activities of a single actor and more often emerge as the product of joint efforts among multiple organizations, institutions, and consumers.

In the academic literature, an innovation ecosystem is defined as a coordinated structure of multiple partners that must interact in order to deliver the core value proposition (Adner, 2017, p. 40), as well as a set of actors that interact in the process of innovation commercialization and, through their interconnections, accumulate human, financial, and other resources in order to increase the efficiency of the innovation process. In a tourism context, these definitions encompass interactions among hotels, restaurants, tour operators, technology companies, start-ups, research organizations, and public institutions that collectively contribute to the creation of new tourism products, services, and experiences.

Within this approach, the concept of the innovation ecosystem develops along two main directions. The first emphasizes processes of co-creation of customer value, in which customers, suppliers, and partners actively participate in the development and improvement of tourism services. The second direction views the innovation ecosystem as a set of institutional conditions that support the formation of territorial ecosystems, including tourism clusters at regional and national levels. In tourism-related research, this second direction is particularly significant, as innovations are often closely linked to destination development, public policies, and regional competitiveness.

In value co-creation processes, a central role is played by the understanding of the relationship between the creator of the core product or service and its complementary elements—the so-called "complementors." In tourism, these may include transport services, digital platforms, cultural and entertainment attractions, as well as technological solutions that together enhance the value of the tourism experience. Empirical studies show that different forms of collaboration between the innovator and its complementors have a significant impact on the participants' ability to coordinate investments in innovation and on the successful commercialization of these innovations (Kapoor & Lee, 2013). Moreover, the exchange of knowledge and information among participants strengthens inter-firm

relationships and contributes both to the development of the ecosystem (Alexy, George, & Salter, 2013) and to its long-term survival (West & Wood, 2013).

In the tourism industry, innovation ecosystems are increasingly associated with the concept of open innovation, whereby firms deliberately use external sources of knowledge and technology. Research indicates that such an approach can accelerate the adoption of digital solutions, sustainable practices, and new business models, while at the same time enhancing the adaptability of tourism ecosystems to dynamic changes in demand and the external environment.

Entrepreneurial Ecosystem

Research in this area is closely related to the innovation discourse discussed earlier, including consideration of the territorial component (technopolises, innovation clusters, etc.).

There are significant differences among scholars regarding whether entrepreneurial and innovation ecosystems should be regarded as the same type of ecosystem, as different types, or whether the concept of the "entrepreneurial ecosystem" is broader and includes, among other elements, innovation ecosystems as well.

In the present text, innovation and entrepreneurial ecosystems are distinguished as separate discourses, since research on innovation ecosystems usually focuses on the innovation project around which interactions among participants are structured (which may be implemented within a start-up or a large corporation), whereas in entrepreneurial ecosystems the entrepreneur occupies a central position as the key actor within the ecosystem.

This line of research emphasizes the creation of new firms and related issues of entrepreneurial development, including the realization of entrepreneurial potential and access to resources and markets.

In this context, the ecosystem is understood as "a set of interconnected actors, organizations, institutions, and processes of entrepreneurial activity that are formally and informally combined in order to ensure coordinated and mediated governance in the local entrepreneurial environment" (West & Wood, 2013, p. 27).

Both formal institutions (government initiatives, institutional investors) and informal institutions that support the emergence and development of new firms are examined (Acs et al., 2017).

Researchers of both entrepreneurial and innovation ecosystems acknowledge the key importance of the environmental context for their effective functioning. As a result, in empirical studies the boundaries between the two discourses are often highly blurred. Typically, ecosystems located in specific geographical areas and/or industries are analyzed

(e.g., the Silicon Valley ecosystem, the digital entrepreneurship ecosystem). Empirical studies of this type of ecosystem are primarily focused on high-technology and internet-based start-ups.

The innovation–entrepreneurship discourse of ecosystem research also includes the popular stream devoted to university ecosystems, which, on the one hand, serve as environments for the development of innovation projects and, on the other, create educational programs for entrepreneurship training.

Research on entrepreneurial ecosystems is particularly popular among Russian scholars. Although it largely builds on the work of international authors, it also exhibits a specific emphasis on the role of the state as a key participant or major stakeholder in the ecosystem.

An analysis of publications shows a decline in the number of studies explicitly focused on the topic of the "business ecosystem" observed after 2015. This trend is likely due to the deepening and specialization of research within other related fields rather than to a decrease in the significance of the concept itself.

Entrepreneurial Ecosystem in Tourism

Research on entrepreneurial ecosystems is closely linked to the innovation discourse and shares a number of common theoretical foundations and analytical approaches. A key characteristic of both types of ecosystems is the acknowledged territorial component, which is of particular importance in tourism. Tourism activity is inherently spatially embedded, which determines the role of destinations, tourism clusters, and local networks of firms as a basis for the development of entrepreneurial initiatives.

In the academic literature, there are significant differences in the interpretation of the relationship between entrepreneurial and innovation ecosystems. Some authors consider them to be the same type of ecosystem, while others emphasize their differences and treat them as distinct analytical categories. A third position holds that the entrepreneurial ecosystem represents a broader concept that includes, among other elements, innovation ecosystems as well.

In the present analysis, innovation and entrepreneurial ecosystems are distinguished as separate discourses. This distinction is particularly applicable in the tourism context, since studies of innovation ecosystems usually focus on a specific innovation project or technology—for example, a digital platform or a new tourism product or service. In entrepreneurial ecosystems, by contrast, the entrepreneur plays a central role as the key actor who identifies market opportunities, mobilizes resources, and coordinates interactions among various participants in the tourism environment.

This line of research emphasizes the processes of new firm creation and the factors that stimulate or constrain the development of entrepreneurship. In tourism, this includes small and medium-sized enterprises such as family-owned hotels, restaurants, travel agencies, start-ups in the field of digital tourism services, as well as entrepreneurial initiatives aimed at sustainable and alternative tourism. Key research issues include the realization of entrepreneurial potential, access to financial, human, and informational resources, and opportunities for integration into broader tourism markets.

In this context, the entrepreneurial ecosystem is defined as "a set of interconnected actors, organizations, institutions, and processes of entrepreneurial activity that are formally and informally combined in order to ensure coordinated and mediated governance in the local entrepreneurial environment" (West & Wood, 2013, p. 27). Applied to tourism, this definition highlights the importance of interaction among entrepreneurs, local authorities, educational and cultural institutions, investors, and tourism organizations for the sustainable development of destinations.

Research within this discourse examines both formal institutions—such as government programs, regulatory frameworks, public investments, and institutional investors—and informal institutions, including entrepreneurial culture, networks of contacts, and local traditions that support the emergence and development of new tourism firms (Acs et al., 2017). In tourism, these factors often determine entrepreneurs' ability to create authentic and competitive products based on local identity and natural resources.

Researchers of both entrepreneurial and innovation ecosystems acknowledge the key importance of the environmental context for their effective functioning. As a result, in empirical analyses the boundaries between the two discourses are often blurred. In tourism research, ecosystems localized in specific geographic areas or sectors are most commonly examined—for example, ecosystems of mountain, coastal, or cultural tourism, as well as ecosystems of digital entrepreneurship in tourism.

The innovation–entrepreneurship discourse also includes the increasingly popular research stream on university ecosystems. In the tourism context, universities perform a dual function: on the one hand, they provide an environment for the development of innovation and entrepreneurial projects in tourism, and on the other hand, they contribute to human capital formation through educational programs and training in entrepreneurship and tourism business management.

Research on entrepreneurial ecosystems is particularly popular among Russian scholars. Although it is largely grounded in the work of international authors, it is characterized by a specific emphasis on the role of the state as a key participant or principal stakeholder in the ecosystem. This perspective is especially relevant for tourism, where

public policy, public investment, and destination development strategies can have a decisive impact on the dynamics and sustainability of entrepreneurial ecosystems.

Conclusion

Although the ecosystem concept is characterized by a certain degree of terminological ambiguity and a diversity of interpretations, it has become an increasingly important analytical framework for describing interactions among economic agents in the process of value creation for consumers. In the field of tourism, this concept proves to be particularly applicable, as the tourism product is inherently the result of coordinated interaction among multiple participants—tourism enterprises, local communities, public institutions, infrastructure providers, and end consumers.

At the same time, several relatively distinct discourses have emerged in the academic literature that further develop the ecosystem concept—namely business, innovation, entrepreneurial, and platform-based discourses. This makes it necessary, when applying the ecosystem approach in economic and management research on tourism, to clearly specify the particular analytical focus, since different discourses emphasize different aspects of interaction, coordination, and value creation.

The ecosystem perspective makes it possible to describe contemporary structures of the tourism business and destination management by extending the scope of analysis beyond the individual tourism enterprise and directing attention toward the network of interdependent actors. In this way, it substantially complements and partly substitutes the traditional sectoral approach, which often proves insufficient for explaining the complex nature of tourism interactions.

Given the dynamic nature of the tourism environment, its high sensitivity to technological, social, and economic changes, and the accelerated development of digital platforms, understanding the mechanisms underlying the functioning and success of tourism ecosystems is of not only theoretical but also significant practical importance. This is particularly relevant for destination management, the sustainable development of tourism, and the competitiveness of tourism enterprises.

The need for the ecosystem approach becomes especially evident under conditions of structural transformation in tourism—both in the emergence of new forms of tourism consumption (digital, sustainable, experience-based tourism) and in the adaptation of traditional tourism sectors to processes of digitalization. In this sense, the transition toward a technology- and data-driven economy can be interpreted as a process of formation and development of tourism ecosystems in which “smart” enterprises and digital platforms play a key coordinating role.

At the same time, the application of the ecosystem concept in tourism is constrained by a number of methodological and empirical challenges. Among the most important are:

- the need for more in-depth research into the factors determining the success and failure of participants in tourism ecosystems, as well as the question of the reproducibility of ecosystem models under different destination and institutional conditions;
- the need to clearly define the boundaries of the tourism ecosystem in order to identify participants, their roles, contributions, and interactions, and to adequately assess the overall effectiveness of the ecosystem;
- the need to develop appropriate analytical metrics, since traditional indicators of performance at the level of individual enterprises, sectors, or regions do not sufficiently capture the processes of co-creation of value that are characteristic of tourism ecosystems, which are currently analyzed mainly at a conceptual level or through individual empirical case studies (Ketonen-Oksi & Valkokari, 2019).

In summary, the ecosystem approach offers considerable potential for a deeper understanding of the complex processes taking place in tourism; however, its effective application requires further theoretical refinement, empirical validation, and adaptation to the specific characteristics of tourism activities and destination management.

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Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: I, Year: 2026, pp. 36-59
DOI: 10.37708/em.swu.v23i1.3

BEYOND BORDERS AND BARRIERS: PESTEL DYNAMICS AND THE ROLE OF SUPPORT AGENCIES IN FOSTERING INCLUSIVE ENTREPRENEURSHIP IN ALGERIA — INSIGHTS FROM THE UK

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Received: 09.01.2026, Accepted: 02.04.2026

Abstract

This study examines the effectiveness of support agencies in promoting the inclusive entrepreneurship among marginalized groups. While grounded in the Algerian context, international policy lessons presented in the UK are used to generalize wider recommendations to other emerging economies. A mixed-methods approach was used by combining quantitative data from 250 Algerian entrepreneurs, and qualitative interviews with agency officials. The paper uses a PESTEL analysis in testing external environmental forces on agency effectiveness and benchmarking selected UK initiatives. Findings demonstrate that although support agencies in Algeria have a role to play, their effectiveness is hindered by bureaucratic inefficiencies, lack of sufficient financing as well as lack of the coordination of operations. This study links the internal institutional limitations to the environmental factors providing directions to reform using international policy models and points to the development of inclusive entrepreneurship as an institutionally entrenched option to support equity and resilience.

Keywords: *Inclusive entrepreneurship; Marginalized groups; PESTEL analysis; Support and accompaniment agencies.*
JEL Codes: *I3, L26, O25*

Introduction

Economic growth, job creation, increased equity, and social inclusion come through entrepreneurship as a strong economic power. The world recognizes inclusive entrepreneurship as a fundamental tool to reduce economic gaps and achieve the Sustainable Development Goals (SDGs) particularly in developing countries (United

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Nations, 2023). Certain areas have discovered that entrepreneur training and microloan programs allow communities to support self-reliance as well as distribute wealth locally.

In Algeria, various support and accompaniment agencies such as NESDA, ANGEM, ANDI, ASF, and CNAC have been established to provide entrepreneurs with different types of aid, particularly those from underrepresented groups (British Council, 2020). These agencies use financial resources, training, and mentorship support to increase inclusive entrepreneurship for those who deal with economic or social barriers as well as geographic limitations (World Bank, 2020). They have improved their support for entrepreneurship; however, inadequate support continues to be an issue for marginalized groups who encounter distinct obstacles when attempting to use these resources (Lounes & Mancer, 2024).

Research on the actual impact on promoting inclusive entrepreneurship by Algeria's support systems remains limited despite established assistance structures. Existing studies often provides analysis about entrepreneurship promotion but overlook how marginalized groups face hurdles and what results they achieve. Consequently, a significant literature gap remains unaddressed regarding the effectiveness of these agencies in promoting inclusive entrepreneurship and the challenges they encounter in the achievement of their goals and objectives. This analysis reveals internal constraints in order to implement better effective policy changes to strengthen support systems and enhance socioeconomic equity. It creates a logical context for understanding how internal and external factors enhance the achievement of these initiatives while providing applicable findings for countries that share similar socio-economic conditions with Algeria.

The study aims to determine the effectiveness of support and accompaniment agencies in promoting inclusive entrepreneurship in Algeria. it combines quantitative and qualitative data to simultaneously analyze the direct impact of agency support and put the influence of external factors into context through PESTEL analysis. Ultimately, it presents practical recommendation to enhance inclusivity and sustainability of Algeria's entrepreneurial ecosystem with the aim of delivering fair business opportunities for marginalized groups.

To achieve these objectives, this study seeks to answer the following research question:

How effective are support and accompaniment agencies in promoting inclusive entrepreneurship among marginalized groups under the influence of internal challenges and PESTEL factors?

The RQ above support the formulation of the following hypotheses:

- H1: Support from accompaniment agencies positively influences entrepreneurial success among marginalized groups.

• H2: PESTEL factors significantly moderate the relationship between support from accompaniment agencies and entrepreneurial success among marginalized groups.

In the context of benchmarking inclusive models of entrepreneurship, this paper draws on mature systems such as the United Kingdom. As an example, the Startup Loans scheme is a government-supported program, which has funded more than £1 billion unsecured loans and mentoring packages since its launch (British Business Bank, 2023). This reflects the importance of structured finance and specific support that can greatly enhance the performance of marginalized founders, a useful guide to policy learning.

The paper adds value to a broader debate on how institutional and contextual processes influence the operation of entrepreneurship support systems in different parts of the world by considering the Algerian case. The findings particularly apply to nations in North Africa, Sub-Saharan Africa, Latin America and South Asia where inefficiencies in bureaucracy, lack of access to finance and policy fragmentation undermine the ability to engage in inclusive economic participation.

Conceptual Framework and Comparative Context

Inclusive Entrepreneurship

Inclusive entrepreneurship is a process that focuses on eliminating systemic barriers and neutralizing obstacles including socioeconomic exclusion to financing, lack of skills, and institutional discrimination, so that individuals from all segments of society especially the disadvantaged groups, can pursue entrepreneurial activities (OECD/ European Commission, 2019, 2023). Such barriers generally exclude women, youth, people with disabilities, seniors, migrants, and rural populations from contributing to business growth thereby highlighting the need to build an equitable entrepreneurial landscape that promotes sustainable growth.

Inclusive entrepreneurship maintains its position as a key area of interest for both governments and NGOs worldwide among other actors who have been establishing policy changes, deliver capacity development, and resource accessibility initiatives. It exists as a fundamental facilitating mechanism that enables (SDGs) 8 (inclusive and sustainable economic growth with decent work) and 10 (poverty reduction) to accomplish their targets (Rolle et al, 2020)

According to the progress report of the United Nations Secretary-General (2024) on the SDGs the current achievements reach only 17% while substantial inequalities persist when it comes to providing equitable opportunities for economic growth. This background highlights the critical importance of developing inclusive business opportunities towards a more effective resistance of the global economy.

Aligned with the SDGs, inclusive entrepreneurship promotes "development-orientated policies," which help create jobs and stimulate innovation, while giving special priority to business financial inclusion and institutional support for businesses of all sizes. Such policies form the basis needed to support marginalized communities' specific needs (United Nations, 2023). The implementation of adaptive multi-level policies promoting inclusion and resilience lies at the core of addressing challenges in Algeria as they combine socio-economic necessity and SDG progress.

The practice of inclusive entrepreneurship goes beyond creating economic growth since it involves transformation of society (Bakker & McMullen, 2023). It enables disadvantaged communities to achieve economic independence and social impact as it builds a sustainable global economy (Rolle et al., 2020).

Support and Accompaniment Agencies

Support and accompaniment agencies earn their importance through facilitating access to funding, while providing training and mentorship services and connecting entrepreneurs with essential networks (OECD/ European Commission, 2023). It develops tailored programs that address group-specific challenges, enhance resilience levels, as well as improving innovative potential (Jones et al., 2022). On a global scale, Business incubators, accelerators, and microfinance institutions have successfully reduced challenges for disadvantaged groups.

Public institutions, private entities, and civil society must form stronger partnerships according to The Sustainable Development Goals Report to build innovation and resilience in sectors without adequate support. Algerian agencies aim to provide both financial support and technical guidance to entrepreneurs. To maximize their impact, these agencies must adopt the transformative practices such as digital inclusion along with capacity-building programs (Kheira & Safia, 2024).

In advanced ecosystems like the UK, agencies such as Innovate UK and the British Business Bank have a well organised institutional framework that combines universities, government bodies, and other private institutions. Their digital tools, coordinated funding mechanisms and inclusion requirements present a reference model on how to create ecosystems seeking modernization (UK Research and Innovation, 2023).

Internal Challenges of Support Agencies

Multiple internal issues faced by accompaniment agencies prevent them from offering effective and sustainable service delivery. The solutions to these obstacles will guarantee efficient entrepreneur empowerment to progress sustainable inclusive growth (Audretsch et al., 2022).

- **Financial Limitations:** Insufficient funding remains one of the widest problems across the broad. It forces agencies to struggle with the development and expansion of tailored programs that fits the needs of marginalized communities (Hamza et al., 2024). Funding shortages decrease outreach, restrict the adoption innovation and slow infrastructure development (Fetni & Barhoum, 2022).

- **Bureaucratic Inefficiencies:** Policymakers creating multiple definitions put agencies through a challenging position which results in communication problems, resource mismanagement, and prevents coordinated action. Simultaneously, Algeria faces difficulties where its bureaucratic governance structures create multiple delays in service delivery systems (Bouazzouz & Tahraoui, 2024).

- **Skill and Capacity Gaps:** The agency staff often lack training in digital tools, market analysis and specialized mentoring preventing tailored support delivery (Oussedik, 2025).

- **Policy Constraints:** Confusion and poor performance in support activities stem from unclear agency mandates and their failure to achieve proper coordination across programs (Lounes & Mancer, 2024). Many stakeholders face significant issues when their goals do not align, leading to overwork and neglect of important aspects (Guerrero & Espinoza, 2020).

Marginalized Groups

a. Women Entrepreneurs

Women encounter various obstacles such as social discrimination, restricted mobility and limited access to finance (OECD/ European Commission, 2023). This kind of discrimination persists despite legal policies that promote fair treatment for women in Algeria. Cultural norms prevent women from developing their businesses or participating in male-dominated industries (Işık et al., 2025). Family policies along with unfavorable financial systems intensify these challenges (Setti, 2024). However, current socio-cultural developments in Algeria have made it possible to expand women's entry into entrepreneurship, while there are still large gaps in the achievement of real equity (Ghanem, 2022)

b. Youth Entrepreneurs

Young people experience structural obstacles which prevent them from pursuing entrepreneurial ventures (Bouazzouz & Tahraoui, 2024). High youth unemployment rates in Algeria emphasize the importance of acting in this regard. Successful entrepreneur development requires main components which young entrepreneurs usually do not have sufficient access to: financial support, education, and mentorship (Metaiche, 2024). Modern entrepreneurial ecosystems become challenging to understand where youth entrepreneurs lack experience along with social capital (Rahman & Raman, 2024).

c. People with Disabilities

People with disabilities stand among the most marginalized groups in the entrepreneurial environment. The combination of structural disadvantages with nonexistent individualized support systems prevents them from obtaining needed resources and opportunities (Csillag et al., 2025). Disabled entrepreneurs face major challenges in gathering information, attracting sponsors, and establishing networks while reaching the crucial phase which requires these elements for businesses to succeed (Mendoza, 2023). The wide range of disability types makes it challenging to develop a universal solution for support system development (OECD/ European Commission, 2023).

3. Comparative Perspectives

The United Kingdom is a highly structured entrepreneurial ecosystem with support agencies that function using coordinated institutional frameworks, digital systems and inclusive funding mechanisms. Programs such as Innovate UK, the British Business Bank, Startup Loans, and the Women in Innovation Fund demonstrate how clear mandates and integrated online platforms as well as performance monitoring tools help to enhance the delivery of services and improve inclusivity (British Business Bank, 2023). These models provide a useful contrast to the developing ecosystem in Algeria and offer lessons on how to build stronger and more efficient support structures.

In the Algerian context, several institutional inefficiencies and resource limitations are evident, which align with overall findings from the Progress towards the Sustainable Development Goals Report. Agencies frequently struggle with delayed services, unstable funding and poor coordination between the support structures. Structural issues in governance systems create operational gaps and hinder the development of a fully supportive entrepreneurial environment (Bouazzouz & Tahraoui, 2024). Furthermore, the support services remain concentrated in urban areas leaving rural regions with minimal access to resources (Zidane, 2022). Women and youth continue to face barriers as the current programs rarely provide gender responsive initiatives or mentoring and inclusive training opportunities remain limited (Hamza et al., 2024).

Conversely, the UK model shows how the inclusion can be institutionalized in terms of policy. For example, the dedicated initiatives of the British Business Bank such as the £450 million Women in Innovation Fund and diversity-oriented investment vehicles can help to see how the structural funding mechanisms can proactively support underrepresented founders (British Business Bank, 2024). These measures fill in systemic gaps and increase the opportunities of entrepreneurs who traditionally face challenges and barriers to finance and networks (OECD & GWEP, 2025). Such practices demonstrate the role of formal inclusion mandates in enhancing the participation of entrepreneurs a lesson

that can be applied to contexts like Algeria where the fragmented support systems and the gender-biased program delivery still exist.

Overall, the UK benefits from coordinated agency framework, formalized evaluation systems and the consistent digital processes. These elements facilitate reducing administrative burdens, expanding outreach and ensuring the transparency (Lopez et al., 2025). For Algeria, adopting aspects of these institutional practices especially digitalization, performance monitoring, and coordinated inclusivity policies could highly improve the effectiveness of the support agencies and enhance outcomes for marginalized entrepreneurs.

Methodology

This paper adopts a mixed-methods approach to analyze the effectiveness of support and accompaniment agencies in promoting inclusive entrepreneurship in a conclusive manner. It draws upon both quantitative and qualitative data enabling it to capture the macro environmental factors affecting entrepreneurs as well as the internal issues faced by agencies. This methodological choice also supports the comparative element of the study, where the UK serves as a reference point on the institutional practices relevant to Algeria.

Research Design

The research design combines survey data and interview findings to investigate the effects of PESTEL factors on the entrepreneurial experiences and how internal agency challenges shape support outcomes.This approach provides a more comprehensive understanding of the Algerian entrepreneurial environment and allows the findings to be compared with structured UK institutional models.

Justification for Mixed Methods

The mixed-methods approach was selected because the research examines two dimensions simultaneously:

- External macro-environmental pressures (PESTEL) faced by entrepreneurs, and
- Internal institutional challenges experienced by support agencies.

Quantitative data measures the effect of PESTEL factors on entrepreneurial outcomes, while qualitative data is used in order to gain a deeper insights of agency operations. The combination increases the study's validity and supports the comparative component with the UK case by offering a complete view of both systemic and institutional conditions.

Data Collection Methods

Quantitative Data Collection

A total of 250 Algerian entrepreneurs participated in the survey which focused on the PESTEL dimensions, using a structured methodology to include participants

representing marginalized groups such as youth, women and people with disabilities from different regions of Algeria. Other sections included in the survey addressed rates of entrepreneurial success and effectiveness of support agencies, which also contributed to the overall data collection.

Out of the 250 collected questionnaires 209 were retained for analysis due to incomplete demographic responses in 41 cases. Missing data were handled using listwise deletion to ensure consistency across statistical analyses. Therefore, all subsequent statistical analyses are based on valid responses (N = 209).

Qualitative Data Collection

A PESTEL analysis was conducted using qualitative data that was gathered through structured interviews with officials from key support agencies. The interviews assessed both background details of the agencies and their support programs as well as the challenges they faced and evaluated the effectiveness of their operations to explore potential areas for improvement. Each interview revealed how political, economic, social, technological, environmental, and legal elements affected agency operations. The analysis applied thematic coding on the responses to identify patterns of similar occurrence that were relevant to the PESTEL components. Through this research design the analysis preserved both the complete structural aspects and the contextual nuances of the entrepreneurial ecosystem in Algeria.

Sampling Technique

A purposive sampling technique was used for both the survey and interviews. Entrepreneurs were selected based on their belonging to marginalized categories (women, youth, and disabled people) and their interaction with support agencies. This ensured that the sample reflected the target population of the study.

For the qualitative component, agency officials were selected according to their administrative experience and involvement program delivery.This approach allowed the collection of relevant and information-rich data needed to understand institutional challenges and PESTEL influences.

Data Analysis

Quantitative Analysis

Descriptive statistics, correlation analysis, and trend analysis of the survey responses were conducted to determine the impact of the PESTEL factors on entrepreneurial outcomes. SPSS software was utilized for this purpose.

Control variables such as age, gender and sector as well as years of experience were not included in the regression models which may influence the observed relationships and represent a limitation of the study.

Qualitative Analysis

NVivo software was used to analyze the interview transcripts thematically. Analysis included PESTEL dimensions as main coding categories which allowed researchers to uncover patterns and obstacles with new business prospects. It revealed Supplementary significance of themes that relate to internal agency challenges and productive effectiveness.

Operationalization of PESTEL Variables

To ensure analytical clarity, each PESTEL dimension was operationalized using specific indicators measured through the survey and interview data.

- Political factors were assessed through variables related to government support policies, regulatory stability and the access to public programs.

- Economic factors included access to finance as well as funding availability and perceived economic stability.

- Technological factors measured the access to digital tools, infrastructure and innovation support services.

- Environmental factors reflected awareness of sustainability practices and environmental constraints affecting business operations.

- Social factors captured cultural norms, societal support as well as inclusivity perceptions toward marginalized entrepreneurs.

- Legal factors included regulatory complexity, administrative procedures and compliance requirements.

These indicators were integrated into the quantitative analysis and qualitative thematic coding to evaluate their influence on entrepreneurial outcomes and agency effectiveness.

Integration of Findings

The research findings collected through survey and interview data allowed the researchers to develop a full understanding of the impact of external factors and barriers to entrepreneurship. Through this integration of various research methods, the study achieves more validity as well as deeper insight.

The findings were then aligned with the UK benchmark to determine institutional differences, gaps in support systems and practices that Algerian agencies could adopt or adapt.

Integration of the UK Benchmark in the Methodology

The UK was included in this study as a benchmark because it has a well-developed entrepreneurial support system that shows how structured and coordinated agencies operate. Such Programs like Innovate UK and the British Business Bank apply to structured

support mechanisms, digital tools, and inclusion requirements that are helpful for comparison with developing countries.

In this study, the UK is not presented separately. Instead, it is used to help interpret the Algerian findings and highlight differences in support practices, levels of coordination, and policy implementation. This comparison allows the study to identify gaps in the Algerian ecosystem and understand which elements from the UK model can be used to inform future improvements.

It is important to note that the UK comparison is based on secondary data and institutional reports rather than primary empirical data collection, and is therefore used solely as a contextual benchmark for interpreting Algerian findings.

Results and Discussion

Demographic Characteristics

Table no. 1. Demographic Characteristics

		Count	%
Age	Under 20	44	21.1%
	20-30 years	56	26.8%
	31-40 years	51	24.4%
	41-50 years	32	15.3%
	Over 50 years	26	12.4%
Sex	Female	100	47.8%
	Male	109	52.2%
Level of Education	Primary	40	19.1%
	Secondary	59	28.2%
	Vocational	39	18.7%
	University	71	34.0%
Type of Business	Retail	56	26.8%
	Services	62	29.7%
	Manufacturing	54	25.8%
	Agriculture	37	17.7%
Years of Activity	Less than 1 year	45	21.5%
	1-3 years	52	24.9%
	4-6 years	42	20.1%
	7-10 years	40	19.1%
	Over 10 years	30	14.4%
	Yes	85	40.7%

Do you have a disability?	No	124	59.3%

Source: Author's elaboration based on field survey data (2025).

Data obtained from valid responses (N = 209) indicates a wide and dynamic entrepreneurial environment. Nearly half of the responders fall within the age range of 20-30 years (26.8%) and 31-40 years (24.4%) showing substantial entrepreneurial interests while maintaining equal gender distribution (52.2% male and 47.8% female). Higher education stands out as significant for entrepreneurial success due to its prevalence among respondents at 34.0%. The Algerian economy reflects multiplicity with services (29.7%) and retail (26.8%) as major form of businesses. A vibrant entrepreneurial space exists due to the fact that most businesses start up fresh or maintain a brief operational period of 1-3 years which represents 21.5% and 24.9% respectively. A notable proportion of respondents (40.7%) reported having a disability, indicating representation of this group within the sample. However, this does not necessarily reflect overall inclusivity at the national level.

Reliability of Measurement Scales

To determine the reliability of the scales in terms of internal consistency, Cronbach's alpha reliability tests were conducted. Internal consistency analysis showed that the scale 24 items possessed consistent measurement with alpha values of $\alpha \geq 0.7$. According to Shevlin et al. (2000), the research shows that a strong Cronbach's alpha score indicates reliable measurement and consistent participant responses.

Table no. 2. Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.819	24

Source: Author's elaboration based on empirical data processed using SPSS software.

Hypothesis Testing and Statistical Results

H1: Support from accompaniment agencies has a significant positive effect on entrepreneurial success among marginalized groups.

The Research investigations through regression analysis measured how accompaniment agency support influenced entrepreneurial success rates for three distinct groups: female entrepreneurs, individuals with disabilities and the youth (under 20, between 20 and 30 years old).

Table no. 3. Regression analysis

Group	R^2	*F*	*p-value (F)*	*Coefficient*	*p-value (Support)*
Women	0.202	24.756	< .001	0.455	< .001
Disabled individuals	0.217	33.851	< .001	0.436	< .001
Young People	0.315	45.003	< .001	0.582	< .001

Source: Author's elaboration based on statistical regression outputs computed from field data.

Women's entrepreneurial success shows a 20.2% association ($R^2 = 0.202$) with support from accompaniment agencies. The results show a statistically significant positive effect as measured by the regression analytics ($F = 24.756$, $p < .001$) with a coefficient value of 0.455 ($p < .001$). This indicates that women entrepreneurs achieve higher success rates when they receive increased support from accompaniment agencies.

Statistical data indicates that support from accompaniment agencies contributes to 21.7% of entrepreneurial success outcomes ($R^2 = 0.217$) for disabled individuals. Support demonstrates a substantial positive link with entrepreneurial success according to the model results ($F = 33.851$, $p < .001$) while showing a coefficient value of 0.436 ($p < .001$). The research indicates that Support levels which increase above average lead entrepreneurs with disabilities to achieve better outcomes.

As for young people (under 20 and from 20 to 30 years old), The analysis shows that support provided by accompaniment agencies correlates to 31.5% of entrepreneurial success ($R^2 = 0.315$). The model shows a statistically significant fit ($F = 45.003$, $p < .001$) where a coefficient of support variable = 0.582 ($p < .001$) indicates a large positive relationship between both factors. Young entrepreneurs experience more favorable outcomes when they receive higher levels of support.

The findings from these regression analyses reveals that Support from accompaniment agencies stands out as a vital factor to promote entrepreneurial growth and success of marginalized groups. Results from all groups indicate that proper support mechanisms represent a critical factor which affects the development of entrepreneurial success that align with the requirements of women, individuals with disabilities, and youth.

The regression results support the hypothesis that support provided by accompaniment agencies prompts significant positive impacts in terms of entrepreneurial success within marginalized communities (H1). The entrepreneurial success rate increases directly with higher levels of support through significant positive coefficient results across the examined demographic groups.

H2: PESTEL factors significantly moderate the relationship between support from accompaniment agencies and entrepreneurial success among marginalized groups.

This analysis aims to examinate the impact of PESTEL factors on how accompaniment agency support affects entrepreneurial success of marginalized groups. The investigation focuses on three marginalized. The PROCESS macro for SPSS served to analyze interactions between variables while performing moderation analysis.

Table no. 4. Moderation analysis

Group	R^2	*F*	*p-value (F)*	*Coefficient*[1]	*p-value*[1]	*Coefficient*[2]	*p-value*[2]	*Coefficient*[3]	*p-value*[3]
Women	0.2795	12.4151	< .001	0.0657	0.8979	0.5445	0.3352	0.0445	0.7780
Disabled individuals	0.2649	14.4159	< .001	-0.2169	0.5731	-0.1115	0.8004	0.1601	0.1768
Young People	0.4082	22.0741	< .001	0.4292	0.1968	0.7899	0.0107	-0.0468	0.6259

**1 = (Support), 2 = (PESTEL), 3 = (Interaction)*

Source: Author's elaboration based on data processed via the PROCESS macro for SPSS.

The analysis examined PESTEL factors interactions with accompaniment agency support through moderation tests applied to women, individuals with disabilities, and youth. For women, the predictive variables successfully explain 27.95% of entrepreneurial success outcomes ($R^2 = 0.2795$) showing statistical significance ($F = 12.4151$, $p < .001$). However, the interaction term (Support x PESTEL) did not demonstrate statistical significance ($\beta = 0.0445$, $p = 0.7780$) which indicates PESTEL factors fail to impact the relationship between accompaniment agency support and entrepreneurial success for women. Results indicate that accompaniment agencies maintain consistent support effectiveness for entrepreneurial success no matter what external PESTEL factors represents.

Similarly, for individuals with disabilities, the research models specified that predictors account for 26.49% of the variance in entrepreneurial success ($R^2 = 0.2649$) when the model remains statistically significant ($F = 14.4159$, $p < .001$). The (Support x PESTEL) interaction term fails to reach statistical significance ($\beta = 0.1601$, $p = 0.1768$) thereby indicating PESTEL factors do not impact the relationship between accompaniment agency support and entrepreneurial success for individuals with disabilities.

For young people, analysis revealed that the variables predict 40.82% ($R^2 = 0.4082$) of entrepreneurial success and shows a statistical significance at $F = 22.0741$ ($p < .001$). However, the interaction term (Support x PESTEL) did not demonstrate statistical significance ($\beta = -0.0468$, $p = 0.6259$), which indicates PESTEL factors fail to impact the relationship between accompaniment agency support and entrepreneurial success among youth.

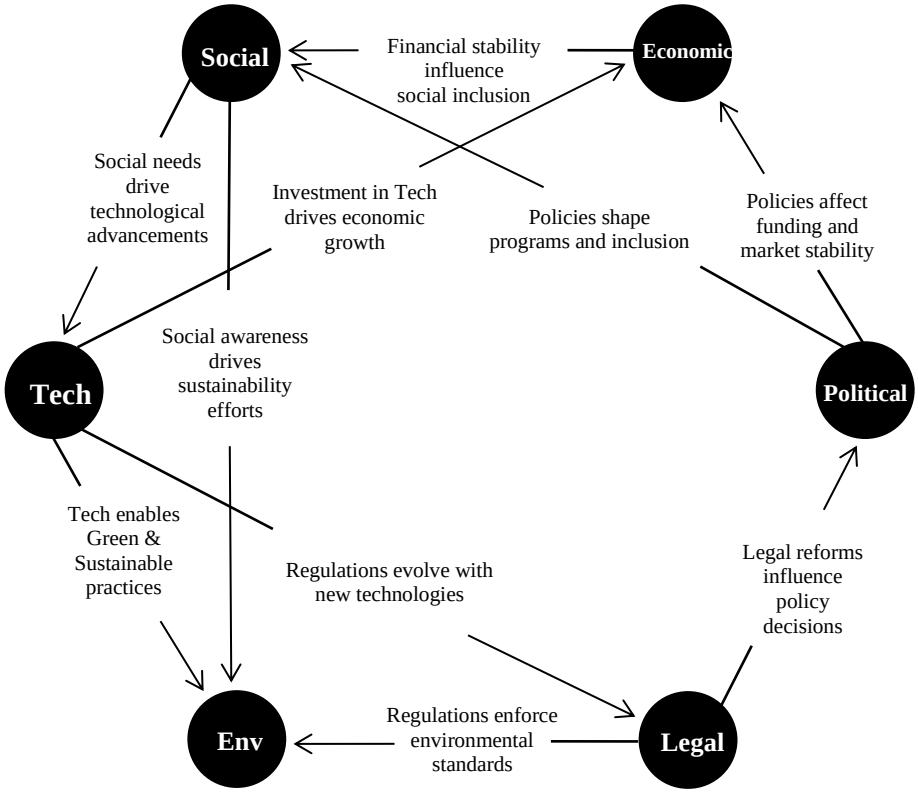
Overall, the findings of the moderation analyses do not provide statistical support for the hypothesis that PESTEL factors can have substantial moderating effects on the relationship between support by accompaniment agencies and entrepreneurial success in marginalized groups (H2). The findings show that support from accompaniment agencies foster entrepreneurial success among marginalized groups regardless of the external environment.

This indicates that while PESTEL factors shape the operational environment of agencies they do not statistically alter the strength of the relationship between support and entrepreneurial success. This apparent divergence suggests that while PESTEL factors influence contextual conditions their effects are indirect and not captured as statistical moderators in the quantitative model.

PESTEL Analysis: Fostering Inclusive Entrepreneurship

External factors affecting the entrepreneurial ecosystem interact differently using the PESTEL analysis. These factors affect inclusive entrepreneurship by interacting in a complex way that forms either supportive conditions or obstacles to its advancement. For instance, political funding and regulation policies directly affects economic stability while determining the availability of financial resources for entrepreneurs. In turn economic conditions affect social participation opportunities, particularly for the marginalized groups who may struggle to tap into entrepreneurial opportunities. Social and economic Barriers get solutions from Technological advancements although they are limited by outdated infrastructure and rigid legal constraints. The current Economic sustainability and policy directions receive influence from environmental concerns such as climate change and resource scarcity problems. These interactions demonstrate that the development of entrepreneurship requires a holistic adaptive approach.

Figure no. 1. Interactions between PESTEL Factors



Source: Author's own compilation based on PESTEL analysis and field data (2025).

- **Political Factors:** Support and accompaniment agencies depend heavily on political elements that determine their framework through government regulations and policies. The changes in laws and policies related to funding mechanisms, tax incentives, and regulatory frameworks affect support agencies through a combination of chances and difficulties.

- **Economic Factors:** Economic factors influence support program sustainability through the inflation rates, funding instability, and economic downturns. The insufficient funding available for programs remains the primary obstacle to their growth while economic recessions cause critical resource shortages which negatively impact entrepreneurial programs.

- **Social Factors:** Support programs are designed and delivered based on cultural norms, gender roles and social expectations. In order to overcome these social barriers, agencies put in place special programs targeted at fulfilling the unique needs of marginalized groups.

- **Technological Factors:** The entrepreneurial support environment has changed through technological advancements that include artificial intelligence, e-learning systems and digital marketing instruments. However, the successful implementation of modern entrepreneurship support is challenged by two major barriers, outdated infrastructure systems, and limited digital tools.

- **Environmental Factors:** The development of green energy and sustainable operation standards creates new entry points for entrepreneurs to build their business. Additionally, the impact of environmental factors particularly affects logistical operations in locations that experience negative effects of climate change.

- **Legal Factors:** The implementation of programs faces substantial effects from legal frameworks through their complicated licensing procedures as well as financial regulation needs and regulatory compliance standards. Agencies support legislative changes to simplify bureaucratic procedures, decrease administrative obligations and establish favorable business conditions for inclusive entrepreneurship.

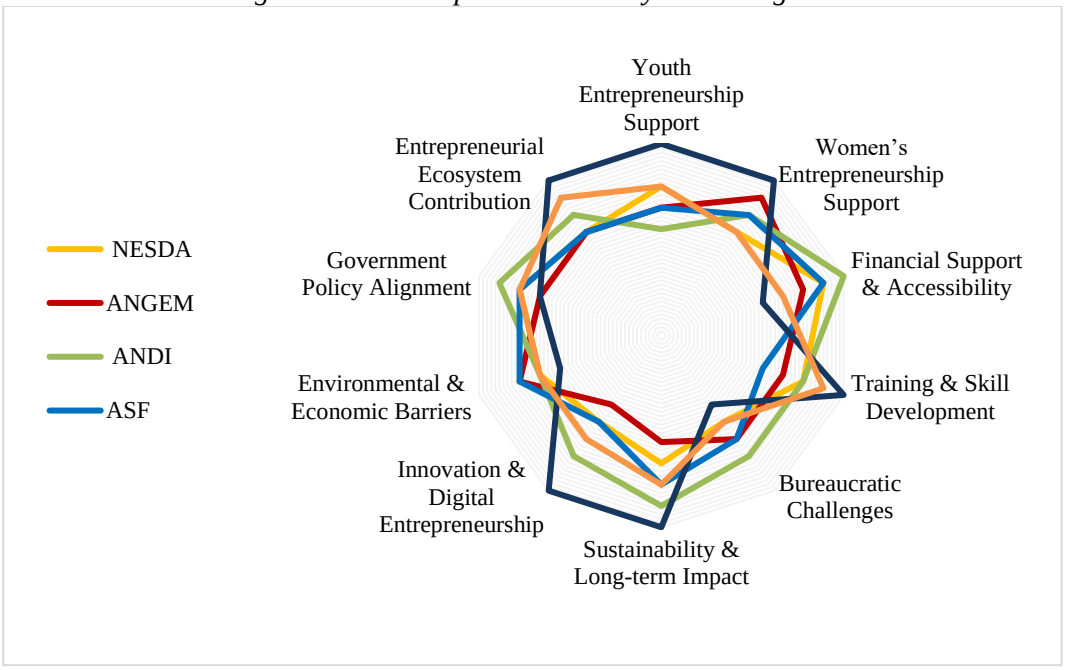
According to the PESTEL analysis, External factors interacting with each other create significant dynamic conditions which influence the development of inclusive entrepreneurship.

Synthesizing PESTEL and Field Data: A Radar Mapping of Inclusive Entrepreneurship Dimensions

The PESTEL analysis provided qualitative insights into the external factors influencing the operations of support agencies. While qualitative evidence shows that PESTEL factors shape agency operations and create potential opportunities and barriers, the quantitative survey data processed by the PROCESS macro for SPSS indicates that PESTEL factors did not demonstrate a significant moderating effect on the relationship between accompaniment agency support and entrepreneurial success among marginalized communities. As revealed by the PESTEL analysis results and regardless of external challenges, the effectiveness of agency support shows statistical strength and stability across various external environmental conditions. This highlights a distinction between perceived external influences captured qualitatively and measurable statistical moderation detected in the quantitative model.

Based on these insights, a Radar Analysis was developed to offer a systematic visualization of the Algerian entrepreneurial ecosystem. Multiple sources including PESTEL analysis findings, survey responses from marginalized entrepreneurs and qualitative interviews from agency officials were used to create this Radar chart. Such combined data allows the researcher to carry out a multi-dimensional analysis between some of the key factors including youth and women entrepreneurship as well as agency impact together with sectoral representation and environmental barrier.

Figure no. 2. Entrepreneurial Ecosystem in Algeria



Source: Author's own compilation based on PESTEL analysis and field data (2025).

By mapping these dimensions, the chart shows how to create a full understanding of the strengths and limitations within the support system, thus supporting the requirements for specific policy changes. It illustrates inequalities in support dimensions with stronger performance in youth and financial support compared to innovation, sustainability and bureaucratic efficiency highlighting the need for a coordinated and inclusive ecosystem reform. This mapping also visualizes the precise areas where external pressures (revealed by PESTEL) translate into structural weaknesses, which creates a bridge between individual entrepreneurial experiences and gaps in the institutional systems.

The results obtained from both statistical analysis and qualitative insights reveal the strengths and the weaknesses of existing support ecosystem in Algeria. To better contextualize these findings it is important to interpret them alongside international practices especially the structured models applied in the United Kingdom. This comparative lens provides a clearer understanding of where Algerian agencies are in line with the international standards and where the institutional gaps still exist.

Therefore, the synthesis presented in this section serves as the foundation for the comparative framework that follows showing how the ecosystem of Algeria performs internally and how it contrasts with more mature models such as the UK.

Broader Relevance and Comparative Insights

While the analysis is rooted in Algeria, the emerging patterns in this study apply to many developing countries. These difficulties can be closely related to other areas of the Global South, where similar issues, including administrative complexity, policy discrepancy, and discrimination against particular social groups, can be readily found. For instance, entrepreneurship ecosystems in some regions of Sub-Saharan Africa, Tunisia and Egypt, report comparable inefficiencies in public support systems.

The PESTEL based evaluation framework utilized in this paper can serve as a replicable model to diagnose weaknesses in the ecosystems beyond Algeria.

Against this benchmark, the Start up Loans program in the UK provides a good example of how formal performance monitoring and broad outreach can benefit any initiative. With a 69% five year survival rate with clear activity surrounding targeting marginalized populations, this program brings to light how systematic monitoring and systems of accountability can help enhance the success of entrepreneurs in the long-term. Similar formalized systems could be adopted to the Algerian ecosystems to achieve transparency, reach and refinement of policies.

Comparative Framework: Algeria vs. the United Kingdom

The results from Algeria can be further contextualized in terms of a more mature entrepreneurial ecosystem like that of the United Kingdom to provide deeper perspective. Through a systematic comparison of the two countries in terms of essential institutional dimensions we can identify strengths, gaps and policy lessons. The following table presents a side-by-side comparison of Algeria and the UK, focusing on support mechanisms, coordination, digitalization, inclusivity, and other critical factors.

Table no. 5. Comparative Institutional Framework between Algeria and the UK

Dimension	Algeria	United Kingdom	Key Difference	Implication for Algeria
Institutional Coordination	Fragmented support system; agencies operate separately with limited coordination.	Highly coordinated ecosystem under UKRI and British Business Bank with clear integration.	UK has structured multi-agency coordination; Algeria has isolated institutions.	Algeria needs coordinated programs and shared operational frameworks.
Digitalization of Support Services	Limited digital tools, reliance on paperwork and in-person procedures.	Strong digital platforms (online applications, automated systems, monitoring dashboards).	Digitalization is fully operational in the UK.	Invest in digital transformation to reduce delays and increase transparency.

Funding Structure	Frequent financial shortages; unstable funding cycles; complex access to credit.	Stable, diversified funding (Start Up Loans, Innovate UK grants, women-specific funds).	UK funding is predictable and structured; Algeria faces scarcity.	Adopt clearer funding mechanisms and targeted financial programs.
Inclusivity Programs	Few gender-specific or disability-specific programs; limited outreach.	Clear inclusion policies (Women in Innovation Fund, disability access regulations).	UK has institutionalized inclusivity; Algeria has emerging but limited programs.	Create formal inclusion strategies and gender-focused initiatives.
Performance Monitoring	Weak evaluation systems; limited tracking of program outcomes.	Structured monitoring and annual reporting of startup survival and performance.	UK monitoring is systematic; Algeria lacks formal evaluation.	Implement monitoring tools to improve accountability and program efficiency.
Bureaucratic Efficiency	Multiple administrative delays and complex procedures.	Simplified processes with standardized documentation and clear timelines.	UK reduces bureaucracy; Algeria remains slow.	Simplify procedures and reduce administrative burdens.
Ecosystem Maturity	Developing ecosystem with uneven regional distribution (urban-centered).	Mature ecosystem with strong regional entrepreneurship hubs.	UK system is advanced; Algeria still building capacity.	Expand support services beyond major cities and strengthen local ecosystems.

Source: Author's elaboration based on field data and institutional reports (2020-2025).

Interpretation and Policy Lessons

This comparison illustrates the clear differences in institutional maturity and operating patterns between the Algerian and the British entrepreneurial ecosystems. While Algerian agencies show strong commitment to supporting youth, women and people with disabilities, they struggle with poor coordination, limited digital infrastructure and weak performance monitoring. On the contrary, the UK model presents the impact of structured multi-agency coordination, inclusive funding mechanisms and the effecient digital systems that can result in more sustainable and scalable support.

For Algeria, the lessons are tangible: by investing in digital platform development and creating formal evaluation systems as well as enhancing the coordination of agencies can help policymakers significantly to increase the reach and impact of support programs.

Additionally, by creating inclusion-specific initiatives, including gender-targeted funds, can address gaps that continue to exist in entrepreneurial accessibility for the marginalized groups. This comparative insight underscores the value of adopting adapted versions of UK institutional practices to reinforce Algeria's support system and drive more equitable, effective entrepreneurship outcomes.

Conclusion

This paper has explored how effective support and accompaniment agencies are in fostering inclusive entrepreneurship for marginalized groups highlighting the effects of institutional systems, policy structures and the challenges they face. The study shows that a more specific and driven approach is needed, as one size fits all strategies are insufficient and require adaptable policies tailored to different entrepreneurial groups. While grounded in Algeria, the findings are also relevant to other developing economies and emphasize the importance of the structured institutional models such as those in the UK where coordinated support as well as digital procedures and formal evaluation systems strengthen outcomes for marginalized entrepreneurs.

Managerial Implications

This study offers several key managerial implications for the policymakers and support agency leaders aiming to foster inclusive entrepreneurship. Findings highlight the need for government bodies to cooperate with private sector entities and NGOs to build supportive ecosystems for marginalized entrepreneurs. Agency managers need partnerships where they can consolidate resources or pool their programs to expose it to a larger audience, especially in the rural or underserved areas. Additionally, they must be aware of the dynamic macro environmental highlighted in this study and adopt flexible strategies to keep agencies receptive to the changing circumstances. Being proactive in addressing the policies and providing services on these factors ensures the long-term sustainability of inclusive entrepreneurship initiatives.

Suggestions and Recommendations

The following recommendations address the institutional gaps identified in the empirical findings, particularly those related to bureaucratic inefficiencies, weak coordination as well as limited access to finance and insufficient digitalization.

- **Entrepreneurial Sandboxes:** Given the regulatory constraints and bureaucratic delays identified in the findings the Entrepreneurial Sandbox approach allows marginalized entrepreneurs to test new business models with reduced regulatory constraints and receive real world feedback before fully committing to the project.

- **Digital Twin for Entrepreneurial Policy Design:** In response to the identified gaps in data-driven policy design and coordination, a Digital Twin for Entrepreneurial Policy Design can be created within the framework of marginalized groups to assess the needs and potential of entrepreneurs from underserved communities, analyzes data to identify common challenges and proposes tailored policy solutions while identifying the high potential industries.

- **Entrepreneurial Support Credits:** Considering the limited access to finance highlighted in the results the Entrepreneurial Support Credits serves as a solution to fill this gap. Government could offer access to capital, mentorship and business infrastructure resources by providing it as rewards for entrepreneurial or educational achievements.

- **Startup-as-a-Service Platform (SaaS Platform for Entrepreneurs):** To address the lack of coordination and digital infrastructure identified in the analysis, Algeria could develop centralized Startup as a Service Platform where it provides ready made business templates, including licenses, legal frameworks, and pre-designed patterns.

Based on GOV.UK Business Support portal of the UK, this service platform makes all services including grants, mentoring, or legal guidance, available in one accessible, easy to reach digital space to enhance transparency and efficiency. Further, Algeria might emulate the Start up Loans scheme in the UK which takes the form of microloans, coupled with personalized mentoring. A localized version would be beneficial for marginalized entrepreneurs. Finally, inclusion mandates like the UK Invest in Women Fund would help create systematic support of underserved groups due to earmarked funds and diversity based outreach efforts. These are among the strategies that would be incorporated in GSSI to enable Algeria create an inclusive entrepreneurial ecosystem that minimizes barriers to entry, increases coordination, and enshrines equity in startup support systems.

Future Research Avenues

This research produced valuable insights yet it carries multiple restrictions. It does not control for demographic and firm-level variables such as age, gender, sector or experience which may influence outcomes. The sample is predominantly urban-based, limiting generalizability to rural areas. While the study examines accompaniment agencies in Algeria, its findings may not fully apply across different economic and socio-cultural contexts. Although PESTEL factors were analyzed, they did not show significant moderation effects. Future research should focus on specific PESTEL dimensions, particularly political and legal factors, explore digital transformation and innovation and use longitudinal studies to assess longterm impacts.

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Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: I, Year: 2026, pp. 60-78
DOI: 10.37708/em.swu.v23i1.4

THE IMPACT OF ELECTRONIC MEDICAL RECORDS ON DIGITAL TRANSFORMATION IN ALGERIAN PUBLIC HEALTHCARE INSTITUTIONS: A CASE STUDY OF THE "MOHAMED BENNANI" PUBLIC HOSPITAL IN RAS EL OUED, ALGERIA

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Received: 30.09.2025, Accepted: 15.01 2026

Abstract

This study aims to examine how Electronic Medical Record (EMR) adoption advances digital transformation in Algeria's healthcare sector, using Mohamed Bennani Public Hospital as a case study. It seeks to assess readiness and progress across administrative, technical, financial, and human-resource dimensions, and identify key drivers and barriers to EMR uptake, and estimate expected gains from implementation. Using a mixed-methods approach (descriptive analysis and empirical data from healthcare professionals), expected results point to moderate progress: administrative initiatives are better aligned with national strategies than infrastructure, funding, and staff capacity. EMRs are expected to strengthen communication, accountability, and data security, but adoption may be slowed by limited IT infrastructure, insufficient training, workflow disruptions, staff resistance, and patient dissatisfaction with digital triage in emergency care. The paper anticipates recommending targeted training, sustainable IT funding, and internal technical expertise to support Algeria's Digital 2030 agenda.

***Keywords**: Digital transformation; Electronic medical records; Public healthcare; Healthcare digitization; Resource constraints.*

***JEL Codes**: I10, I18*

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Introduction

The world is witnessing a significant revolution in the field of information and communication technologies, which has directly impacted human lifestyles. Modern technological tools and their associated applications have become fundamental to daily interactions for individuals and institutions (Bouchareb, 2023). Consequently, all countries have rushed to keep pace with these technological advancements by adopting comprehensive digital strategies that embody digital transformation across all sectors to improve service quality and accessibility.

Algeria is among the countries striving to achieve digital transformation in various sectors through its national strategy "Digital Algeria 2030," which aims to modernize government sector management, enhance service quality, and ensure transparency in transactions. The healthcare sector has been prioritized as one of the first sectors to undergo digital transformation by adopting new management methods based on information technologies. This shift aims to transition from traditional paper-based operations to electronic systems built on ICT, thereby improving healthcare efficiency and facilitating access to medical information.

Medical records are the primary source of health information about patients. Organizing and preserving these records in an electronic medical file—which includes medical examinations, lab results, treatment plans, medications, and more—has emerged as a new and effective tool for achieving digital transformation (Guerriche et al, 2024; Filipova et al, 2023). The electronic medical record (EMR) serves as an integrated digital platform that enables information exchange among healthcare stakeholders, enhances coordination, and clarifies responsibilities, thereby improving service quality.

Transitioning to EMRs depends on fulfilling the material, technical, financial, and human requirements of digital transformation. However, this shift poses multifaceted challenges related to infrastructure, training, privacy, cybersecurity, and more, all of which impact the success and sustainability of the project. Therefore, investigating the impact of EMR adoption on digital transformation in Algeria's healthcare sector is critical. This study seeks to address this through the following research question:

What is the impact of electronic medical records on digital transformation at the Mohamed Bennani Public Hospital in Ras El Oued, Algeria?

This study holds critical importance as it addresses two pivotal dimensions within public healthcare institutions: the adoption of electronic medical records (EMRs) and the broader framework of digital transformation. These themes align directly with Algeria's national strategy, *Digital Algeria 2030*, which prioritizes modernizing public sector management through technological integration (Algerian Ministry of Health, 2023). By

focusing on the Mohamed Bennani Public Hospital, the research sheds light on the practical challenges and opportunities of digitizing healthcare systems in a developing context. It underscores the Algerian Ministry of Health's commitment to leveraging cutting-edge technologies to enhance service quality, reduce administrative and medical errors, and improve patient outcomes and gaining their consumer satisfaction (Ismail et al, 2021). The study contributes to understanding the real-world application of EMRs in resource-constrained settings, offering insights into infrastructure requirements, workforce readiness, and cybersecurity concerns. The findings also provide actionable recommendations for policymakers and healthcare administrators to accelerate digital adoption while addressing systemic barriers. By bridging theoretical frameworks with empirical data, this research advances academic discourse on digital transformation in healthcare and serves as a practical guide for institutions navigating similar transitions globally.

Literature Review

Digital Transformation and Its Characteristics

Digital transformation refers to the integration of digital technologies into all aspects of an organization, fundamentally reshaping its operations, culture, and value delivery. According to the Online Dictionary for Library and Information Science (ODLIS), digital transformation involves converting information into computer-readable formats to enable computational processes. Stolterman and Fors (2004) expand this definition, emphasizing that digital transformation transcends technological adoption; it represents a societal shift driven by digital technologies, altering human behavior, organizational structures, and interactions. In the context of higher education, Adel Mohamed (2023) defines it as the transition from traditional administrative and academic practices to systems leveraging information and communication technologies (ICT) to enhance efficiency and accessibility. Similarly, Kheira Chaouchi and Zahra Khelouf (2023) describe digital transformation in Algeria as a strategic imperative to modernize public sectors, including healthcare, through ICT adoption. The transition of institutions from traditional operational models to ones reliant on digital technologies for innovating products, services, management, and marketing. This shift creates new revenue channels through digital strategies, requiring an evaluation of digital capabilities and managerial willingness to embrace change (Chaouchi & Khelouf, 2023; Salami & Boushi, 2019).

Digital transformation represents a strategic overhaul of administrative practices, enabling organizations to adopt modern technological tools (hardware and software) that prioritize service speed, cost reduction, quality enhancement, and accessibility. This shift

replaces traditional paper-based and labor-intensive methods with efficient, technology-driven processes.

Digital transformation endows organizations with a distinct set of characteristics that fundamentally reshape their operations and competitive positioning. Primarily, it enhances organizational adaptability, enabling businesses to respond effectively to rapidly changing and diverse market environments. This transformation fosters competitive differentiation by equipping organizations with unique capabilities that create sustainable advantages in their respective industries (Al-Matraf, 2020). Furthermore, it provides access to cutting-edge technologies, often of global standards, that drive innovation and efficiency. A key outcome is the establishment of transparency and integrity within digitally transformed organizations, achieved through clearly defined roles, responsibilities, and objectives, which facilitate daily decision-making without reliance on traditional hierarchical structures. Beyond these core benefits, digital transformation fundamentally alters organizational dynamics by shifting focus toward intangible assets such as intellectual property, software development, algorithms, and creative content (Plekhanov et al, 2022). It eliminates geographical barriers, allowing organizations to leverage internet platforms to establish and maintain cross-border relationships with clients (Abdelhamid, 2023). Perhaps most significantly, it enables the transition from paper-based administrative systems to digital management solutions, introducing innovative approaches to information recording, storage, retrieval, and transfer that significantly enhance operational efficiency (Salmi & Boushi, 2019; Abdelhamid, 2023; Al-Matraf, 2020). This comprehensive transformation represents not merely a technological upgrade, but a fundamental reimagining of organizational processes and strategies in the digital age.

Digital transformation in healthcare improves service quality, reduces costs, and enhances patient outcomes. Digitizing medical records streamlines data access, reduces diagnostic errors, and enables real-time monitoring of epidemics like COVID-19 (Bouhafa, 2021). Electronic health records (EHRs) facilitate personalized care, evidence-based decision-making, and efficient resource allocation (Kamel, 2023). Furthermore, digital platforms enhance transparency by clarifying roles and responsibilities among healthcare providers, as observed in analyses of Algeria's healthcare sector (Peral et al, 2020).

Electronic Medical Records (EMRs)

The electronic medical record (EMR) is a cornerstone of digital transformation in public healthcare institutions. While it shares the same functional purpose as traditional paper records, it differs in nature, features, flexibility, and benefits. The American Health Information Management Association defines an EMR as a digital medical record containing all personal and administrative patient data, diagnostic information, medical

history, vital signs, treatment procedures, and consent documentation (McLean, 2006). It is further described as a dynamic medical file created during patient-doctor interactions, encompassing clinical notes, imaging results, prescriptions, lab data, treatment reports, and medical timelines, accessible to authorized healthcare providers across institutions (Sharif et al., 2023). Additionally, EMRs are machine-readable documents stored on computers, allowing restricted access to authorized personnel only, and populated through direct data entry or digitized scans of medical documents (Goodrum et al, 2020; Niu et al, 2020). In essence, EMRs digitize paper-based records using information technology, offering advantages such as flexibility, ease of access, and centralized patient data management (Roca et al, 2024).

Electronic Medical Records (EMRs) are defined by a suite of features that enhance accuracy, security, and interoperability within healthcare systems. A foundational characteristic is confidentiality and security, achieved through role-based access controls that restrict patient data visibility to authorized personnel such as doctors, nurses, and lab technicians, thereby safeguarding sensitive information (Bouhafa, 2021). Additionally, EMRs enable the integration of medical documents by consolidating imaging results, lab reports, prescriptions, and other critical records into a unified digital file, streamlining data management (Sharif et al., 2023). Another key feature is the variable data lifecycle, which distinguishes between permanent patient identifiers (e.g., names, demographics) and dynamic clinical data (e.g., treatment plans, lab results), ensuring both stability and adaptability in record-keeping (Laforest et al., 2002). Finally, EMRs enhance coordination and communication across healthcare departments by facilitating real-time data sharing, fostering collaboration and ensuring cohesive patient care (Smaili & Akkrouf, 2024). Together, these characteristics underscore the transformative potential of EMRs in modernizing healthcare delivery.

Method

This study adopted a mixed-methods approach, combining theoretical and empirical components to evaluate the impact of electronic medical records (EMRs) on digital transformation in a public healthcare setting. The descriptive-analytical framework was first employed to explore theoretical concepts related to EMRs and digital transformation through a review of academic literature, institutional reports, and global best practices. This phase aimed to establish a foundational understanding of key variables, including administrative, technical, human-resource, and financial requirements for digitization.

For empirical validation, a cross-sectional survey was conducted using a structured questionnaire distributed to 70 healthcare professionals (doctors, nurses, administrators, and technicians) at the target institution. A total of 55 valid responses were collected,

representing a response rate of 78.57%. The questionnaire, designed to assess perceptions of EMR implementation and digital transformation challenges, underwent reliability testing via Cronbach's alpha, yielding a score of 0.807, indicating high internal consistency.

Table no. 1. Reliability of the Study Tool Using Cronbach's Alpha Coefficient

Study Axes and Dimensions	Number of Items	Reliability Coefficient (α)	Measurement Quality
Digital Transformation Requirements	16	0.856	Good
Administrative Requirements	4	0.688	Acceptable
Technical Requirements	4	0.639	Acceptable
Human Resources Requirements	4	0.769	Good
Financial Requirements	4	0.709	Good
Electronic Medical File	11	0.627	Acceptable
Total Questionnaire	27	0.807	Excellent

Source: Prepared by the researchers, based on SPSS outputs.

Data analysis was performed using SPSS (v25), with descriptive statistics (mean, standard deviation) summarizing participant responses and inferential statistics (Pearson's correlation, linear regression) identifying relationships between variables.

To ensure the validity of parametric tests, the Kolmogorov-Smirnov test was applied to confirm normal data distribution. The analysis focused on evaluating the alignment of EMR adoption with organizational readiness, infrastructure adequacy, and workforce adaptability. This methodology provided a comprehensive lens to assess both qualitative insights and quantitative trends, ensuring a robust evaluation of digital transformation dynamics in the healthcare context.

To answer the main questions, the following hypotheses were proposed:

- The electronic medical record (EMR) serves as a replacement for paper-based records, differing only in technical features rather than core functionality.
- The requirements for digital transformation in public healthcare institutions include material, technical, financial, and human resources.
- The implementation level of EMRs at the Mohamed Bennani Public Hospital is high.
- The level of digital transformation at the Mohamed Bennani Public Hospital is high.

Results and Discussion

Digital Transformation Requirements

The analysis of participants' responses to statements regarding digital transformation requirements at the Mohamed Bennani Public Hospital revealed varying levels of agreement across administrative, technical, human-resource, and financial dimensions. The findings, summarized in Table 2 below, highlight strengths and areas for improvement in the hospital's digitization efforts.

Table no. 2. Analysis of Participants' Responses to Statements on "Digital Transformation Requirements"

No.	Statements	Mean	SD	Relative Importance	Approval Level
Administrative Requirements					
01	The hospital administration supports digitization policies across all departments.	4.0226	0.87129	02	High
02	The administration selects qualified personnel to oversee the digitization project.	4.1226	0.47519	01	High
03	The administration holds regular meetings to address digitization challenges.	3.6452	1.11201	03	High
04	The administration develops training programs for staff in digitization.	3.5774	0.94471	04	High
Administrative Requirements (Total)		**3.7919**	**0.63405**	**1st**	**High**
Technical Requirements					
05	The hospital provides adequate equipment for digitization (computers, networks, software, etc.).	4.0323	0.79515	01	High
06	The hospital upgrades hardware and software for its electronic information system.	3.5452	0.75491	02	High
07	Computers in the hospital have information security systems.	3.3548	1.11201	03	Moderate
08	Existing technical equipment meets digitization needs.	3.3516	0.92516	04	Moderate
Technical Requirements (Total)		**3.3210**	**0.62873**	**2nd**	**Moderate**
Human Resources Requirements					
09	The hospital has qualified staff to use IT equipment.	3.7419	0.89322	01	High
10	Staff skills in digitization align with assigned tasks.	3.2581	1.06357	03	Moderate

11	Staff receive training on digitization tools.	3.0806	0.99244	04	Moderate
12	Staff exchange information using modern digital technologies.	3.3548	1.01812	02	Moderate
Human Resources Requirements (Total)		**3.2839**	**0.76359**	**4th**	**Moderate**
Financial Requirements					
13	The hospital secures sufficient funding for digitization equipment.	3.5161	0.85131	01	High
14	Technical malfunctions are inspected and repaired promptly.	3.2710	0.80589	02	Moderate
15	The hospital allocates funds for data protection and recovery systems.	3.1935	0.90992	03	Moderate
16	The hospital allocates funds for expert services in digitization.	3.0000	1.03280	04	Moderate
Financial Requirements (Total)		**3.2952**	**0.66073**	**3rd**	**Moderate**
Overall Digital Transformation Level		**3.3503**	**0.72928**	—	**Moderate**

Source: Prepared by the researchers, based on SPSS outputs.

The table above displays the calculated mean values and standard deviations of the study sample participants' opinions regarding their agreement with statements about digital transformation requirements. The overall mean score for this dimension was 3.3503 with a standard deviation of 0.729, indicating a moderate level of agreement with the "Digital Transformation Requirements" statements. This moderate rating stems from the results of three requirements—technical, human resources, and financial—all scoring moderately, while administrative requirements were the only ones rated as strong. We elaborate on these findings as follows:

Administrative Requirements

The administrative dimension emerged as the strongest pillar of digital transformation at Mohamed Bennani Public Hospital, achieving a high aggregate score (mean = 3.79, SD = 0.63). This underscores the administration's robust adherence to national digitization mandates, particularly Algeria's *Digital 2030* strategy. The prioritization of qualified supervisory oversight (mean = 4.12) reflects institutional alignment with ministerial directives, a critical success factor noted in similar contexts by Chaouchi and Khelouf (2023), who emphasized strategic leadership as a catalyst for technological adoption in resource-constrained environments (Bouchareb, 2024). Active policy endorsement across departments (mean = 4.02) further signals systemic efforts to institutionalize digitization, mirroring Kamel's (2023) findings on the centrality of top-down governance in healthcare modernization.

However, while regular stakeholder engagement (mean = 3.65) demonstrates proactive management of transition challenges, the comparatively lower score for staff

training initiatives (mean = 3.58) reveals a critical gap. This contrasts with Sharif et al. (2023), who identified technical infrastructure—not training—as the primary barrier in Algerian healthcare digitization. The discrepancy suggests that while Mohamed Bennani's administration excels in structural compliance, it may underestimate the socio-technical dynamics of workforce readiness, a recurring theme in global literature on digital transformation (Plekhanov et al., 2022). For instance, studies in analogous settings, such as Egypt's public hospitals (Adel, 2023), highlight that sustained training programs are indispensable for mitigating resistance and ensuring long-term system efficacy.

The administration's performance aligns with Smaili and Akkrouf's (2024) observation that Algerian healthcare institutions are increasingly adopting centralized digitization frameworks. Yet, the moderate overall transformation level (mean = 3.35) indicates that administrative rigor alone cannot compensate for deficiencies in technical, financial, and human resource domains. This divergence from Kamel's (2023) assertion—that administrative readiness directly correlates with high transformation outcomes—underscores the multidimensional nature of digitization. The findings thus reinforce the necessity of holistic strategies that harmonize policy enforcement with capacity-building, a principle echoed in the WHO's guidelines for low-resource health systems (2021).

While the hospital's administrative efforts reflect commendable progress, their impact is constrained by uneven investment in human capital development. Future initiatives must bridge this gap to align with global benchmarks, where integrated training and leadership engagement are hallmarks of successful digital transformation (Plekhanov et al., 2022).

Technical Requirements

The technical infrastructure at Mohamed Bennani Public Hospital demonstrates moderate readiness (mean = 3.32, SD = 0.63), reflecting incremental progress in digitization despite persistent systemic constraints. The availability of essential equipment—computers, networks, and software (mean = 4.03)—signals foundational compliance with Algeria's *Digital 2030* agenda, aligning with Sharif et al. (2023), who identified hardware provisioning as a primary driver of early-stage digitization in Algerian healthcare. However, the lower scores for cybersecurity systems (mean = 3.35) and technical sufficiency (mean = 3.35) underscore critical vulnerabilities, mirroring global challenges in resource-limited settings where basic infrastructure often precedes advanced safeguards (Goodrum et al., 2020).

Continuous modernization efforts, evidenced by hardware and software upgrades (mean = 3.55), suggest proactive adaptation to technological advancements. Yet, the pace of these upgrades lags behind benchmarks observed in middle-income countries, such as

Tunisia's healthcare sector, where routine system updates correlate with higher patient data integrity (Guerriche et al., 2024). This disparity highlights a gap between policy-driven procurement and sustainable technological evolution, a recurring issue in public institutions reliant on centralized funding (Chaouchi & Khelouf, 2023). Notably, the moderate rating for cybersecurity aligns with Niu et al.'s (2020) caution that digitization without robust data protection frameworks risks exacerbating vulnerabilities, particularly in environments transitioning from paper-based systems.

The hospital's technical profile diverges sharply from Kamel's (2023) findings in Egyptian tertiary hospitals, where cloud-based solutions and interoperable platforms elevated technical readiness to "high" levels. Instead, Mohamed Bennani's reliance on localized systems, coupled with insufficient budgets for expert IT services (mean = 3.00), reflects a broader trend in Algerian public healthcare, where digitization is often siloed and vendor-dependent (Smaili & Akkrouf, 2024). This contrasts with Plekhanov et al.'s (2022) assertion that scalable technical architectures are pivotal for sustainable transformation, suggesting that the hospital's current infrastructure may hinder long-term interoperability and AI integration.

Although the administration has established a functional technical baseline, the lack of advanced cybersecurity measures and reliance on fragmented systems curtail the potential for transformative outcomes. These findings reinforce the necessity of strategic investments in interoperable technologies and cybersecurity upskilling, as advocated by the WHO's *Global Strategy on Digital Health* (2021), to align with global standards.

Financial Requirements

The financial dimension of digital transformation at Mohamed Bennani Public Hospital reflects moderate adequacy (mean = 3.29, SD = 0.66), revealing a critical misalignment between short-term resource allocation and long-term technological sustainability. While funding for essential digitization equipment (mean = 3.52) demonstrates compliance with national procurement mandates under Algeria's *Digital 2030* strategy, the lack of dedicated budgets for advanced cybersecurity (mean = 3.19) and expert technical support (mean = 3.00) underscores systemic underinvestment in foundational pillars of digital resilience. This aligns with Sharif et al.'s (2023) observation that Algerian healthcare institutions often prioritize visible infrastructure (e.g., hardware) over "invisible" yet critical expenditures (e.g., cybersecurity), a trend that perpetuates vulnerabilities in data-intensive systems.

The moderate responsiveness to technical malfunctions (mean = 3.27) further highlights a reactive rather than proactive fiscal approach, contrasting starkly with Peral et al.'s (2020) findings in Spanish public hospitals, where predictive maintenance budgets

reduced downtime by 40%. Such disparities emphasize the consequences of fragmented funding models in resource-constrained settings, where financial planning often prioritizes immediate operational needs over strategic foresight. This is compounded by the hospital's reliance on ministerial funding cycles, which—as Chaouchi and Khelouf (2023) note—frequently delay upgrades and stifle innovation in Algeria's public sector.

Notably, the hospital's financial profile diverges from Kamel's (2023) study in Egypt, where public-private partnerships and donor-funded initiatives bolstered digitization budgets, enabling investments in AI-driven diagnostics and blockchain-based records. In contrast, Mohamed Bennani's reliance on centralized government allocations reflects a broader challenge in Algerian healthcare: the absence of diversified funding mechanisms to address evolving technological demands. This gap mirrors findings in Moroccan public hospitals, where limited fiscal autonomy hindered the scalability of digital initiatives (Bouhafa, 2021).

The moderate financial readiness also exposes a paradox: while initial investments in digitization are politically incentivized, sustaining them requires systemic reforms. For instance, the lack of earmarked funds for cybersecurity contradicts global best practices outlined by Niu et al. (2020), who advocate for allocating ≥15% of IT budgets to data protection in healthcare. Similarly, underfunding expert services perpetuates vendor dependency, a vulnerability critiqued by Plekhanov et al. (2022) as a barrier to institutional self-reliance. These findings underscore the urgency of adopting multi-year budgetary frameworks and integrating digital transformation into national health financing strategies, as recommended by the World Bank's *Digital Health Investment Guidelines* (2022).

Despite the hospital meets baseline financial requirements for digitization, its ad hoc funding model risks perpetuating technical debt and cybersecurity gaps. Addressing these challenges demands policy shifts toward sustainable financing, including contingency reserves for emergent technologies and incentives for private-sector collaboration.

Human Resources Requirements

The human resource dimension reveals a paradox of partial readiness (mean = 3.28, SD = 0.76), where baseline technical competencies coexist with systemic gaps in specialized training and adaptive capacity. The strong score for IT-qualified staff (mean = 3.74) aligns with Algeria's national push for digital literacy under the *Digital 2030* agenda, mirroring Chaouchi and Khelouf's (2023) findings on workforce upskilling in public sectors. However, the moderate alignment of skills with digitization tasks (mean = 3.26) and inadequate training programs (mean = 3.08) expose a critical disconnect between foundational IT knowledge and the specialized demands of EMR systems. This dissonance echoes Sharif et al.'s (2023) identification of "skill stagnation" in Algerian healthcare,

where staff proficiency in generic tools (e.g., basic software) fails to translate into mastery of integrated platforms.

The limited adoption of digital communication technologies (mean = 3.35) further underscores cultural and procedural inertia, contrasting sharply with Smaili and Akkrouf's (2024) observations in Algerian tertiary hospitals, where interoperable systems enhanced interdisciplinary collaboration. This divergence suggests that Mohamed Bennani's reliance on siloed workflows perpetuates analog-era practices, despite technological investments. Such resistance is compounded by staff frustration over increased workloads during the paper-to-digital transition—a phenomenon well-documented in low-resource settings (Goodrum et al., 2020) but absent in studies of Egyptian hospitals, where phased EMR rollouts minimized disruption (Adel, 2023).

The hospital's human resource challenges reflect broader socio-technical tensions highlighted by Plekhanov et al. (2022), who argue that digital transformation necessitates not only technical upskilling but also cultural shifts toward collaborative, data-driven workflows. For instance, while staff possess baseline IT literacy, the lack of targeted training on EMR-specific functionalities—such as automated alerts or data analytics—limits their ability to leverage these tools for clinical decision-making. This gap mirrors findings in Moroccan healthcare, where underutilized EMRs became "digital paper trails" due to insufficient training (Bouhafa, 2021).

Notably, the resistance to digitization among administrative and paramedical staff (mean = 2.32) underscores a critical oversight in change management strategies. Unlike Kamel's (2023) study in Egypt, where participatory design of EMR systems fostered staff buy-in, Mohamed Bennani's top-down implementation likely exacerbated resistance. This aligns with WHO (2021) guidelines emphasizing co-creation with end-users to mitigate resistance and align workflows with technological capabilities.

While the hospital has cultivated a technically capable workforce, its failure to bridge skill gaps and foster a culture of digital collaboration stifles transformative potential. Future strategies must prioritize context-specific training, participatory implementation, and incentives for digital adoption, as exemplified in Tunisia's competency-based training frameworks (Guerriche et al., 2024).

The overall digital transformation level at the Mohamed Bennani Public Hospital in Ras El Oued, Algeria, falls within the moderate range, thereby invalidating the hypothesis that *"the level of digital transformation implementation at the public hospital is high."*

Electronic Medical Record Implementation

The following table presents participants' perceptions regarding the implementation and effectiveness of the Electronic Medical Record (EMR) system at the hospital. The

analysis focuses on key aspects of EMR utilization, communication efficiency, error reduction, and user acceptance.

Table no. 3. Level of Electronic Medical Record Utilization

No.	Statement	Mean	SD	Rank	Approval Level
01	The EMR facilitates communication between medical and technical departments.	4.2580	0.68155	02	Very Strong
02	The EMR enables medical information exchange among healthcare providers.	4.2581	0.51431	01	Very Strong
03	The EMR reduces errors due to accurate data entry.	3.5290	0.92166	06	Strong
04	The EMR ensures transparency and clarifies responsibilities.	3.7935	0.74919	04	Strong
05	The EMR promotes treatment adherence through medication reminders and interventions.	4.0226	0.74776	03	Strong
06	The EMR system provides effective patient service.	3.5355	0.77182	05	Strong
07	The EMR reduces workloads compared to paper-based records.	2.5484	1.28682	08	Low
08	EMR implementation was unaffected by technical issues.	2.3548	1.08162	09	Low
09	Medical and technical staff accept transitioning to the EMR system.	2.3226	1.07663	10	Low
10	The hospital administration provided necessary resources for EMR implementation.	2.8065	1.04624	07	Moderate
Overall Section (Electronic Medical Records)		**3.4037**	**0.42782**	—	**Moderate**

Source: Prepared by the researchers, based on SPSS outputs.

The analysis revealed that the implementation of Electronic Medical Records (EMRs) at Mohamed Bennani Public Hospital yielded a moderate overall adoption level (mean = 3.40, SD = 0.43), reflecting a nuanced landscape of technological promise and systemic friction. While interoperability and clinical coordination emerged as strengths—evidenced by high scores for interdisciplinary communication (mean = 4.26) and information exchange (mean = 4.26)—the coexistence of workflow inefficiencies and user resistance underscores the complex socio-technical dynamics inherent to digitizing healthcare in resource-constrained environments. These findings align with global patterns where EMRs enhance data accessibility but struggle to reconcile with legacy workflows (Plekhanov et al., 2022), while diverging from studies in more advanced healthcare systems where technical maturity mitigates transitional disruptions (Kamel, 2023).

The system's efficacy in standardizing care protocols, particularly through treatment adherence mechanisms (mean = 4.02), mirrors the transformative potential of EMRs

observed in Tunisian hospitals, where automated reminders reduced prescription deviations by 22% (Guerriche et al., 2024). Similarly, the emphasis on transparency and accountability (mean = 3.79) resonates with WHO (2021) frameworks that position EMRs as tools for reducing diagnostic errors through structured data hierarchies. However, the moderate performance in error reduction (mean = 3.53) contrasts with Sharif et al.'s (2023) findings in Algerian tertiary facilities, where mandatory data fields decreased documentation errors by 37%. This discrepancy suggests that Mohamed Bennani's hybrid paper-digital transition phase—a common challenge in low-resource settings (Goodrum et al., 2020), may dilute the error-mitigation benefits of structured data entry.

A critical divergence emerges in workload impacts, where staff reported increased burdens (mean = 2.55) contrary to EMR's theorized efficiency gains. This aligns with Smaili and Akkrouf's (2024) observations in Algerian hospitals but conflicts with Egyptian case studies (Adel, 2023), where phased digital transitions minimized dual-system workloads. The resistance from administrative and paramedical staff (mean = 2.32) further highlights cultural inertia, a phenomenon less pronounced in regions with stronger institutional change management frameworks, such as Jordan's AI-driven healthcare reforms (Al-Matrafi, 2020). Technical reliability challenges (mean = 2.35) compound these issues, reflecting a broader trend in Algerian public healthcare where vendor-dependent systems struggle with scalability—a gap exacerbated by insufficient funding for specialized IT expertise (Chaouchi & Khelouf, 2023).

The moderate provision of implementation resources (mean = 2.81) underscores systemic underinvestment in workforce readiness, diverging from WHO (2021) guidelines advocating for parallel investments in infrastructure and human capital. This misalignment mirrors findings in Moroccan healthcare systems, where under-resourced digitization efforts led to suboptimal EMR utilization (Bouhafa, 2021). The hospital's experience thus exemplifies the "digital transformation paradox" prevalent in low- and middle-income countries: technological adoption outpaces institutional adaptability, resulting in fragmented outcomes.

While the EMR system demonstrates measurable benefits in care coordination and protocol standardization, its transformative potential remains constrained by transitional workloads, technical fragility, and cultural resistance. These challenges necessitate context-specific strategies, including phased system integration, participatory workflow redesign, and sustainable investments in technical upskilling, measures aligned with the World Bank's (2022) emphasis on holistic digital health ecosystems.

The moderate overall implementation level (3.4037) rejects the hypothesis that *"EMR adoption at the Mohamed Bennani Public Hospital in Ras El Oued, Alegeria is*

high." Key challenges include technical barriers, workflow disruptions, and staff resistance, underscoring the need for enhanced training and systemic support.

Correlation Analysis

To examine the relationship between the use of the Electronic Medical Record (EMR) and digital transformation requirements in the studied healthcare institution, Pearson's correlation coefficient was employed.

Table no. 4. Correlation between EMR Use and Digital Transformation Requirements

Independent Variable	Dependent Variable	Pearson's Correlation	Significance Level	Strength
Administrative Requirements	EMR Use	0.650	0.000	Strong
Technical Requirements	EMR Use	0.556	0.000	Strong
Human Resources Requirements	EMR Use	0.585	0.000	Strong
Financial Requirements	EMR Use	0.603	0.000	Strong
Digital Transformation	EMR Use	0.702	0.000	Strong

Source: Prepared by the researchers, based on SPSS outputs.

The results indicate **strong positive correlations** between EMR adoption and all digital transformation requirements:

- Administrative: *r* = 0.650
- Technical: *r* = 0.556
- Human Resources: *r* = 0.585
- Financial: *r* = 0.603

Furthermore, a *strong positive correlation* (*r* = 0.702, *p* < 0.001) exists between the independent variable (EMR use) and the dependent variable (digital transformation), confirming that EMR implementation significantly drives digital transformation.

Normality Test

To validate the assumptions for regression analysis, the **Kolmogorov-Smirnov test** was used to assess data normality. The hypotheses were:

- **H_0**: Data follow a non-normal distribution (*p* < 0.05).
- **H_1**: Data follow a normal distribution (*p* ≥ 0.05).

Table no. 5. Kolmogorov-Smirnov Test Results

Variable	Kolmogorov-Smirnov Z	Sample Size (N)	Significance	Decision
Independent Variable (EMR Use)	5.128	54	0.455	Non-significant (Normal)
Dependent Variable (Digital Transformation)	4.876	54	0.438	Non-significant (Normal)

Source: Prepared by the researchers, based on SPSS outputs.

The test results show *non-significant* values (*p* = 0.455 for EMR use; *p* = 0.438 for digital transformation), both exceeding the 0.05 threshold. Thus, we reject H_0 and accept H_1, confirming that the data follow a normal distribution.

Results of Testing the Main Hypothesis

The fourth sub-hypothesis states: "The use of the Electronic Medical Record has an effect on improving digital transformation in the studied institution."

To test the validity of this hypothesis, simple regression analysis was used to verify the effect of using the Electronic Medical Record on digital transformation in the studied institution, as shown in the following table:

Table no. 6. Testing the effect of using the Electronic Medical Record on digital transformation

Variable	Beta	R^2	Calculated T-value	Significance Level
Digital Transformation	0.660	0.416	15.725	0.000

Source: Prepared by the researchers, based on SPSS outputs.

The statistical results demonstrate a significant effect of Electronic Medical Record (EMR) usage on digital transformation in the studied institution, as evidenced by: (1) a calculated t-value of 15.725 exceeding critical thresholds, (2) a highly significant p-value of 0.000 (below the α=0.05 threshold), (3) a Beta coefficient of 0.660 indicating that each unit increase in EMR adoption corresponds to a 0.660-unit improvement in digital transformation, and (4) an R^2 value of 0.416 showing that 41.6% of the observed variance in digital transformation outcomes can be attributed to EMR implementation, thereby confirming the hypothesis that EMR utilization positively impacts digital transformation.

Therefore, we accept the main hypothesis that states: "*The use of the Electronic Medical Record has an effect on digital transformation in the studied institution*."

Conclusion

This study reveals critical insights into the challenges and opportunities of digital transformation in Algerian public healthcare institutions, with a focus on the Mohamed

Bennani Public Hospital. The findings demonstrate that digital transformation is an urgent necessity in the healthcare sector, particularly in an era marked by rapid technological advancements and the growing integration of artificial intelligence. The hospital administration has shown commitment to this transition by addressing administrative requirements, such as implementing ministerial directives, holding regular meetings to resolve digitization challenges, and investing in technical infrastructure. However, significant gaps persist, particularly in human resource readiness, financial allocations, and technical adaptability. While administrative requirements scored highly, the study highlights moderate performance in technical, financial, and human resource dimensions, with staff resistance and insufficient training emerging as key barriers.

The implementation of the Electronic Medical Record (EMR) system has yielded measurable benefits, including faster interdepartmental communication, improved transparency in clinical responsibilities, and enhanced data security through role-based access controls. Despite these advantages, the parallel use of paper and electronic records during the transition phase increased workloads for medical staff, particularly physicians, fostering resistance. Patients and their companions also expressed dissatisfaction with electronic triage systems, especially in emergency departments, underscoring the need for tailored solutions in high-pressure environments (Bouchareb, 2024). Regression analysis confirmed a statistically significant relationship between EMR adoption and digital transformation ($\beta = 0.660$, $*p* < 0.001$), with the EMR explaining 41.6% of the variance in transformation outcomes.

To address these challenges, the study proposes several recommendations. Public healthcare institutions must prioritize comprehensive training programs to enhance digital literacy among staff, coupled with incentives to foster acceptance of technological changes. Financial investments should be scaled to support continuous upgrades of hardware, software, and cybersecurity systems, ensuring compatibility with emerging technologies like AI. Internal technical teams should be developed to reduce reliance on external vendors, enabling rapid resolution of technical issues. Furthermore, the EMR system should be expanded across all departments to streamline data collection and improve crisis response during epidemics or disease outbreaks. Specific attention must be given to optimizing EMR workflows in emergency care units, where speed and efficiency are critical. Finally, stakeholders—including healthcare providers, administrators, and patients—require ongoing engagement to mitigate resistance and align digitization efforts with Algeria’s national "Digital 2030" strategy.

While the Mohamed Bennani Public Hospital has made strides in its digital transformation journey, sustained efforts are needed to address systemic barriers, foster

human resource development, and ensure that technological advancements translate into tangible improvements in healthcare delivery.

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Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: I, Year: 2026, pp. 79-105
DOI: 10.37708/em.swu.v23i1.5

THE ROLE OF ELECTRONIC PAYMENT METHODS IN ACTIVATING AND STIMULATING CROSS-BORDER E-COMMERCE - CHINA AS A MODEL

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Received: 04.11.2025, Accepted: 11.02.2026

Abstract

The study aims to demonstrate the role of electronic payment methods in activating and stimulating cross-border e-commerce in China. It relied on quantitative methods and a descriptive and analytical approach. To achieve the study's objective, SPSS version 27.0 was used to analyze a questionnaire directed to a sample of 210 respondents in the import and export market. It also used a set of tests, including Cronbach's alpha, correlation coefficients, and multiple and simple regression coefficient tests. The results showed that the use of electronic payment methods has a significant impact on activating and stimulating cross-border e-commerce. It was found that improving the independent variables by one-unit results in a 2,736-unit improvement in the level of cross-border e-commerce for each improvement unit. Reflecting its role in facilitating foreign exchange, reducing costs, and saving a lot of time, as the impact of the dimension (comfort and ease) was greater, reaching a value of (0.624) units, which highlights its decisive role in adopting and using electronic payment methods to activate and stimulate cross-border e-commerce.

Keywords: *electronic payment methods; digital currencies, bank cards; international trade; cross-border e-commerce.*
JEL Codes: F41, F81, N15

Introduction

The buying and selling of goods and services in this era cannot take place without a payment tool, whether traditional or electronic, especially when it comes to cross-border e-commerce and foreign trade.

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Our current era has witnessed significant developments in the fields of technology, communications, and the financial industry. The digital transformation has also encompassed all aspects of citizens' daily lives, whether personal, professional, or financial, which has increased the importance of modern payment methods of various kinds.

For any trade, whether local or international, to reach the high and favorable levels desired by both buyers and sellers, there must be an appropriate means to ensure that the exchange of sales and purchases of goods and services occurs quickly and securely, keeping pace with developments in the field of trade and finance.

What is meant by this method here is the existence of payment methods that aim to facilitate the methods of settling transactions in trade, and enhance their efficiency in light of technological progress and communication? The renaissance that both foreign trade and cross-border e-commerce have witnessed in the method of settling their transactions, especially since traditional payment methods were unable to keep up with this type of commerce, which relies primarily on electronic and internet-based platforms, it was necessary to consider finding a suitable alternative.

Based on these reasons, specialists have begun to think and research on finding modern alternatives to traditional payment methods, in order to keep pace with the changes taking place and help settle commercial transactions taking place in the field of foreign trade and cross-border e-commerce, which are represented by electronic payment methods of all kinds. This importance has necessarily led to the recognition and acknowledgement that electronic payment methods have become an indispensable and essential pillar in settling commercial and financial transactions, especially during times of crisis. This is precisely what happened during the COVID-19 pandemic, as global foreign trade witnessed a significant slowdown. According to the World Trade Organization, the annual growth rate of global trade has not exceeded 3% Since 2012, China, a leader in technology, digital payments, and cross-border e-commerce, has recorded an average annual growth rate of 3.41% during the period (2011-2020). This is due to the maximum use of the Internet and digital technology, as the share of cross-border e-commerce in China has increased to approximately 5% of total foreign trade (Dokken & ATO Beijing Staff, 2023, p. 2).

Therefore, both payment methods and systems enable individuals and businesses to engage in cross-border commercial transactions and send money to friends, family, and loved ones living in other countries. In order to understand and study the nature and type of relationship between electronic payment methods and their security concerns when used in cross-border e-commerce in China, we will attempt to answer the following question:
To what extent do electronic payment methods contribute to stimulating and activating cross-border e-commerce?

Hypotheses

Through this study, we seek to answer the problem posed within the framework of the following hypotheses:

Main Hypothesis: The increased adoption of electronic payment methods leads to the activation and revitalization of cross-border e-commerce.

From this main hypothesis, the following two sub-hypotheses branch out:

Sub-Hypothesis 1 (Hs1): Electronic payment methods contribute to the convenience and ease of cross-border transactions, which leads to the promotion of cross-border e-commerce.

Sub-Hypothesis 2 (Hs2): Speed and efficiency are the most important attributes leading to the adoption of electronic payment methods in cross-border e-commerce.

Sub-Hypothesis 3 (Hs3): Electronic payment costs are important in increasing the activation and stimulation of cross-border e-commerce.

Literature Review

Electronic or digital payments are payments made via electronic transfers rather than using paper checks or physical cash (Kabir, Saidin, & Ahmi, 2015). They are also viewed as a means of communication between institutions and individuals with the help of banks and financial and transfer networks (Briggs & Brooks, 2011). These transfers are usually made online. From payer to recipient via an electronic payment channel that enables customers to manage their accounts and track their transactions online (Teoh, Chong, Lin, & Chua, 2013). It takes place in the e-commerce environment in the form of financial exchange via electronic media. These means are integrated into a general system known as the electronic payment system, which consists of a set of rules, institutions, and mechanisms used to conduct money transfers from one account to another. With the aim of fulfilling obligations arising from economic, commercial and financial activities (Victory, 2022), this system creates many methods that enable the transacting parties to conduct or pay for goods and services through an electronic means. It contains many elements such as payment instruments, a clearing mechanism for settlement, etc., as well as the institutions participating in its management, such as banks and non-banking financial institutions. Money transfer agencies, remittance companies, the central bank, etc. (Victory, 2022) Electronic payment systems cannot be used or implemented on the ground unless the necessary infrastructure, such as the internet, is available and in place to facilitate the payment process. These are essential for further development in the field of e-commerce and business (Abdul Aziz & Muneeb, 2019). It has many features, including assurance, maintaining the security and confidentiality of information, security, availability, cost-

effectiveness, and integration capabilities. In light of these features, we find that the vast majority of consumers have begun using various electronic payment methods to settle their daily transactions, due to convenience (Jebarajakirthy & Shankar, 2021) and efficiency (Kaur, Dhir, Bodhi, Singh, & Almotairi, 2020). Cost-effectiveness (Mukhopadhyay, 2016), in addition to the following factors: relative advantages, compatibility, complexity, trialability, perceived usefulness, perceived ease of use, perceived risk, trust, etc. (Muliad & Usman, 2023).

Innovation is defined as an individual's willingness or desire to experiment with any new information technology (Midgley & Dowling, 1978). It also refers to the extent to which customers adopt innovations earlier than others, according to the diffussion of innovations theory by Rogers (1983). Several applied studies have been conducted in this field by a group of scholars and experts, who found that personal innovation influences adoption behavior for various innovations in information technology systems (Aydin & Burnaz, 2016). This is based on the relative advantage of the innovation, which refers to the benefits it offers compared to previous solutions. The greater the relative advantage the adopter receives, the faster the innovation will be adopted and accepted (Rogers, 1983). This was confirmed by the experimental study conducted by Al-Jabri & Sohail (2012) on the adoption and acceptance of mobile banking in Saudi Arabia, as well as by Nor, Pearson, Michael, & Altaf (2010). Those who conducted a study on the adoption of online banking, using diffusion of innovation theory with undergraduate and graduate students at four universities in Malaysia, as well as studies by Moore & Benbasat (1991), Mccloskey (2006), and Lin (2011). Fit is viewed as the extent to which a new innovation aligns with current values, past experiences, and societal needs. If the innovation is similar and compatible with the values and standards that potential users adhere to, it is adopted more quickly, and vice versa if it is not appropriate, it is difficult to adopt. This is what Royer (1983), Chen, Gillenson, & Sherrell (2004), Nor, Pearson, Michael, & Altaf (2010), Ndubisi & Sinti (2006), and Al-Gahtani (2003) have concluded. While complexity indicates the difficulty of using an innovation—in other words, the rate at which it will be adopted—complexity has a negative relationship with the adoption of new innovations (Cheung, Chang, & Lai, 2000), (Luarn & Lin, 2005) and (Wang, Lin, & Luarn, 2006). The lower the level of complexity, the faster the adoption of a new innovation, and vice versa. The more complex the innovation, the more difficult it is to adopt (Au & Kauffman, 2008), (Tahar, Riyadh, Sofyani, & Purnomo, 2020), (Bauer, Barnes, Reichardt, & Neumann, 2005), (Wulandari, Meuwissen, & Karmana, 2017). Trialability refers to the ability to try out a new innovation before committing to its use (Muliad & Usman, 2023), (Tan & Teo, 2000), (Agarwal & Prasad, 1998). The role of observability in electronic payment adoption decisions lies in its perception of the ease with which the results of using the new innovation

can be seen and evaluated. For others, the easier it is to perceive the benefits of an innovation, the more quickly it will be adopted and embraced (Muliad & Usman, 2023), (Al-Jabri & Sohail, 2012). These perceived benefits indicate the extent to which an individual believes that using electronic payment will enhance the efficiency of their transactions (Wardana, Saputro, Wahyuddin, & Abas, 2022). This feature helps consumers decide whether or not to accept a system, based on their perception of its ease of use. This perception is considered one of the key dimensions that significantly influences the acceptance of new technologies and technological systems (Davis, Bagozzi, & Warshaw, 1992). This is based on the perception that an individual develops when using a new system, whether it is effortless or easy to implement (Davis & Davis, 1989). Perceived risks also limit adoption and acceptance, as they include concerns about privacy, security, and the potential for financial loss during transactions (Chelvarayan, Yeo, Yi, & Hashim, 2022). However, the pivotal role that trust plays in the acceptance and use of electronic payment systems and methods remains important and necessary, as it reduces uncertainty and mitigates concerns about security and privacy breaches. Despite the availability of trust, perceived risks remain a major obstacle to the widespread use of these methods. They indicate the degree of risk associated with the use of innovation and, consequently, the degree of adoption of all types of electronic payment applications. Customer perceptions of risk are typically created by doubts about the degree of discrepancy between customer judgment and actual behavior. The failure of technology to achieve the expected results and the resulting losses (Al-Jabri & Sohail, 2012). Rewards are also considered among the most important external motivators and incentives that drive individuals and consumers to seek adoption and acceptance of these methods. They come in the form of tangible benefits (cash incentives, vouchers, free gift items, raffles, etc.). Thanks to these rewards consumers are willing to go to great lengths to obtain them (Aydin & Burnaz, 2016). This is what Kim and Han (2014) demonstrated regarding marketing communications and advertising. They found that customers' focus on advertisements increases when the message includes benefits. Social influence is also evident in the acceptance and adoption process when consumers encounter a new product, and they may feel uncertain. Regarding these products, their characteristics, and the consequences of their use, this uncertainty can be reduced by obtaining the opinions of others (family, friends, reference groups) that the consumer values.

This adoption and acceptance have actually translated into reality through the emergence of new business and financial trading models. Similar to e-commerce, which has become an inevitable reality in keeping pace with the new technological developments that have imposed their dominance over the daily and practical lives of societies, e-commerce refers to transactions that include all types of commercial information

exchanged between companies and individuals, or companies and companies, and which rely on the electronic exchange of data. Whether written, visual, or audible, it also includes the effects resulting from the electronic exchange of commercial data and information (Shuqing, 2009), (Kim, 2022). Cross-border e-commerce is defined as the commercial transactions that take place between different regions and countries around the world via e-commerce platforms. This trade includes all international activities related to e-commerce. Consumers purchase goods and services online from merchants located in countries other than their own (Ding, Huo, & Campos, 2017), with transactions conducted virtually using digital platforms (Wang, 2017). It also extends to include integrated services, such as customs, taxes, logistics, and electronic payments, facilitating business transactions, saving time and costs, and opening new channels for international trade. This enhances the efficiency, effectiveness, and speed of exchange between different parties (Lan, Ouyang, Gu, & Wang, 2023), (Chen, Li, Song, & Ma, 2022).

This development in these types of trade is due to the emergence of a wide and diverse group of factors that have contributed to driving and significantly enhancing them, such as the rapid development of technology, the increasing degree and value of innovation, and the embodiment of digital transformation locally. Internationally, in addition to the improvements and updates to e-commerce platforms, electronic payment technologies, and artificial intelligence applications (Vivian, Abla, & Tahani, 2022). The renewal and development of logistics services and international transport and shipping infrastructure were among the most important factors that contributed to facilitating the movement of goods between borders, as they provided express shipping services and accurate parcel tracking, in addition to the cooperation achieved. Between logistics companies and e-commerce companies, this has enhanced the possibility of delivering products faster and at a lower cost (Chen, Qiu, Wang, & Yang, 2022). Meanwhile, the increased spread of communication and high-speed internet across the globe has made access to e-commerce extremely easy and simple for everyone (Yin & Choi, 2021). As for agreements, Trade and regional blocs such as (free trade zones spread around the world) have encouraged many companies to expand their activities beyond their local borders (Zhang, 2016). Despite its widespread spread, it still suffers from a set of shortcomings and obstacles that prevent its development and further generalization around the world, such as the consumer culture, which includes cultural differences (Chen et al., 2022) and language and its barriers (Yin & Choi, 2021), (Wu & Li, 2023). The merchant's reputation and reliability (Wang & Street, 2019). The difficulty of achieving a position in the market, obtaining market share, and building a distinctive brand (Fefer, 2022) due to the unbalanced and unfair competition with major companies with distinctive and well-known brands, which are always working to expand their international operations, This threatens the growth and stability of these

emerging companies with unknown brands. Furthermore, counterfeiting and imitation of products and brands poses a major challenge, preventing consumers from engaging in trustful transactions with sellers across borders (Fefer, 2022). Differences in regulatory procedures, rules, and laws between most countries of the world, and differences in data protection and privacy laws Variation in policies regarding product returns, fees, taxes, and customs laws (Wu & Li, 2023).

Methodology

The current study was designed to achieve its objective by relying on a quantitative approach. This approach is an effective research method for accessing the largest possible number of samples and collecting primary data to explain the phenomenon under study. An electronic questionnaire was used as a study tool, with the goal of providing accurate, reliable, and valid data. The questionnaire was created based on analysis, designed within an analytical framework, the research instrument comprised 19 items measured using a five-point likert scale. The survey captured key dimensions namely the usability of electronic payment systems, transaction efficiency, and cost structures in order to examine their influence on strategic decision-making in cross-border e-commerce (CBEC). The real reason for using this tool is the lack of necessary secondary data that could be used in the study. The online survey was administered to a targeted sample comprising 60% importers and 40% exporters. To enhance of the study, participation was restricted exclusively to representatives of small and medium-sized enterprises (SMEs) and e-commerce firms. Individual consumers were intentionally excluded in order to preserve a focus on professional business activities, encompassing both B2B and B2C operations, rather than consumer-driven retail purchasing behavior, during the period from June 2025 to July 2025 in the Chinese market. From a geographical perspective, the majority of respondents represented firms operating within the Chinese market, predominantly located in the Pearl River Delta (Shenzhen and Guangdong) and the Yangtze River Delta (Shanghai and Hangzhou), regions widely recognized as key hubs for cross-border e-commerce (CBEC). Additionally, approximatelly 10% of the surveyed firms were foreign-invested enterprises (FIEs) operating in China, while the remaining 90% consisted of domiestically owend Chinese firms. The questionnaire was distributed regularly online. It was also sent to the above-mentioned individuals for distribution and collection, and data and responses were collected during the aforementioned time period. The number of distributed questionnaires reached 250, and the distribution process was carried out digitally. At the end of the collection period, 210 survey results were deemed valid for statistical analysis. In order to ensure to increase the accuracy and external validity of survey results, 40 of the 250

questionnaires withdrawn were excluded due to missing data, incorrect responses, or incomplete answers, so 210 questionnaires were ultimately approved and used for analysis.

Results

Testing the reliability of the study tool (Questionnaire):

Table no. 1. Results of Cronbach's alpha coefficient to measure the reliability of the questionnaire.

Study topics	Dimensions	Number of paragraphs		Cronbach's alpha coefficient		
Axis 1: Electronic payment methods	First dimension: comfort and ease	05	14	0,763	0,684	Good ratio
	The second dimension: speed and efficiency	04		0,728		Good ratio
	The third dimension: cost	05		0.702		Good ratio
Axis 2: Cross-border e-commerce	-	05		0,944		Excellent ratio
The total sum of the study		19		0,718		Good ratio

Source: Prepared by the researcher based on the outputs of the SPSS.V.27 program for the study sample individuals.

From the table above, it is clear that the stability of the value of the first axis (the independent variable) indicating the use of electronic payment methods is stable and good, as the Cronbach's alpha measurement coefficient for the first axis reached a value of approximately (0.684), while with regard to the Cronbach's alpha value for the first dimension of the first axis, it reached (0.763), which is a good value. Which is a good value, and if this indicates anything, it indicates that the phrases of the first dimension are characterized by strong internal consistency between them and the dimension to which they belong. The same thing applies to the second and third dimensions of the first axis, as they reached (0.728) and (0.702) respectively, which is a good percentage, and that the phrases of the second and third dimensions are characterized by very strong internal consistency with the dimension to which they belong. For the second axis (the dependent variable), it reached approximately 0.944, an excellent percentage, indicating the strength of internal consistency among the statements in the second axis. A more accurate interpretation can be given from the results of the table above, which indicates that the overall stability value for the impact of the use of electronic payment methods on e-commerce is good. The stability rate in all the questionnaire phrases, which numbered (19) phrases or paragraphs, ranged (0.718), which are considered high and good stability coefficients, which explains

the degree of consistency between the phrases, considering that the value of Cronbach's alpha, whenever it is greater than (0.60), i.e., it is close to the correct one, this indicates the stability and internal consistency of the scale used in the study (approach of Feldt et al (1987)), It is the standard percentage for accepting or rejecting Cronbach's alpha coefficient, which reflects its accuracy, reliability, acceptance, and validity for use in analyzing field study data. This, if it indicates anything, indicates that if the study were repeated on the same sample and under the same conditions, we would find a match in the results at a rate of (71.8%), which confirms the validity and reliability of the approved study measurement tool. It gives us confidence in its validity and suitability for analyzing results, answering study questions, and testing hypotheses.

Normal Distribution Test for the Study

The Kolmogorov-Smirnov test allows us to determine whether the data is normally distributed. It is frequently used to measure the validity of hypotheses, in line with the nature of the distribution, as most studies rely on the normal distribution of data for their analysis.

Table no. 2. Normal distribution test for all study axes

Sig level of significance	K-S value	
0,257	0,185	All topics of the study

Source: Prepared by the researcher based on the outputs of SPSS.V.27 for the study sample.

From the results of the table above, it is clear that the significance level of the Kolmogorov-Smirnov test is greater than 0.05, indicating that the overall study data follow a normal distribution, allowing us to rely on parametric tests to analyze the study data.

Hypothesis Testing

Table no. 3. Results of the Multiple Regression Coefficient Test.

T signification	β	F Signification	F value	R^2	R	Independent variables	Dependent variable
	2,736	**The constant**					Cross-border e-commerce
0,000	0,624	**0,000**	545,607	0,888	0,942[a]	First dimension: comfort and ease	
0,000	0,04					The second dimension:	

						speed and efficiency	
0.000	0.02					The third dimension: cost	
Multiple linear regression equation for the overall model							
$\boldsymbol{Y_i = 2,736 + 0,624X_1 + 0,04X_2 + 0.02X_3}$							

Source: Prepared by the researcher based on the outputs of the SPSS V. 27 program for the study sample members.

From the table above, we note that the results obtained from the multiple linear regression analysis indicate that the multiple linear regression model is significant, as shown by the Fisher value (F = 545.607), where the value of (β) that explains the relationship between The dependent variable (cross-border e-commerce) and the independent variable (use of electronic payment methods) are represented by the three dimensions with a value of (2.736) with a significant statistical significance (0.000) which is smaller than the significance level (α=0.05). These results explain that the independent variables explain about (88.8%) of the variance in (activating and activating cross-border e-commerce), given the value of (R^2) the coefficient of determination. This means that every time the dimensions of the independent variable (use of electronic payment methods) improve by one unit, the level of cross-border e-commerce improves by 2,736 units. The value of (β_1), which illustrates the relationship between (activation and activation of cross-border e-commerce) and the dimension (convenience and ease), reached a value of (0.624), which is a statistically significant value. This can be concluded through the value of (T) and the associated significance, which is estimated at (0,000), which is less than the significance level (α=0,05). This means that whenever the dimension (comfort and ease) improves by one unit, the level of (activation and activation of cross-border e-commerce) improves by (0,624) units.

The value of (β_2) for the dimension (speed and efficiency) was (0.04), which is a statistically significant value, as this can be deduced from the value of (T) and the moral significance associated with it, which is estimated at: (0.000) less than the level of significance (α=0.05), and this means that whenever the dimension (speed and efficiency) improves by one unit, the level of (cross-border e-commerce) improves by (0.04) units.

As for the value of (β_3) of the dimension (cost), it is (0.02), which is a statistically significant value, as this can be deduced from the value of (T) and the moral significance associated with it, which is estimated at: (0,000) less than the level of significance (α=0,05),

and this means that whenever the dimension (cost) improves by one unit, the level of (cross-border e-commerce) improves by (0.02) units.

Based on the above, we can conclude the following: The null hypothesis is rejected and the alternative hypothesis is accepted, which claims that there is a statistically significant effect at a significance level (α=0.05) for the independent variable, the use of electronic payment methods, represented by the three dimensions, in activating and enabling cross-border e-commerce. However, the clearest and greatest effect was for the independent variable (X_1), represented by (convenience and ease).

The multiple linear regression equation for the study as a whole can be written as follows:

$$Y_i = 2{,}736 + 0{,}624X_1 + 0{,}04X_2 + 0.02X_3$$

Y_i: Dependent variable (activation and activation of cross-border e-commerce)

β: Constant, equal to 2.736

X_1: Convenience and ease

X_2: Speed and efficiency

X_3: Cost

Many previous studies have confirmed the positive effects of using electronic payment methods in developing cross-border trade, including the study (Ivan, 2024), which concluded that electronic commerce plays a major role in reducing the costs of international trade, improving the efficiency of transactions, and encouraging innovation in global business practices. Challenges such as online security, intellectual property protection, and cross-border payments must also be addressed to maximize their benefits. The study, "The Role of Electronic Payment Methods in Developing Foreign Trade - Iraq as a Case Study," indicated that the use of electronic payment methods contributes to modernizing and revitalizing foreign trade and driving its growth. However, their effectiveness remains dependent on structural reforms and infrastructure investments. A study by Li et al. (2024) finds that digital payments significantly improve international trade by reducing barriers to cross-border capital flows and strengthening trade ties. However, their impact varies depending on the level or degree of trade openness of countries. In countries with high levels of trade openness, the impact is significant and increases international trade growth, while its impact remains limited in countries with low levels of trade openness. It also highlights the need to improve digital payment infrastructure and enhance data that supports the integration of digital payments into international trade. As for the study by Sadaoui (2024), while arguing and emphasizing that electronic banking services facilitate commercial transactions by reducing costs and accelerating trade, on the one hand, it did not fail to highlight the significant delay in Arab countries' adoption of these technologies and tools, even though the United Arab Emirates is making rapid progress toward an

advanced digital banking system (Kere & Zongo, 2023)**.** Also argued that rapid digital transformation is crucial to boosting intra-trade between the sample countries, and that the use of information and communication technology (ICT), in particular (Internet, mobile phone, introduction of mobile payment services), has a significant positive impact on exports. However, this effect is moderate for manufactured goods, even though access to electricity is a key factor in the effectiveness of ICT. The results of a study (Shlapak & al, 2023) showed that digital transformation reduces the costs of international trade, accelerates trade, and enhances innovation. However, the digital divide remains a major obstacle, especially for developing countries. Regarding the study by Alqarni (2023), it concluded that there was a significant improvement in transaction speed (85% of respondents), a decrease in transaction costs (75%), and an increase in trade volume (65%). However, there are still barriers that must be overcome, such as the lack of a coordinated regulatory framework (55% of respondents), and security concerns (45% of respondents).

As Bhatt et al. (2023) showed, age, gender, perception, and transaction amounts significantly influence the use of digital payments in international trade. Digital payments via PayPal offer multiple advantages, such as speed, security, and the ability to track transactions, reduce hidden costs, and facilitate cross-border e-commerce. In addition to the use the widespread adoption of digital payments plays a key role in the development of global trade. The research paper also highlighted the obstacles and difficulties associated with electronic payments, such as fraud risks, high fees for international transactions, and the threat of cyberattacks. A study by Hasan (2021) concluded that blockchain provides greater transparency and traceability of products in the supply chain. It reduces the complexity of traditional commercial transactions and allows for faster payments. It also does not hide the significant challenges facing widespread implementation, including regulatory issues and a lack of awareness of the technology's benefits in some countries. A study by Chen (2020) showed that electronic payments expedite transactions, minimize transfer costs, and minimize the risk of currency fluctuations. However, there are still shortcomings and obstacles in the areas of transaction security and the reliability of credit systems, which require improved regulatory frameworks and risk management systems.

A study by European Parliamentary Research Service (2020) also demonstrated that blockchain technology can improve supply chain efficiency, thanks to its contribution to reducing costs and delays while enhancing transparency and combating fraud and counterfeiting.

As for the studies that recommended the need to correct imbalances and overcome obstacles and security and regulatory concerns, which we believe have an impact on the use of electronic payment methods in cross-border trade, such that this impact is according to the degree of these concerns. The more there is control and ability to address security

and regulatory concerns, the more there is an improvement in trade, and vice versa. The greater the security and regulatory concerns, the more negative their impact on trade. In addition to the above, numerous studies have addressed the relationship between the independent and dependent variables, including: Li et al. (2024), Sahlan & Nasution (2024), Shlapak et al. (2023) ,(Alqarni, 2023), (Bhatt et al., 2023), (Nabila et al., 2022) , (Victory, 2022), (Wua et al., 2021), (Hasan, 2021), (Chen, 2020),(Ahmedov, 2020), (Derindag et al., 2019).

Discussion

Thanks to the tremendous revolution brought about by technological innovation in the economy, finance, and business, digital payments using electronic payment methods have created a better environment for cross-border capital flows and reduced barriers to these flows. Reducing these barriers to cross-border capital flows and payments contributes to increasing the import and export of goods and services between countries. This supports the formation of a promotional impact on foreign trade.

Under the traditional conditions of cross-border transactions, exporters and importers in the past, and even today in some regions of the world, were forced to undergo complex payment and settlement processes. They relied on cross-border banks to achieve final payment and comprehensive settlement of trade transactions, which required a certain level of knowledge in the field. Both parties and more time.

However, with the emergence of digital payments and electronic payment methods as a new method for settling payments, electronic payment methods have significantly revitalized the settlement process and reduced the difficulty of settlement across the world.

Today, digital payment platforms (cross-border e-commerce platforms) are directly responsible for negotiating with banks. Both parties can easily exchange foreign currencies, pay and receive, and exchange local currencies on these platforms. Furthermore, this process does not require large sums of money for transactions, providing significant convenience in foreign trade. In terms of payment and settlement operations and scope.

On the other hand, eliminating or reducing barriers to cross-border capital flows will create a favorable environment and conditions that encourage increased international investment, which often results in increased exports and imports of technology, factors of production, goods, and services, thus providing an incentive and impetus for the development, growth, and revitalization of cross-border trade. This explains the enhanced impact of reducing barriers to cross-border payments on international trade relations. This status China has attained did not come out of nowhere, but rather as a result of the importance Chinese political authorities place on this sector. They have taken the initiative

to establish comprehensive pilot zones for cross-border e-commerce, supporting the stability of foreign trade. For example, in 2015, the government approved the establishment of 165 pilot zones, increased internet bandwidth from 2Gbps to 5Gbps, emphasized the adoption and expansion of digitalization, and imposed and encouraged the use of electronic payment methods (Wu & Li, 2023, p. p186). In general, this section will address the most important points, initiatives, and actions undertaken by China to achieve its current status in the field of digitization and electronic payments.

Participation in numerous cross-border initiatives, including mBridge, a platform based on distributed ledger technology (DLT), which aims to improve, encourage, and secure cross-border payments through the issuance and exchange of Central Bank Digital Currencies (CBDCs) by several central banks (Bank for International Settlements, 2022, p.8).

This project is the result of cooperation between the Bank for International Settlements (BIS) and four (04) central banks from Asia and the Middle East: Hong Kong Monetary Authority, Bank of Thailand, Central Bank of the United Arab Emirates, and the World Currency Institute. The People's Bank of China's digital platform has also invited several central banks from around the world as observer members to provide transparency and flexibility. These include Bank Indonesia, Bank Negara, Malaysia, Korea, Sweden, Rikki, and staff from the Eurosysteme Innovation Center at the Bank for International Settlements and the New York Innovation Center at the Federal Reserve Bank of New York (Bank for International Settlements, 2022, p.9).

The project includes twenty (20) participating commercial banks, which can make cross-border payments directly with each other, using central bank digital currencies. The project has many advantages that can be summarized as improving the speed of cross-border payments, reducing costs, increasing transparency, and reducing financial risks.

Thanks to this project, China was able to make the Chinese digital currency more integrated with global payment systems, and it also strengthened its cross-border trade, as it acquired a large share of the project’s transactions, due to the large volume of its regional trade, and it also enabled it to manage liquidity with complete flexibility. For example, within six (06) weeks, currencies were issued to central banks with a total value of 12.1 million US dollars. 164 cross-border payment transactions were conducted, with a total value of US$22.1 million, of which China accounted for 23.6 million yuan (Bank for International Settlements, 2022, p. P 4). The mBridge project is an innovative pilot initiative aimed at restructuring cross-border payments systems through central bank digital currencies. It contributes to massive transactions, with China receiving significant benefits, in terms of promoting the global use of e-CNY.

Transaction costs were high in cross-border trade, due to different institutional frameworks and the need for cross-border financial transactions and foreign exchange transactions. However, with the emergence of cross-border e-commerce companies in China, which have begun to use artificial intelligence and robotics extensively to improve their storage and distribution networks and plan routes more efficient delivery and optimal utilization of their warehouses, and many startups are developing autonomous robots that work alongside humans and track inventory on shelves in warehouses, factories, and distribution centers, have contributed to reducing costs and facilitating trade.

E-commerce and mobile banking platforms facilitate cross-border payments: E-commerce platforms have developed their own payment systems for cross-border transactions. These systems facilitate the exchange of goods and services across platforms. This has helped bypass banking infrastructure, reducing delays and eliminating processing fees. It increases the efficiency of international transactions, to the point where they reach the level of efficiency of domestic transactions. For example, the Chinese platform (Alipay), and the American platforms (Amazonpay and PayPal) are some examples of popular payment systems in the world. In light of the global slowdown in foreign trade, cross-border e-commerce platforms in China have emerged as a solution to the dilemma, thanks to making the most of the internet and digital technology, cross-border e-commerce has flourished in China, expanding into global markets. In 2021, cross-border e-commerce volume reached 1.96 trillion yuan, a 15% year-on-year increase. In 2022, it exceeded 2 trillion yuan, reaching 2.1 trillion yuan, registering an annual growth rate of 1.5%. By 7.1%. In the first half of 2023, China's trade value reached $152.7 billion, an increase of 16% over the same period in 2022. In addition, since 2020, the share of cross-border e-commerce has increased to about 5% of China's total foreign trade (Dokken & ATO Beijing Staff, 2023, p.2), making China a leader. It is a leader in the global cross-border e-commerce market, while the United States and Europe hold shares estimated at 27% and 18%, respectively. Therefore, cross-border e-commerce platforms have become a fundamental component of China's foreign trade and a key driver of its growth (OMC, 2018, p. P 79).

The role of youth in driving innovation in cross-border payment systems: They have contributed to finding practical solutions for electronic payment that have enabled small and medium-sized enterprises to bypass traditional systems and reduce costs. For example, Taobao Maker is a good example, demonstrating that youth have become the driving force for innovation (AliResearch, 2017, p. 32).

Initiatives and proposals by the private sector and governments to propose solutions: The most ambitious initiative is the Alibaba initiative, which plans to create a network of digital free trade zones, which would allow micro, small and medium-sized enterprises to

sell their products in other countries without import duties, and with fast and low-value customs clearance.

The first such zone was established in Malaysia in 2017 to facilitate trade between that country and China (OMC, 2018, p. 86). In 2020, Alibaba's platform included 200,000 sellers and more than 20 million buyers from more than 200 countries and regions around the world. In 2022, the total registered goods reached $35 billion (Feng & al, 2024, p. 1). Since 2016, Alibaba has transformed from a display site to a cross-border commerce platform, incorporating payment, transaction, and settlement functions, allowing buyers and sellers to conduct secure transactions. Thirty (30) warehouses have been allocated in major cities in China, with coverage from more than twenty (20) global shipping lines. During the pandemic, when many companies faced significant logistical challenges, Alibaba offers flexible logistics solutions tailored to the needs of diverse businesses. It has also developed a comprehensive foreign trade services system, offering a wide range of services, including factory security checks, certification to help buyers select reliable suppliers, and secure payment platforms. To address the issue of trust between merchants and buyers, it has provided numerous tools. Such as cargo global, which ensures accurate and efficient delivery, in addition to a credit guarantee system in cooperation with Ant Financial and international banks. It also introduced the Worry-Free-Set Soil strategy to help companies quickly digitize their products, promising to do so within 30 days of signing the contract (Yang, 2022). Some Chinese logistics companies are also trying to improve the efficiency of cross-border shipments. This is in line with another approach taken by major companies: establishing what are known as "fulfillment centers." Using big data analytics, they can predict the level and quantity of demand for certain products, export them in the traditional way, import them, and store them in warehouses in the importing country. This way, they can ship products directly to consumers very quickly. Today, there is an alternative to this model: a modern model that involves storing products in free zones and importing small shipments after each order (AliResearch, 2017, p. 4).

The Chinese government's utmost importance to digitization, the digital economy, and the digitization of foreign trade:

General Secretary Xi Jinping has placed great importance on developing the digital economy. This is achieved by issuing many policies and directives. Starting from 2015, China has developed more than (34) policies and 609 domestic policies to develop the digital economy and foreign trade. This is in addition to the initiative for developing the digital economy and cooperation of the Group of Twenty (G20) at the Hangzhou Summit in 2016, as well as the Digital Silk Road Project in 2018. In 2019, the National Digital Economy Pilot Zone's implementation plan for innovation and development in the digital economy was drawn up and implemented, with a focus on establishing a benchmark for

innovation and development in the digital economy in China. In 2020, the Regional Comprehensive Economic Partnership agreement was signed, with agreements covering trade issues. Digitalization, telecommunications, and cross-border trade are important areas for high-level open cooperation among signatory countries. In 2021, the Government Work Report was released, focusing on digital maturity, industrial digital transformation, and accelerating the construction of a digital society (Zhang & Li, 2022, p. 5).

Fierce competition with leading countries in the digital and electronic payment fields. China and other leading countries in this field are engaged in a geopolitical race in artificial intelligence, digitalization, technology, the Internet of Things, and digital payments. They have developed various policies and strategies to promote innovation in these areas, including high levels of government spending. Amid this escalating conflict, the United States, for example, has repeatedly complained. The Chinese government repeatedly demonstrates its disrespect for intellectual property rights. In 2020, China pledged to refrain from requiring American companies to transfer their technology as a condition for entering the Chinese market (Jones, 2023, p. 75).

Pursuing the internationalization of the Chinese yuan: Given China's advantage in financial technology, it is seeking to transform its official currency into a digital currency. The digital transformation of the Yuan (e-CNY) is a project spearheaded by the People's Bank of China. Launched in 2014, the project relies on central bank digital currencies (CBDCs), capitalizing on another advantage: the yuan's inclusion in the Special Drawing Rights basket in 2016, joining the US dollar, euro, Japanese yen, and British pound. In January 2021, China has launched a joint project with SWIFT to develop payment and data integration systems (Deng, 2024, p. 3). Recent studies indicate that expanding the international use of the yuan depends on trade and political exchanges between China and the target countries. China has also developed strategies to promote the use of the yuan in global markets. Recent studies indicate that expanding the use of the yuan internationally depends on trade and political exchanges between China and the target countries. China has also developed strategies to promote the use of the yuan in global markets, such as establishing a settlement center in London, providing exchange lines, and opening investment markets linked to the yuan (Deng, 2024, p. 5). With the introduction of the e-CNY digital yuan, China has a new tool to further its plans to increase the international use of the yuan. This digital currency can facilitate the spread of technology and expand economic efficiency. Chinese payment systems, such as Alipay and WeChat, are also contributing to this project, indicating integration with global payment systems operated by Unionpay (Deng, 2024, p. 7).

Establishing the Cross-Border Interbank Payment System: The CIP system is a key tool for the internationalization of the Chinese currency (RMB). In 2022, this system

processed approximately 96.7 trillion yuan, with 1,427 financial institutions connected to it in 109 countries and regions. In 2023, the China Investment and Transaction Service processed approximately 6.6 million transactions, with a total value of 123.06 trillion yuan.

That's a 50.29% increase in size and a 27.27% increase in value. As of 2024, the system has approximately 150 direct participants and 1,401 indirect participants spread across four continents. What's most striking about the system, however, are its contributing members. In addition to the People's Bank of China as the largest shareholder, there are state-owned Chinese banks, foreign shareholders, such as HSBC and Standard Chartered, also participated.

Other electronic payment methods saw significant growth during the fourth quarter of 2023, with the number of bank accounts reaching 14.465 billion, an increase of 0.64% compared to the previous quarter. Non-cash transactions reached 152.253 billion, worth 1.338.75 trillion yuan. Bank card usage rose to 9.787 billion. Electronic payments recorded 77.891 billion transactions, worth 862.92 trillion yuan. The total number of online payment transactions reached 24.512 billion, worth 711.39 trillion yuan. Mobile payment transactions Mobile transactions recorded 49,392 billion transactions, worth 134.06 trillion yuan, an increase of 10.46%. Electronic payment systems processed 353,799 billion transactions, worth 3,085.95 trillion yuan, an increase of 20.99 and 14.24%, respectively, compared to the previous year.

Competing with the US dollar: China began 2020 with its digital currency experiments while the rest of the world was busy. The COVID-19 pandemic has been ostensibly aimed at curbing the dominance of private payment instruments such as Alipay and Wechtpay, which offer digital payment services (Aysan & Nawaz, 2022, p. 3), and curbing and combating virtual and cryptocurrencies. However, the real goal is to support and internationalize the renminbi and its use in cross-border payments, especially after Trump's 2017 threats to block it from accessing the SWIFT system. Therefore, after creating and experimenting with this currency, China sought to replace the US dollar as the global reserve currency several times (most recently with the BRICS group, which announced the creation of a unified currency for settlement and payments), through the cross-border use of the digital renminbi (RMB) (Avgouleas & Blair, 2024, p. 5).

Today, China is considered the most important country to have expressed this so far. It aspires to have other countries use its digital currency as a means of exchange for international payments, with the ultimate goal of strengthening China's position in international trade relations, through the potential replacement of the US dollar as the global reserve currency by the digital renminbi (RMB) in the near or distant future (Avgouleas & Blair, 2024, p. 7).

In general, the development of electronic payment methods in a country can effectively reduce barriers to cross-border money flows and strengthen trade ties with other countries, enhancing the position of these tools in foreign trade. Furthermore, countries with a high level of digital payments development have lower barriers to capital flows between them. Which increases the intensity of trade links between them and makes global trade more integrated and interconnected.

Conclusion

This study aims to examine the impact of electronic payment methods on the activation and stimulation of cross-border e-commerce in China. The study relied on a five-point Likert-type questionnaire as a measurement tool. The sample includes 210 participants in the Chinese import and export market. The results showed that there is a positive relationship between the independent variables and the activation and stimulation of cross-border e-commerce. Improved use of electronic payment methods leads to enhanced cross-border e-commerce. The results of the multiple linear regression analysis demonstrated high explanatory power for the proposed model. Specifically, for every one-unit improvement in the independent variables, the activation and revitalization of cross-border e-commerce (CBEC) increases by 2,736 units. This underscores the profound impact of these strategies in bolstering and stimulating CBEC operations (Tiour , Koridjidj , & Khelifa , 2024, p. 27). The coefficient of determination (R^2) reached 0.888, indicating that the three independent variables collectively account for 88.8% of the variance in CBEC efficiency.Regarding the following observations were made:

Comfort and Ease: This variable exerted the most significant influence, recording a regression coefficient of (β=0.624) with high statistical significance ($p<0.01$). This finding implies that both importers and exporters prioritize the seamlessness of technical procedures as a paramount concern.

Speed and Efficiency: This factor ranked second, with a regression coefficient of (β=0.04) and high statistical significance. This reflects the necessity for Chinese firms to maintain robust financial standing to mitigate the risks associated with currency fluctuations.

Cost: Although influential, this variable ranked third with a coefficient of (β=0.02).Its relatively low weight is attributed to the intense price competition within the Chinese payment market, which has rendede pricing a secondary factor compared to operational efficiency.

What must be emphasized here is that these results did not come out of nowhere, but rather as a result of the factors and conditions provided by the Chinese government, which

facilitated the widespread adoption and use of all types of electronic payment methods at all levels. The most prominent of these can be mentioned below:

– Technological development: The proliferation of smartphones and cross-border digital platforms, which provide secure, fast, and easy-to-use payment services, in addition to the financial industry...etc.

– Growing confidence in cybersecurity: Encryption and security authentication systems have improved over time, reducing security concerns associated with hacking and fraud;

– Expansion of local and cross-border e-commerce: The growth of major e-commerce platforms and the increasing number of companies specializing in this industry have increased the need for reliable and fast electronic payment methods.

– Scientific research and training in the digital and technological field, and allocating the necessary expenditures for this field.

Based on the above, this study emphasizes the importance of developing electronic payment methods and addressing security and regulatory concerns to promote, grow, and stimulate foreign trade, especially in light of the accelerating digital economy. The study recommends the following:

For the world to benefit from the advantages of electronic payment methods, the following are recommended:

– The need to provide a flexible legislative environment and improve global digital infrastructure to ensure the use of these tools in supporting foreign trade;

– Countries must improve their digital payment infrastructure and create a favorable development environment for cross-border international digital payments. This primarily includes two aspects:

– Developing digital technology, making it accessible to all, and monitoring all relevant equipment and tools. Countries should also promote the development of cross-border digital payment technologies, particularly electronic payment security technologies, to support the sustainable and secure development of digital payment methods. – Secondly, China and other leading countries in the field should accelerate the construction of servers Core networks, to ensure seamless digital payments within and across borders.

– Developing international guidelines to regulate electronic payment methods (especially digital currencies). Governments and international bodies (the International Monetary Fund, the World Bank, and the World Trade Organization) should cooperate to develop a set of binding international guidelines to regulate these methods, these guidelines will inevitably help ensure security and uniformity in regulatory approaches, reducing barriers to adopting these methods and facilitating smoother international transactions.

– Implementing unified security protocols. To address security concerns, it is recommended to form an international coalition comprising cybersecurity experts and blockchain technology developers. Regulatory bodies are working to develop unified security protocols for electronic and digital transactions, enhancing trust and security for all parties.

– Establishing an authority to facilitate foreign trade using these means: A specialized authority could be established to oversee the further integration of these means into the framework of foreign trade. This authority would serve as a platform for exchanging best practices and suggestions, conducting research, and offering advice guidance on how to leverage the advantages of electronic payment methods to promote trade and economic development.

– Governments must ensure that the level of openness to foreign trade and the facilitation of cross-border payments in countries can meet the requirements for the development of electronic payment methods.

– Digital payments reduce barriers to cross-border money flows, which pose risks to the development of foreign and international trade. Therefore, countries must coordinate and unify relevant laws and regulations to guide the development of electronic payment methods in the right direction, and work to make them consistent and comprehensive.

– Countries and governments must fulfill their regulatory and legal responsibilities toward non-government-issued electronic payment methods to avoid risks that threaten economic development.

– The study also recommends that national banks reduce fees resulting from the use of electronic payment methods in the settlement of cross-border transactions.

– Governments should work to provide partial and aggregate data on the use of electronic payment methods so that researchers can study this phenomenon.

– Exchange professional, academic, and research visits between leading and lagging countries in the field of electronic banking, digital payments, and digitization, in order to exchange expertise and benefit from each other's experiences.

– Strengthening public-private partnerships. Public-private partnerships should be encouraged to drive innovation and the adoption of all types of electronic payment methods in foreign trade. These partnerships could focus on developing more efficient and secure transaction platforms, as well as educational programs to increase awareness and understanding of these companies and the public.

– Supporting research and development. Governments and international organizations should invest in research and development efforts focused on improving the scalability, security, and interoperability of digital payment systems. These investments

help address specific technical challenges and support the long-term growth of electronic payment methods in foreign trade.

– The integration of electronic payment methods into the global trade system presents a unique set of opportunities and challenges. By adopting proposals and recommendations, stakeholders can create a more conducive environment for the use of (bank cards, digital currencies, electronic checks, etc.), enhancing the efficiency, security, and inclusiveness of foreign trade. As the landscape of these methods continues to evolve, Continued cooperation, innovation, and political adaptation will be essential to realize its full potential in global trade.

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Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: I, Year: 2026, pp. 106-118
DOI: 10.37708/em.swu.v23i1.6

RENEWABLE ENERGY CONSUMPTION AND CARBON EMISSIONS IN DEVELOPING ECONOMIES: PANEL DATA ANALYSIS (2000–2022)

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Received: 28.01.2026, Accepted: 31.03.2026

Abstract

This study examines the relationship between renewable energy consumption and carbon dioxide (CO_2) emissions in developing economies from 2000 to 2022. Using panel data from the World Bank, the analysis includes renewable energy share, GDP per capita, population growth, and a financial development index. Three panel data models—Pooled Regression Model (PRM), Fixed Effects Model (FEM), and Random Effects Model (REM)—are estimated, with Fisher, Breusch–Pagan LM, and Hausman tests applied to select the most suitable model. The Random Effects Model (REM) provides the best fit. Results show that higher renewable energy consumption reduces (CO_2) emissions, while economic growth, population expansion, and financial development increase emissions. These findings are consistent with the Environmental Kuznets Curve (EKC), suggesting emissions rise in early development stages and decline as institutions strengthen and cleaner technologies are adopted. The study highlights policy implications for green financing, institutional reforms, and regional cooperation to support sustainable energy transitions in developing countries.

Keywords: *Renewable Energy; CO_2 Emissions; Developing Economies; Panel Data Analysis; Environmental Kuznets Curve (EKC); Sustainable Energy Transition.*

JEL Codes: *Q42, Q53, C23, O13.*

Introduction

In recent decades, there has been a growing global interest in the relationship between renewable energy consumption and carbon dioxide emissions, particularly in

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developing economies that face the dual challenge of achieving economic growth while maintaining environmental sustainability. This interest stems from the increasing severity of climate change, international commitments to emissions reduction under agreements such as the Paris Accord, and rising fossil fuel prices and their associated geopolitical volatility (Dogan & Seker, 2016, p. 430).

Empirical literature indicates that the relationship between renewable energy consumption and carbon emissions varies across geographic and economic contexts. While some studies highlight the positive impact of renewable energy in reducing emissions (Erkut, 2022, p. 2), others suggest that these effects may not be immediate, but rather unfold over the long term as renewable energy infrastructure expands and becomes more efficient (Elmonshid et al., 2024, p. 2). Furthermore, Apergis and Payne (2010) found bidirectional causality between renewable energy consumption and economic growth in OECD countries, reinforcing the hypothesis that adopting renewable energy does not contradict development goals but may in fact support them in the long run.

The study of developing economies in this context is of particular significance, given their heavy reliance on conventional energy sources and the frequent absence of coherent strategies for energy transition. Moreover, many of these countries suffer from weak institutional and financial capacities, which hinder the development of clean energy projec ts and delay their environmental benefits (Elmonshid et al., 2024, p. 3).

Accordingly, this study aims to explore the dynamic relationship between renewable energy consumption and carbon dioxide emissions across a panel of developing economies during the period 2000–2022. It employs panel data analysis techniques that account for both cross-country heterogeneity and temporal dynamics. Additionally, the study seeks to test the Environmental Kuznets Curve (EKC) hypothesis in these economies and investigate how the relationship under study is influenced by factors such as GDP and trade openness.

The significance of this research lies in its contribution to filling a persistent gap in the literature, as most prior studies have focused either on advanced economies, short time spans, or utilized econometric models that overlook structural heterogeneity among countries. Hence, this study provides a modern analytical framework that may inform policymakers in developing nations as they design balanced energy strategies that aim to reduce emissions without compromising growth objectives.

Literature Review

The Nexus between Renewable Energy Consumption and Carbon Emissions in Developing Economies

With the growing urgency to address climate change, the relationship between renewable energy consumption and carbon dioxide (CO2) emissions has become a central topic in environmental economics, particularly for developing economies that face the dual challenge of sustaining economic growth while reducing environmental degradation.

Shahbaz et al. (2015) found that the use of renewable energy sources significantly reduces carbon emissions in emerging economies, especially when accompanied by improved energy efficiency. Similarly, Sarkodie and Strezov (2019), in a comprehensive meta-analysis, concluded that renewable energy consumption generally leads to positive environmental outcomes, though these effects depend heavily on the maturity of energy infrastructure.

In a study focusing on developing countries, Nguyen and Kakinaka (2019) observed that the emission-reducing impact of renewable energy is not clearly evident in low-income nations due to technological inefficiencies and limited institutional capacity. This underscores the disparity in renewable energy outcomes across different stages of development.

Nathaniel et al. (2020) provided empirical evidence from the MENA region, demonstrating that renewable energy consumption plays a vital role in improving environmental performance. Their findings show a statistically significant and negative relationship between renewable energy and carbon emissions in most developing countries analyzed.

Elfadli et al. (2024) further emphasized the role of institutional quality, particularly financial efficiency, in enhancing the effectiveness of renewable energy in reducing CO2 emissions. Their panel quantile regression results from the GCC region revealed that countries with higher financial efficiency witnessed a stronger mitigation impact.

In the same vein, Zakarya et al. (2023) argued that the ability of renewable energy to reduce emissions varies based on national policy frameworks and regional cooperation. In their Mediterranean-focused analysis, they highlighted that weak governance and fragmented policies can undermine the environmental benefits of renewables.

Conversely, Dogan and Seker (2016) noted that shifting from non-renewable to renewable energy does not automatically ensure emission reductions, particularly in the absence of stringent environmental policies and sufficient technological investment.

Overall, the literature suggests that the relationship between renewable energy consumption and carbon emissions in developing economies is neither linear nor uniform.

It is influenced by a variety of institutional, technological, and economic factors. This underscores the relevance of the current study, which aims to provide updated econometric evidence covering the period 2000–2023, offering deeper insights into the dynamics of the renewable energy–emissions nexus in the developing world.

Recent Empirical Studies

Recent empirical research has increasingly focused on the dynamic relationship between renewable energy consumption and CO2 emissions, particularly in developing economies where environmental pressures and economic development intersect.

For instance, Nguyen and Kakinaka (2019) employed panel cointegration techniques to analyze the relationship across countries at different development stages. Their findings suggest that the environmental impact of renewable energy varies significantly depending on economic maturity and institutional infrastructure. In a similar context, Nathaniel et al. (2020) used quantile regression to examine MENA countries and found a consistent negative relationship between renewable energy usage and carbon emissions across quantiles, supporting the notion that renewable energy plays a pivotal role in environmental mitigation.

More recently, Elfadli et al. (2024) applied a panel data quantile regression model to GCC countries and found that the mitigating effect of renewable energy on emissions is stronger in countries with higher financial efficiency. This highlights the importance of institutional quality and financial systems in enhancing the effectiveness of green energy transitions. Likewise, Zakarya et al. (2023) analyzed the Union for the Mediterranean countries and concluded that governance quality and regional policy alignment are critical to the environmental effectiveness of renewable energy deployment.

Additionally, Dogan and Seker (2016) provided evidence from the United States showing that while renewable energy consumption has a negative correlation with CO2 emissions, its effect is relatively modest unless supported by environmental regulations and technological investment. Sarkodie and Strezov (2019), through a meta-analysis, confirmed that renewable energy can reduce emissions, but the magnitude of the effect varies widely depending on country-specific characteristics.

These studies collectively emphasize the need for country-specific strategies, suggesting that while renewable energy has the potential to reduce carbon emissions, its impact is conditioned by macroeconomic, institutional, and technological variables. This underscores the importance of further empirical investigation, particularly in the context of developing economies over extended timeframes.

Research Gap

Although a growing body of empirical literature confirms a link between renewable energy consumption and CO2 emissions, most studies focus on high-income or energy-exporting countries. Few investigations target developing economies as a distinct group, especially through the lens of long-term panel data analysis that incorporates macroeconomic and institutional variables.

Moreover, while earlier research often employs traditional linear models, recent advances suggest that non-linear dynamics, such as those captured by quantile regression or threshold models, may better reflect the heterogeneity across developing countries. In addition, many prior studies omit the joint effects of variables like financial development, population growth, and policy quality on the renewable energy–emissions nexus.

Therefore, this study aims to fill the gap by offering a comprehensive panel data analysis covering a wide range of developing economies over the 2000–2022 period, integrating key economic indicators to better understand the effectiveness of renewable energy in mitigating emissions in diverse contexts.

Research Hypotheses

Based on the reviewed literature and identified research gap, the following hypotheses are proposed:

H1: There is a significant negative relationship between renewable energy consumption and carbon dioxide (CO2) emissions in developing economies.

H2: The relationship between renewable energy consumption and CO2 emissions is moderated by macroeconomic variables such as GDP and population growth.

H3: Institutional and financial development enhances the effectiveness of renewable energy in reducing CO2 emissions.

Data Description

The data used in this study were obtained from the World Bank's World Development Indicators (WDI) database, which is considered one of the most reliable international statistical sources. The main variables used in the analysis are:

- **CO_2 Emissions (CO2):** measured in metric tons per capita.
- **Renewable Energy Consumption (RE):** percentage of total final energy consumption.
- **GDP per capita (GDP):** constant 2015 US dollars.
- **Population growth (POP):** annual growth rate.

- **Financial Development Index (FD):** a composite index combining credit and monetary indicators to capture financial sector depth and efficiency.

Econometric Model

To analyze the relationship between renewable energy consumption and CO2 emissions, the following baseline panel data model is specified:

$$CO_2\_it = \alpha + \beta_1 RE\_it + \beta_2 GDP\_it + \beta_3 POP\_it + \beta_4 FD\_it + \varepsilon\_it$$

Where:

- *i* denotes country;

- *t* denotes year;

- ε_it is the error term.

Descriptive Statistics

The descriptive statistics of the study variables, based on 391 observations, are reported in Table 1. The statistics include the mean, standard deviation, minimum, and maximum values. The results indicate that the dataset is complete, with no missing values or outliers detected.

Table no.1. Descriptive Statistics of the Study Variables

Variable	**CO2**	**RE**	**GDP**	**POP**	**FD**
Mean	0.765719	53.905	4.525963	3.35205	34.86298
Std. dev	0.801934	28.95106	3.397832	1.256066	24.68469
Min	0.0561864	0.0351772	-12.40797	1.050547	5.209203
Max	3.369468	93.73209	14.04712	10.51618	118.8171
Obs	391	391	391	391	391

Source: Authors' calculation based on EViews 13 outputs.

The empirical analysis is conducted using a balanced panel of 17 developing economies, strategically selected to ensure geographical and economic representation across various regions. The sample comprises ten African nations (Ghana, Kenya, Madagascar, Niger, Republic of the Congo, Rwanda, Senegal, Tanzania, Togo, and Tunisia), four Asian countries (Bangladesh, Cambodia, Nepal, and Pakistan), two from Latin America (Colombia and Paraguay), and Jordan from the Middle East. These specific countries were chosen based on the availability of consistent and continuous data for all investigated variables—including renewable energy share, GDP per capita, population growth, and financial development—over the observed period of 2000–2022, thereby ensuring the robustness and statistical reliability of the econometric estimations.

Econometric Results and Model Specification Diagnostics

Estimation Results of the Panel Data Models (2000-2022)

The estimation results of the three panel data models are presented in Table2. The findings indicate that all models are statistically significant, as confirmed by the Fisher statistics with probability values equal to 0.0000, which are lower than the 5% significance level. Moreover, the explanatory power of the three models is found to be adequate.

Table no.2. Estimation Results of the Panel Data Models (PRM, FEM, REM)

Variable		**PRM**	**FEM**	**REM**
RE	Coefficient	-0.01877	-0.108	-0.012
	t-Statistic	-19.62	-7.44	-8.79
	Prop	0.0000	0.0000	0.0000
GDP	Coefficient	-0.01728	0.005	0.00475
	t-Statistic	-2.86	2.42	2.3
	Prop	0.0040	0.016	0.0220
POP	Coefficient	0.00284	0.027	0.0265
	t-Statistic	0.16	3.53	3.43
	Prop	0.874	0.0000	0.0010
FD	Coefficient	0.0083	0.005	0.00467
	t-Statistic	7.98	6.45	6.08
	Prop	0.0000	0.0000	0.0000
Cons	Coefficient	1.557	1.06	1.1475
	t-Statistic	17.49	10.39	8.44
	Prop	0.0000	0.0000	0.0000
R-squaret		0.7595	0.4971	0.4963
F-statistic		292.75	91.44	397.56
Prop(F)		0.0000	0.0000	0.0000

Source: Authors' calculation based on EViews 13 outputs.

Model Selection Tests

To identify the most appropriate panel data model, three specification tests were conducted: the Fisher test, the Breusch–Pagan Lagrange Multiplier (LM) test, and the Hausman test. The results are summarized below.

- *Fisher Test (PRM vs. FEM):*

The Fisher test was applied to discriminate between the Pooled Regression Model (PRM) and the Fixed Effects Model (FEM).

$$\begin{cases} H_0: \text{PRM is appropriate} \\ H_1: \text{FEM is appropriate} \end{cases}$$

The probability value was 0.0000, which is less than the 5% significance level. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating that the Fixed Effects Model is more appropriate.

Table no.3. Fisher Test Results (PRM vs. FEM)

Test	**Statistic**	**d.f.**	**Prob.**
F test that all u_i=0	238.78	(370,16)	0.0000

Source: Authors' calculation based on EViews 13 outputs.

- *Breusch–Pagan Lagrange Multiplier Test for Choosing between the Pooled Regression Model and the Random Effects Model*

Table 4 presents the results of the Breusch–Pagan Lagrange Multiplier (LM) test, which was applied to discriminate between the Pooled Regression Model (PRM) and the Random Effects Model (REM), based on the following hypotheses:

$$\begin{cases} H_0: \text{PRM is appropriate} \\ H_1: \text{REM is appropriate} \end{cases}$$

Based on the probability value of the test, which was estimated at 0.0000 and is lower than the 0.05 significance level, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating that the Random Effects Model is the appropriate specification.

Table.4. Results of the Breusch–Pagan LM Test (PRM vs. REM)

Test statistic (Chibar²)	**p-value**
2916.61	0.0000

Source: Authors' calculation based on EViews 13 outputs.

- *Hausman Test (FEM vs. REM):*

After the Fisher test confirmed that the Fixed Effects Model (FEM) is preferred over the Pooled Regression Model (PRM), and the Breusch–Pagan LM test indicated that

the Random Effects Model (REM) is preferred over the PRM, the Hausman test was conducted to choose between FEM and REM.

$$\begin{cases} H_0 \text{REM is appropriate} \\ H_1 : \text{FEM is appropriate} \end{cases}$$

The results in Table 6 show that the Hausman statistic is 7.16 with a probability value of 0.1278, which is greater than the 5% significance level. Therefore, the null hypothesis cannot be rejected, and the Random Effects Model (REM) is deemed the appropriate specification.

Table.6. Hausman Test Results (FEM vs. REM)

Test	**Chi-Sq. Statistic**	**d.f.**	**Prob.**
Hausman	7.16	4	0.1278

Source: Authors' calculation using EViews 13.

Final Model Estimation (REM):

Based on the model selection tests, the Random Effects Model (REM) was chosen as the preferred specification to estimate the impact of renewable energy consumption (RE) on CO2 emissions (CO2) in developing economies. The estimation results are reported in Table 2 .The results show that the coefficient of renewable energy consumption (RE) is negative and statistically significant, confirming an inverse relationship between RE and CO2 emissions. This implies that a 1% increase in renewable energy consumption leads to a 0.012157% reduction in CO2 emissions, consistent with economic theory and prior empirical evidence. Conversely, GDP per capita (GDP), population growth (POP), and the Financial Development Index (FD) exhibit positive and significant effects on CO2 emissions, suggesting that higher economic activity demographic growth and financial development contribute to increasing emissions. The overall model is statistically significant, as indicated by the high F-statistic (397.56, $p < 0.01$). The explanatory power of the model is satisfactory, with an R^2 of 0.4963, meaning that RE, GDP, POP, and FD collectively explain approximately 49.63% of the variation in CO2 emissions across the sample of developing economies during the period 2000–2022.

Results

The estimation outcomes of the panel data models are reported in Tables 2–4. All models are statistically significant at the 1% level, confirming the reliability of the

specifications. The Fisher test and the Breusch–Pagan LM test both reject the pooled regression model in favor of the Random Effects Model (REM). Moreover, the Hausman test validates the REM as the most suitable estimator for this dataset. Table 4 presents the final estimation results under the REM specification. The coefficient of renewable energy consumption (RE) is negative and highly significant (-0.012, $p < 0.01$), indicating that an increase in the share of renewables effectively reduces CO2 emissions in developing economies. Economically, this implies that renewable energy adoption can contribute to environmental quality without impeding growth, supporting global sustainability targets.

Conversely, GDP per capita shows a positive and significant effect (0.0047, $p < 0.05$), meaning that higher income levels are associated with greater emissions in the short-to-medium run. This result is consistent with the early stages of the Environmental Kuznets Curve (EKC), where growth tends to increase environmental pressure before cleaner technologies are fully integrated.

Population growth also exerts a positive and highly significant influence on CO2 emissions (0.0265, $p < 0.01$). Rapid demographic expansion in developing economies intensifies energy demand and reliance on fossil fuels, thereby amplifying emissions.

Similarly, financial development contributes positively to emissions (0.0046, $p < 0.01$). While deeper financial markets can enhance investment and growth, they may also channel resources into energy-intensive sectors, leading to a "scale effect" that outweighs potential efficiency gains.

The explanatory power of the model is satisfactory ($R^2 = 0.496$), suggesting that the included variables jointly explain about 50% of the variation in CO2 emissions across the sample countries.

Overall, the results demonstrate that renewable energy is an effective tool for mitigating emissions, but structural challenges—income growth, demographic pressures, and financial expansion—continue to drive environmental degradation. This highlights the need for targeted policies that integrate renewable energy promotion with institutional reforms and sustainable financial mechanisms.

Discussion

The findings of this study indicate that renewable energy consumption contributes to reducing carbon dioxide emissions in developing economies. This result is consistent with previous studies such as Nguyen and Kakinaka (2019) and Nathaniel et al. (2020), which confirmed a negative relationship between renewable energy and emissions, particularly when supported by an enabling institutional environment. Conversely, the results revealed that economic growth, population growth, and financial development exert upward pressure on emissions. These outcomes align with the Environmental

Kuznets Curve (EKC) hypothesis, which suggests that emissions increase during the early stages of economic development and eventually decline as technological advancement and environmental policies are strengthened (Sarkodie & Strezov, 2019).

Furthermore, the finding that financial development contributes positively to emissions echoes the conclusions of Elfadli et al. (2024), who argued that inefficient financial systems may exacerbate environmental degradation by channeling resources toward polluting activities unless accompanied by green financing mechanisms. Therefore, these results confirm that the transition toward clean energy in developing economies requires not only technological investments but also improvements in institutional and financial quality to maximize the environmental benefits of renewable energy.

Conclusion

This study provides a rigorous empirical examination of the dynamic nexus between renewable energy consumption and carbon dioxide (CO2) emissions across a strategically selected panel of developing economies from 2000 to 2022. Our findings offer a dual perspective on the path to sustainability: while the transition to renewable energy sources acts as a potent catalyst for decarbonization, the countervailing pressures of rapid economic growth, demographic expansion, and conventional financial development continue to exacerbate the environmental footprint.

The scholarly contribution of this research extends beyond mere statistical estimation; it addresses a critical knowledge gap by situating the energy-emission trade-off within the unique institutional and macroeconomic contexts of the developing world. By shifting the focus toward these high-growth regions, the study provides a nuanced understanding of how structural transformations influence environmental quality over the long term.

From a pragmatic policy standpoint, these results serve as a clarion call for "Green Structural Transformation." It is no longer sufficient to promote renewable energy in isolation. Instead, policymakers in developing nations must orchestrate a synchronized policy mix that:

- Strategic Shift in Financial Credit (Addressing the Scale Effect): Since the results show that financial development currently increases emissions in these specific economies, governments should implement "Green Credit Guidelines." Instead of general lending, central banks should offer preferential interest rates and credit guarantees specifically for small-scale off-grid renewable projects, which are more suitable for the rural and peri-urban areas common in these developing nations.

- Decoupling Growth via Energy Efficiency Standards: In the context of rapid industrialization, these countries must move beyond just "installing" renewable capacity. There is an urgent need for mandatory energy-performance standards in the construction and manufacturing sectors to ensure that economic expansion (GDP) does not lead to a linear increase in carbon intensity.

- Mitigating Demographic Pressure through Urban Planning: As population growth is a significant driver of emissions in our sample, policymakers should integrate renewable energy into low-income housing projects and public transport systems. This "Pro-Poor Green Growth" approach ensures that demographic expansion is managed through sustainable urban infrastructure rather than carbon-intensive informal settlements.

- South-South Technology Transfer: Rather than relying solely on expensive Western technology, the studied nations should establish regional "Green Innovation Hubs" (e.g., between North African and Asian countries in the sample). This facilitates the sharing of cost-effective, locally adapted renewable technologies that are better suited to the climatic and maintenance capacities of developing regions.

Based on the findings, this study offers several tailored policy implications for the investigated developing economies. First, given that financial development currently correlates with increased emissions, governments should shift toward 'Green Credit Allocation,' prioritizing low-interest loans for decentralized renewable projects in rural and peri-urban areas. Second, to manage the pressures of rapid demographic and economic expansion, it is crucial to implement mandatory energy-efficiency standards in urban planning and manufacturing. Finally, fostering South-South technology transfer between the countries in the sample—such as sharing cost-effective solar innovations—can significantly lower the financial barriers to a clean energy transition, ensuring that economic growth is effectively decoupled from environmental degradation.

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Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: I, Year: 2026, pp. 119-149
DOI: 10.37708/em.swu.v23i1.7

REDUCING WORKPLACE ACCIDENTS IN THE CONTEXT OF SOCIAL RESPONSIBILITY ACCORDING TO ISO 26000's GUIDELINES: A CASE STUDY OF THE NATIONAL DRILLING COMPANY (ENAFOR) IN HASSI MESSAOUD

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Received: 20.12.2025, Accepted: 07.04.2026

Abstract

This study examines the extent to which the National Drilling Company (ENAFOR) implements social responsibility guidelines based on the ISO 26000 in order to reduce workplace accidents, by analyzing their relationship and impact. A quantitative, descriptive-analytical approach was adopted. Data were collected through 104 questionnaires randomly distributed to construction site workers and analyzed using SPSS (V.25). The findings reveal a significant relationship and impact between CSR practices and workplace accidents, with employee social care emerging as the most influential dimension in improving workplace safety outcomes. The results also indicate that occupational health and safety practices, awareness of workplace risks, and training programs contribute significantly to accident reduction. Overall, ENAFOR demonstrates a strong commitment to CSR implementation and alignment with ISO 26000 principles, reflecting a positive evolution toward improved safety performance. However, several gaps remain, particularly

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in safety training effectiveness, communication systems, reporting mechanisms, monitoring of safety. measures, employee engagement, and subcontractor compliance. These findings highlight both the progress achieved and the areas requiring improvement to further strengthen workplace safety and ensure sustainable organizational performance.

Keywords: *international standard ISO 26000; social responsibility; workplace accidents; ENAFOR.*

JEL Codes : *J28, M14, K32*

Introduction

Developed countries have increasingly embraced the philosophy of corporate social responsibility (CSR) and its practical applications within organizational settings, particularly with the expanding role of the private sector in fostering economic development. In contrast, developing countries have historically shown comparatively limited engagement with CSR practices. However, in recent years, growing efforts across the Arab world have sought to raise awareness among business leaders regarding their societal responsibilities. In Algeria, this shift is reflected in the gradual adoption of international frameworks such as ISO 26000, with organizations beginning to integrate its principles and dimensions into their operational practices.

Historically, CSR emerged as a response to pressures exerted by various stakeholders, including employees, consumers, and civil society. Over time, it has evolved into a more voluntary and strategic organizational practice, embedded within corporate governance and management systems.

Among all stakeholders, employees represent a central pillar of the production process, making their well-being a key concern of CSR. Nevertheless, they remain continuously exposed to occupational risks, particularly workplace accidents, which constitute a major challenge for organizations due to their significant human, economic, and social consequences.

Workplace accidents are especially prevalent in high-risk sectors such as industry and petroleum activities, where complex operational environments increase exposure to hazards. While such risks cannot be entirely eliminated, their frequency and severity can be significantly reduced through the adoption of effective preventive measures and responsible management practices.

In this regard, organizations play a crucial role in ensuring safe working conditions by implementing CSR principles. The ISO 26000 standard provides a comprehensive framework for this purpose, guiding organizations in integrating social responsibility into

labor practices and working conditions, thereby contributing to the prevention of workplace accidents.

Based on the above, the main research question of this study is formulated as follows: To what extent does the National Drilling Company (ENAFOR) implement ISO 26000 guidelines in reducing workplace accidents?

This main question is supported by the following sub-questions:

- What is corporate social responsibility and what are its main dimensions?
- What are workplace accidents and under what conditions do they occur?
- What are the key methods for preventing workplace accidents?

Study Objectives

Defining the theoretical concepts related to social responsibility and workplace accidents.

Defining the international standard ISO 26000:

- Finding out and measuring the effect and relationship between implementing the social responsibility guidelines according to the international standard ISO 26000 and reducing workplace accidents at the National Drilling Company. (ENAFOR)

- Providing suggestions and recommendations based on the study results obtained through measuring the effect and relationship between the study variables.

Study Methodology

We relied on the quantitative approach, given that the nature and type of our study require analysis, measurement, testing of the research hypotheses, and obtaining statistically significant results regarding the research problem.

Regarding the practical aspect of the study, a descriptive analytical method was employed, using a study tool in him from of a questionnaire that collected the required data from the study population.

Literature review

Corporate Social Responsibility (CSR) has evolved from a normative and philanthropic concept into a strategic framework that integrates social, economic, and ethical dimensions into organizational performance. Previous studies have emphasized that CSR is no longer limited to voluntary initiatives but has become a key driver of sustainable development and organizational competitiveness. (Scherer & Palazzo; Gyoshev, 2011) provided an extensive analysis of the nature, functions, and core characteristics of CSR, highlighting the transition from philanthropic and compliance-based approaches toward

strategic integration within business models. While this contribution offers a valuable conceptual overview and situates Bulgarian CSR within international standards such as SA 8000 and ISO 26000, its predominantly descriptive orientation underscores the need for empirical studies linking CSR principles to concrete organizational outcomes.

Empirical studies on occupational safety indicate that demographic and occupational characteristics including age, educational attainment, work experience, and marital status play an important role in determining workplace accident occurrence and severity (Işsever et al., 2008), (Ghamari et al., 2012). These findings support the argument that occupational health and safety (OHS) constitutes a critical component of socially responsible management, particularly in contexts where workforce vulnerability remains high.

More recent empirical evidence strengthens this perspective by explicitly linking CSR-driven safety practices to organizational performance (Bautista-Bernal et al., 2024).

Drawing on the principles of ISO 26000, conceptualize workplace accident prevention as a strategic pillar of CSR. Their study demonstrates that a strong safety culture characterized by employee participation, continuous improvement, and systematic risk management leads not only to a reduction in accident rates but also to enhanced financial performance and corporate reputation. This confirms that OHS, when embedded within a CSR framework, functions as a driver of sustainability rather than a mere regulatory obligation.

Similarly, Koo and Ki (2020) provide empirical evidence that higher CSR performance is associated with a decrease in work-related injuries and lost working days. These findings reinforce the argument that CSR-oriented policies contribute not only to social well-being but also to organizational efficiency and performance.

Despite these advancements, the existing literature remains largely concentrated in developed economies, with limited empirical research focusing on developing countries, particularly in the Algerian context. Moreover, few studies have explicitly examined the role of ISO 26000 especially its sixth clause related to labor practices and working conditions in reducing workplace accidents

In the Bulgarian socio-economic context, CSR has also been examined through the lens of labor remuneration and social equity. Kalchev (2012), as well as Bellahsene & Bekour (2022), analyze the relationship between CSR principles and wage policies, highlighting persistent disparities in labor compensation. Their analyses emphasize that integrating CSR into corporate strategies can contribute to fairer remuneration systems, improved employee well-being, and strengthened ethical commitments. These studies

collectively suggest that CSR in Bulgaria remains an evolving practice, requiring a stronger alignment between normative principles and measurable organizational and social outcomes.

Overall, the reviewed literature indicates that while CSR in Bulgaria has been well documented at the conceptual level, there is a growing need for integrative approaches that connect CSR standards particularly ISO 26000 with occupational safety, labor practices, and organizational performance. This gap justifies the present research, which seeks to contribute empirically to understanding how CSR-oriented safety and labor policies generate value for both employees and organizations within the Bulgarian context.

Study Hypotheses

Based on the literature review, which highlights the significant relationship between Corporate Social Responsibility (CSR), occupational health and safety practices, and workplace accident reduction, the following hypotheses are formulated:

H1: The implementation of social responsibility guidelines based on ISO 26000 has a significant effect on reducing workplace accidents at ENAFOR.

H2: Employee awareness has a statistically significant effect on the reduction of workplace accidents at ENAFOR.

H3: The application of occupational health and safety (OHS) rules and the design of a safe working environment have a statistically significant effect on reducing workplace accidents at ENAFOR.

Conceptual framework

Defining Social Responsibility

Writers, researchers, and organizations gave different definitions for social responsibility. The following table clarifies different perspectives on social responsibility:

Table no. 1 - The Dimensions of Social Responsibility

Entity	Pioneers	Definition
Definition of Researchers and thinkers	Haward Bowen	It is the businessmen's responsibility tomonitor policies, make decisions, and undertakeactivities that align with society's goals.
	Drucker 1977	It is the commitment towards the society in which it operates.
	Carroll Archie	It is a tool to cover the economic, legal, and ethical aspirations of society.

	Holmes.	A moral, human, and moral obligation that organizations bear towards the society in which they operate.
Definition of International Bodies and Organizations	World Bank	The commitment of business owners to contribute to sustainable development, and to work with the local community and society as a whole to improve the standard of living in a way that serves trade and development simultaneously.
	World Business Council	"The continued commitment of business companies to ethical behavior and to contribute to economic development while improving the quality of life of the workforce and their families, as well as local communities and society as a whole "
	International Chamber of Commerce	All attempts that contribute to companies volunteering to achieve development because of ethical and social considerations, which means that; social responsibility depends on good initiatives from companies without a legal obligation, because they are achieved through conviction and learning.
	The European Union	A concept undertaken by companies that involves social and environmental considerations in their operations and interactions with stakeholders in a voluntary manner.
	International Organization for Standardization	The practices carried out by an organization to take responsibility resulting from its activities on the community and the environment to make its activities consistent with the benefits of society and sustainable development.

Source: Developed by us based on the theoretical framework.

The Dimensions of Social Responsibility

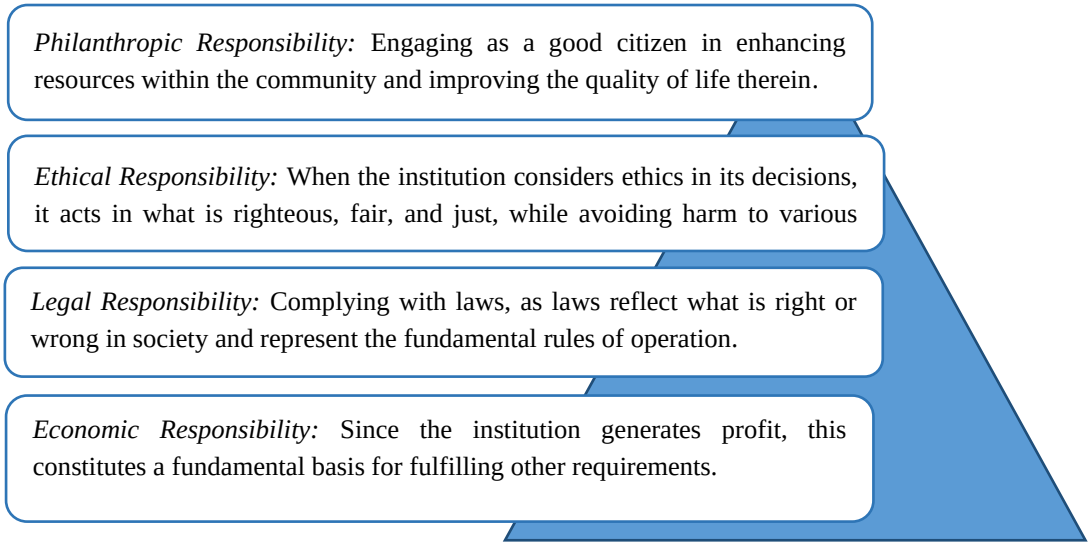
Economic Responsibility: It means providing goods and services specifically designed to meet the needs of consumers while continuously working to generate wealth for shareholders.

Legal Responsibility: It is the ability of the institution to carry out its activities within the framework of compliance with state laws and regulations, as well as the laws established by the institution itself.

Ethical Responsibility: It focuses on all activities of the institution that are considered fair by the institution itself, not subject to a legal framework but rather possessing ethical principles.

Philanthropic Responsibility: refers to voluntary and charitable activities carried out beyond legal and ethical requirements to enhance social welfare (Carroll, A. B., & Shabana, K. M., 2010)

Figure no. 1 The Carroll Pyramid of Social Responsibility



Source: Taher Mohsen Mansouri Al-Ghalebi, Mohsen Al-Amri, Social Responsibility, Business Ethics, and Society, Wael Publishing and Distribution House, Amman, Jordan, 1st edition, 2008, p. 83.

Workplace Accidents

Workplace Accidents Definition

The International Labor Office in Geneva defines workplace accidents in the scientific guidebook for work inspectors as: "any accident that occurs due to or during work, and results in fatal or non-fatal injuries. For instance: falling from a high height." (International Labour Office. Jahr, 2015).

A workplace accident is an occurrence arising out of, or in the course of, work resulting in either fatal or non-fatal injury (Magalhães, L. M. C. A., et al., 2022).

Additionally, workplace accidents can be legally defined. The Algerian legislature defined workplace accidents in Law 83-13, dated 21 Ramadan 1403, corresponding to July 2, 1983, related to workplace accidents and occupational diseases in Article 06. This article defines workplace accidents as: "any accident resulting in physical injury caused by a sudden and external cause that occurred within the work scope

Through the previous definitions, a definition of workplace accidents can be given as follows: “Every sudden and unexpected incident that occurs during work or related activities, including exposure to natural, mechanical, chemical hazards, as well as any severe stress, fatigue, or other risks that lead to the death, physical injury, or severe illness of the affected worker.”

Workplace Accidents Conditions

In order for an accident to be considered a workplace accident, the following conditions must be met:

The accident should occur during working hours: This indicates that the accident affecting the worker must occur while they are actively engaged in their duties, even if it was not directly caused by the tasks they were performing, and even if it happened during a break.

*Physical injury (bodily harm)***:** This means that the accident should result in physical or mental harm that affects the worker's ability to perform their duties normally.

Causation between the accident and the harm: This means that there must be a causal relationship between the accident and the harm suffered by the worker.

The suddenness of the accident: This means that the incident causing the workplace accident should occur within a very short period of time and in a sudden manner, distinguishing it from occupational diseases, such as a gas leak leading to an explosion. (B.Léa, 2020).

Causes of Workplace Accidents

The various personal, psychological, and social circumstances related to the worker are considered factors that contribute to workplace accidents.

Environmental and Organizational Factors

Work Pace: Research has shown that a high work pace significantly contributes to workplace accidents. For instance, Salminen et al. (2017) found that employees frequently working in a hurry were much more likely to suffer occupational injuries (25 % vs 8 %, $p < 0.001$), with interruptions further increasing accident risk (OR = 12.06 (Salminen, S., et al, 2017))

Temperature: Temperature is a significant environmental factor affecting occupational safety. Research indicates that workplace accidents increase when temperatures fall below or rise above the optimal thermal comfort range of approximately 21°C–22°C. High temperatures can cause heat stress, dehydration, fatigue, and reduced cognitive performance, while cold temperatures impair dexterity, concentration, and

judgment. Both extreme heat and cold therefore increase the likelihood of occupational injuries, making temperature control an essential preventive measure in workplace safety (Kjellstrom, T., et al., 2016).

Lighting: Recent academic research supports the critical role of appropriate lighting in workplace safety and cognitive performance. Jayawardena et al. demonstrated that high-quality industrial lighting evaluated via metrics such as relative visual performance (RVP) and small target visibility (STV) can markedly reduce accident rates due to better detection of hazards (Jayawardena, S., Morrow, D., & Bhusal, P., 2016).

Dust and dirt: Empirical research indicate that elevated dust levels substantially increase risks to worker health and safety. In Madrid, everyday increases of 10 $\mu g/m^3$ in PM_{10} were associated with a 2.5 % rise in outdoor occupational accidents, and NO_2 levels linked to even higher risk (6.4 %) (L.Calderon et al., 2021), a construction-specific study by Lee et al. (2023) confirmed a statistically significant increase in accident probability correlated to PM_{10} concentrations (Lee, M., Jeong, J., & Kim, D, 2023), Recent research emphasizes that workplace dust is not only an environmental issue but also a major occupational safety concern. (Luo, H., Li, X., Li, C., & Wang, J., 2021) demonstrated that prolonged exposure to airborne particulate matter significantly increases respiratory and accident risks in industrial settings. Similarly, (Gutarowska, B. et al., 2018) confirmed that bioaerosols and dust particles contribute to both short- and long-term health problems, directly affecting workers' safety and productivity.

Mechanical Causes: remain a major contributor to workplace accidents. Duarte et al. (2021) provide a systematic review highlighting how heavy machinery is frequently implicated in accidents. Aneziris et al. (2015) analyzed 106 serious and fatal accident reports from Québec and found that many involved contacts with moving machinery parts. A study in Poland further identified that injuries often occur due to rotating elements, crushing actions, or necessary access to dangerous zones during maintenance or adjustments (analysis based on frequency of access and type of hazard (Dźwiarek, M., & Latała, A., 2016).

Personal Factors

Age: The is an important determinant of occupational injury risk. Empirical findings indicate that injury patterns vary significantly across age groups, with younger workers generally experiencing higher rates of non-fatal occupational injuries compared to older workers. This increased vulnerability is largely explained by limited work experience, insufficient safety training, and greater exposure to high-risk tasks, while older workers

tend to exhibit higher injury severity and mortality due to physical decline and reduced recovery capacity. (Salminen, S., 2011)

Expertise: Professional expertise plays a crucial role in preventing occupational hazards, as experienced workers are more familiar with machinery operation and are better able to respond appropriately to operational demands (Arlinghaus et al., 2013).

Visual acuity: Visual performance is an important human factor in occupational safety, as reduced visual capacity increases the risk of accidents, particularly in low-light or night work conditions (Lam, K. B. H. et al., 2012).

The social and economic status of the worker plays a critical role in occupational safety. Socioeconomic conditions are strongly associated with occupational stress, which can negatively affect concentration and decision-making, thereby increasing the probability of workplace accidents. Occupational stress is a major concern for employers and organizations, as it compromises decision-making and the overall safety of workers. Studies indicate that work-related stress contributes to severe mental strain, increased accident rates, and in extreme cases, even suicides (Mohammad Junayed Hasan, et al., 2025).

Fatigue: The influence of fatigue, recovery, and environmental factors on the body stability of construction workers. Sensors.

Intelligence: Workers with high-level emotional intelligence are more likely to cope with occupational health and safety lapses, comply with the organization's safety management practices, exhibit safe working behaviors, and contribute to improving safety performance in the organization. (Nkrumah Nana Kwame Edmund, et al., 2023)

Causes Related to the Worker: Causes Related to the Worker: Causes related to the worker include a range of unsafe behaviors that directly increase the risk of workplace accidents. These include neglecting to wear personal protective equipment (PPE), operating machinery beyond its safe capacity, and working under the influence of drugs or alcohol (Christian, M. S., et al., 2009).

The Relationship between Social Responsibility and Workplace Accidents

Definition of the International Standard ISO 26000

The international standard ISO 26000 is defined as: ISO 26000 is an international standard that provides comprehensive guidance on social responsibility. It is designed to support organizations,including businesses, public administrations, and non-profit associations, ethical principles, transparency in operations, contribution to sustainable

development, consideration of stakeholder interests (such as employees, customers, suppliers, and communities), and compliance with applicable laws and internationally recognized norms of behavior. (International Organization for Standardization ISO 26000, 2010).

Explaining the Sixth Clause of the International Standard ISO 26000, 2010

Firstly, Reasons for Choosing the Sixth Clause of the International Standard ISO 26000, 2010

The ISO 26000: 2010 standard on social responsibility is one of the most comprehensive and widely accepted frameworks for promoting responsible business practices. The first three clauses outline the fundamental principles of social responsibility, while the fourth clause focuses on evaluating the institution's performance in relation to these principles. The fifth clause emphasizes awareness and engagement of stakeholders in social responsibility. However, the sixth clause, which this study concentrates on, addresses crucial areas directly related to improving working conditions to minimize risks leading to workplace accidents.

While prior studies have explored many aspects of corporate social responsibility (CSR), the sixth clause, which deals with work relationships and their conditions, has not received as much attention. This is particularly important because it focuses on improving the work environment and minimizing risks, directly linking to the core focus of this study—reducing workplace accidents. The factors of working conditions, employee participation, and safety regulations under this clause form the conceptual basis for understanding how an organization can enhance safety practices and reduce workplace accidents.

Secondly, the Fundamental Elements of the Sixth Clause of the International Standard ISO 26000, 2010, in the Part Related to Work Relationships and their Conditions

Principles and Considerations

The sixth clause outlines several core principles that organizations must adopt to ensure a responsible and safe work environment. Key principles involve ensuring compliance with fundamental human rights, as outlined by the International Labour Organization (ILO) and aligning with the Universal Declaration of Human Rights. Additionally, the standard emphasizes the need for employers to adopt policies that protect workers' rights and promote fairness, equality, and safety.

Description of the Work Field

Recruitment and Employer-Employee Relations: Improving the standard of living through ensuring full, fair employment, job stability, and decent work.

Working Conditions and Protection*:* This encompasses working conditions, wages, working hours, rest periods, providing health facilities, medical services, and all aspects related to working conditions.

Social Dialogue: It encompasses negotiation or consultation between government representatives and employers regarding social and economic issues.

Occupational Health and Safety: It encompasses all aspects related to occupational health and safety, aiming to promote and maintain the highest level of physical, mental, and social well-being for workers.

Human Capital Development: It includes processes aimed at expanding people's options by developing their capabilities through skill development, training, and learning, providing them with equal opportunities for advancement without discrimination.

Employees are a crucial component of a company's sustainable growth and expect a safe working environment. Consequently, it is important to analyze the factors influencing employee safety. Using data from Korean listed companies between 2012 and 2014, the Ordinary Least Squares (OLS) regression results indicate that higher corporate social responsibility (CSR) scores are associated with a reduction in the number of working days lost due to workplace injuries. (Koo, J. E., & Ki, E. S., 2020)

The Relationship between Social Responsibility and Workplace Accident

The relationship between social responsibility and workplace accidents is clear when we examine the work environment and the impact on workers' safety. ISO 26000 provides specific guidelines for reducing the risks associated with work-related accidents:

Regarding the Work Environment

The sixth clause of the International Standard ISO 26000; 2010 provides a set of guidelines to ensure a safe working environment and to minimize, as much as possible, the risks leading to work-related accidents:

- Providing a clean work environment, along with fair and satisfactory work circumstances.

- Limiting work-related negative risks as much as possible, as well as eliminating psychological and social risks at work, in addition to the risks that increase tension and sickness.

- Allowing workers to participate in the decisions and activities of health and safety.
- Recording, studying, and investigating workplace accidents.
- Developing and distributing safety booklets and training programs, as well as encouraging the workers to implement occupational health and safety standards.

Regarding Workers

- Ensuring fair employment and job stability, in addition to equal opportunities and treatment for all workers.
- Training employees and developing their skills.
- Respecting working hours as stipulated by law and collective agreements.
- Respecting break times and vacations.
- Complying with social protection for workers.
- Taking into consideration all risks associated with the work.
- Providing incentive programs specifically aimed at reducing work-related accidents.

Linking ISO 26000 Guidelines to Workplace Accident Prevention

Building upon the framework of the sixth clause, the study emphasizes the importance of integrating ISO 26000 guidelines into organizational policies to prevent workplace accidents. By ensuring safe working conditions, promoting health and safety education, and maintaining open dialogue with workers, organizations can significantly reduce workplace risks.

Measuring the Impact

This study focuses on several critical areas that directly influence workplace safety, which align with the ISO 26000 guidelines:

- *Awareness of Workplace Accidents:* The effect of raising awareness about workplace safety aligns with ISO 26000 - Workplace conditions and relationships, as awareness fosters safer working behaviors.
- *Implementing Occupational Health and Safety Rules:* This directly aligns with ISO 26000's emphasis on occupational health and safety.
- *Designing Training Programs:* This supports human capital development, encouraging skill development for safer work practices.
- *Social Care for Workplace Accidents:* It aligns with human rights and community engagement, ensuring the organization's responsibility to support employees after accidents.

- *Designing Safe Work Environments:* This relates to environmental safety, which is crucial to preventing accidents and ensuring that employees work in a safe and risk-free environment.

- *Institution's Commitments to Prevent Workplace Accidents:* The organization's commitment to safety supports ISO 26000 - Governance of the organization, demonstrating accountability for employee well-being.

In this conceptual framework, the study uses the ISO 26000 guidelines as the foundation for measuring the impact of various factors on workplace accidents. These include workplace safety practices, health initiatives, and employee participation in safety efforts, all in line with ISO 26000. The next section will outline the methodological framework, detailing the approaches and techniques used to assess these factors and their relationship with workplace accidents.

This study is based on a conceptual framework that links ISO 26000 guidelines to the reduction of workplace accidents through Corporate Social Responsibility (CSR). ISO 26000 serves as a reference framework guiding organizations in implementing socially responsible practices, particularly in labor conditions and occupational health and safety.

CSR practices are operationalized through several key dimensions identified in this study, including awareness of workplace risks, implementation of occupational health and safety rules, training programs, social care for employees, and the design of a safe working environment. These dimensions contribute to improving workplace safety conditions.

Based on the empirical results obtained from the case study of ENAFOR, these CSR-related practices have a significant effect on reducing workplace accidents. Therefore, workplace safety acts as a mediating mechanism between CSR implementation and accident reduction.

Research Methodology

After presenting the theoretical aspect of social responsibility and workplace accidents and discussing the relationship between them, which allowed us to understand the role of social responsibility in reducing workplace accidents, it is now time to move on to the practical aspect. This involves examining one of the institutions, specifically the National Drilling Company (ENAFOR), to assess the extent of its commitment to social responsibility in reducing workplace accidents. This will be achieved through distributing a questionnaire to its employees.

Study Approach

Methodology is a set of processes and steps followed by the researcher; to achieve the study objectives.

The adopted methodology in this study is the descriptive-analytical methodology. This type of research falls within the descriptive research category, which aims to collect data related to certain characteristics of the statistical population. This type of study relies on statistical analysis in data processing, the conducted tools in the current study are as follow:

Records and documents: are among the most important sources that researchers rely upon to gather data. Records and documents were utilized to obtain information about: the institution's identification organizational structure, tasks, general policies, and key objectives.

Observation: This involved familiarizing oneself with the workplace (construction sites) of the original community under study, the surrounding conditions, as well as the safety measures they employ, and their behaviors during work.

Questionnaire: The questionnaire was divided into three parts

- The first part consisted of personal data of the study sample.
- The second part focused on the independent variable, which is social responsibility.
- The third part was related to the dependent variable, which is workplace accidents.

Study Sample and Population

The petroleum sector in Algeria was chosen as the study population, with a focus on the National Drilling Company (ENAFOR).

To achieve the study's objectives, 110 questionnaires were distributed to the workers of the institution, with 108 retrieved. Four questionnaires were excluded due to their unsuitability for analysis. Therefore, the number of questionnaires valid for analysis is 104, as shown in the following table:

Study Scale: The Likert five-point scale was used, which is considered one of the most commonly used scales for measuring weights and their scores.

Cronbach's Alpha Scale: It is used to measure the reliability of the study tool (questionnaire) and to calculate the internal consistency coefficient of the questionnaire items with their axes.

Spearman's Correlation Coefficient: This coefficient is used to determine the degree of correlation between each statement in the questionnaire and the total score of the axis to which it belongs.

Frequencies and Percentages: Used to identify the personal characteristics of the study's items, and to determine individuals' responses to these statements included in the tool.

Arithmetic mean: It is one of the most important statistical tools, as it helps researchers interpret and analyze phenomena well, in order to determine the rise and fall of responses from the study sample to each item of the questionnaire. Through it, each element can be arranged according to the highest mean.

Standard deviation: It is a measure of dispersion, helping researchers to understand the degree of deviation of scores from the arithmetic mean.

One-Way ANOVA (Analysis of Variance) test*:* It is used to determine differences in sample responses.

Statistical Design of the Study

Testing the Validity and Reliability of the Study

Face Validity

The questionnaire was presented to a group of employees and managers in the institution under study to assess the accuracy of formulating questionnaire items. Additionally, it was presented to a group of professors at the National School of Management to study any suggested modifications by the reviewers to some questionnaire items.

Study Reliability

To measure the accuracy of the questionnaire, the Cronbach's Alpha coefficient was utilized, indicating the consistency and correlation among the questionnaire items. It is necessary to obtain a percentage greater than the statistically acceptable percentage, which is estimated to be 60%, as shown in the following table:

Table no. 2. Illustrates the Cronbach's Alpha reliability coefficient for the questionnaire.

Questionnaire	Number of Items:	Cronbach's Alpha Coefficient	Ratio of validity and reliability
Social Responsibility Axis	34	0.962	96%
Workplace Accidents Axis	16	0.83	83%
The overall reliability rate of the questionnaire	50	0.963	96%

*Source***:** Prepared by the researcher relying on the SPSS outcomes.

Through the table, we notice that the reliability coefficient of Cronbach's Alpha for the questionnaire items, whether related to the dependent variable or the independent variable, exceeds 80%. This indicates the presence of consistency and correlation among the questionnaire items. Since the statistically acceptable percentage is 60%, this confirms the stability and validity of our study tool.

Presenting and Analyzing the Results

In this study, the results of the questionnaire study will be presented, along with a discussion of the findings obtained after analyzing the data and verifying the validity of the hypotheses.

Presentation and Analysis of Personal Characteristics Results

Distribution of Sample Individuals by Gender, Age, and Social Status

Data Related to Gender

Table no. 3. Illustrates the Distribution of Sample Individuals by Gender

Gender	Frequencies	Percentage
Male	104	100 %
Female	0	0%

Source: Prepared by the researcher relying on the SPSS outcomes.

From the table above, we notice that the entire study sample consists of males, accounting for 100%. This can be attributed to the nature of the work, which requires physical effort and strength that are typically not associated with women. Additionally, the nature of the work involves night shifts to ensure the continuity of production operations. Such shift patterns are challenging for women, especially in our Algerian society, where it may be difficult for women to commit to working during nighttime hours. Moreover, the physical conditions at the construction sites, including high temperatures and the manual handling of equipment, make it physically demanding for women. The physiological nature of women may not allowthem to withstand such physical exertion. Consequently, women are more concentrated in administrative positions. This observation was noted during my survey visit to the institution.

Distribution of Sample Individuals by their Job Position, Educational Qualification, and Vocational Experience

Distribution of Sample Individuals by their Job Position

Table no. 4. Illustrates the Distribution of Sample Individuals by their job position

Job position	Frequencies	Percentage
Cadre	26	25%
Control Assistant	29	27.9%
Implementation Assistant	49	47.1%

Source: Prepared by the researcher relying on the SPSS outcomes.

From the table above, we notice that the highest percentage in the professional level was for the category of implementation assistants at 47.1%. This is attributed to the nature of the assigned tasks, in addition to being the selected sample. Following them is the category of control assistants at 27.9%, which is also due to the distribution of tasks, as there are implementation workers who work under the supervision of construction site supervisors. Finally, the category of cadres accounted for 25%, as this type of institution employs a larger number of implementation workers due to the nature of its activities.

Analyzing the impact of corporate social responsibility on workplace accident occurrence

Studying the impact of social responsibility on work accidents

Studying the impact of awareness of the dangers of workplace accidents on the dependent variable (workplace accidents)

We suppose that:

H1: There is an effect of the axis of awareness of the dangers of workplace accidents on workplace accidents at a significance level of 0.05.

H0: There is no effect of the axis of awareness of the dangers of workplace accidents on workplace accidents at a significance level of 0.05.

Table no. 5. Linear Regression Analysis of the Effect of Workplace Risk Awareness on Workplace Accidents

Variance	Total Boxes	Degree of Freedom	Medium Boxes	Arithmetic Value (F)	Intangible value Sig
Between groups	7.807	1	7.807	31.708	0.000
Within groups	25.113	102	0.246	At function level: Alfa=0.05	
Total Variance	32.919	103		R= (0.487)	R^2 = (0.237)

Source: Prepared by the researcher relying on the SPSS outcomes.

The table no. 5 above shows that the calculated value of (F) is (31.708) at a degree of freedom of (1 and 275) and a significance level (Sig) of (0.000), which is less than the accepted level of significance (0.05) for this study. This necessitates rejecting the null hypothesis and accepting the alternative hypothesis, which suggests an effect of awareness of the dangers of workplace accidents on workplace accidents. This is evident from the correlation coefficient, which is estimated at (0.487), and the determination coefficient, which is (0.237). This means that only (23.7%) of the variations observed in the dependent variable can be attributed to the independent variable "awareness of the dangers of workplace accidents".

Studying the effect of implementing occupational health and safety rules on workplace accidents

We suppose that:

H1: There is an effect of implementing occupational health and safety rules on workplace accidents at a significance level of 0.05.

H0: There is no effect of implementing occupational health and safety rules on workplace accidents at a significance level of 0.05.

Table no. 6. Linear Regression Analysisof the Effect of Occupational Health and Safety Rules Implementation on Workplace Accidents

Variance	**Total Boxes**	**Degree of Freedom**	**Medium Boxes**	**Arithmetic Value (F)**	**Intangible value Sig**
Between groups	13.575	1	13.575	37.390	0.000
Within groups	37.034	102	0.363	At function level: Alfa=0.05	
Total Variance	50.609	103		R = (0.518)	R^2 = (0.268)

Source: Prepared by the researcher relying on the SPSS outcomes.

The table above, numbered (33), shows that the calculated value of (F) is (37.390) with degrees of freedom (1 and 102) and a significance level (Sig) of (0.000), which is less than the accepted level of (0.05) for this study. This necessitates rejecting the null hypothesis and accepting the alternative hypothesis, which indicates an effect between implementing occupational health and safety rules and workplace accidents. This is evident from the correlation coefficient, which is estimated at (0.518), and the coefficient of determination, which is (0.268). This means that only (26.8%) of the variations in the dependent variable are attributed to the independent variable "implementing occupational health and safety rules".

Studying the effect of designing training courses on the dependent variable (workplace accidents)

We suppose that:

H1: There is an effect of designing training courses on workplace accidents at a significance level of 0.05.

H0: There is no effect of designing training courses on workplace accidents at a significance level of 0.05.

Table no. 7. Linear Regression Analysis of the Effect of Training Programs on Workplace Accidents

Variance	Total Boxes	Degree of Freedom	Medium Boxes	Arithmetic Value (F)	Intangible value Sig
Between groups	12.046	1	12.046	16.340	0.000
Within groups	75.191	102	0.737	At function level: Alfa=0.05	
Total Variance	87.237	103		R= (0.372)	R^2 = (0.138)

Source: Prepared by the researcher relying on the SPSS outcomes.

The table above (Table no 7) shows that the calculated value of (F) is (16.340) with degrees of freedom (1 and 102) and a significance level (Sig) of (0.000), which is less than the predetermined level of significance (0.05) for this study. This necessitates rejecting the null hypothesis and accepting the alternative hypothesis, which suggests an effect between designing training courses and workplace accidents. This is evident from the correlation coefficient estimated at (0.372) and the coefficient of determination, which reached (0.138), indicating that only (13.8%) of the variations observed in the dependent variable are attributed to the independent variable "designing training courses".

Studying the effect of social care for workplace accidents on the dependent variable (workplace accidents)

We suppose that:

H1: There is an effect of social care for workplace accidents on workplace accidents at a significance level of 0.05.

H0: There is no effect of social care on workplace accidents at a significance level of 0.05.

Table no. 8. Linear Regression Analysis of the Effect of Employee Social Care on Workplace Accidents

Variance	Total Boxes	Degree of Freedom	Medium Boxes	Arithmetic Value (F)	Intangible value Sig
Between groups	19.147	1	19.147	42.234	0.000
Within groups	46.482	102	0.456	At function level: Alfa=0.05	
Total Variance	65.729	103		R= (0.541)	R^2 = (0.293)

Source: Prepared by the researcher relying on the SPSS outcomes.

The table above (Table no 8) indicates that the calculated value of (F) is (42.234) with degrees of freedom (1 and 102) and a significance level (Sig) of (0.000), which is less than the predetermined level of significance (0.05) for this study. This necessitates rejecting the null hypothesis and accepting the alternative hypothesis, which suggests an effect of social care workplace accidents. This is evident from the correlation coefficient estimated at (0.541) and the coefficient of determination, which is (0.293), indicating that (29.3%) of the variations observed in the dependent variable are attributed to the independent variable "social care for work accidents".

Studying the effect of designing a safe work environment on the dependent variable (workplace accidents)

We suppose that:

H1: There is an effect of designing a safe work environment on workplace accidents at a significance level of 0.05.

H0: There is no effect of designing a safe work environment on workplace accidents at a significance level of 0.05.

Table no. 9. Linear Regression Analysis of the Effect of Safe Work Environment Design on Workplace Accidents

Variance	Total Boxes	Degree of Freedom	Medium Boxes	Arithmetic Value (F)	Intangible value Sig
Between groups	9.748	1	9.748	25.904	0.000
Within groups	38.386	102	0.376	At function level: Alfa=0.05	
Total Variance	48.134	103		R= (0.450)	R^2 = (0.203)

Source: Prepared by the researcher relying on the SPSS outcomes.

The table above (Table no 9) indicates that the calculated value of (F) is (25.904) with degrees of freedom (1 and 102) and a significance level (Sig) of (0.000), which is less than the predetermined level of significance for this study. This necessitates rejecting the null hypothesis and accepting the alternative hypothesis, which suggests an effect between designing a safe work environment and workplace accidents. This is evident from the correlation coefficient estimated at (0.450) and the coefficient of determination, which is (0.203), indicating that only 20.3%) of the variations observed in the dependent variable are attributed to the independent variable "designing a safe work environment".

Studying the effect of the institution's commitments to prevent workplace accidents on the dependent variable (workplace accidents)

We suppose that:

H1: There is an effect of the institution's commitments to prevent workplace accidents on workplace accidents at a significance level of 0.05.

H0: There is no effect of the institution's commitments to prevent workplace accidents on workplace accidents at a significance level of 0.05.

Table no. 10. Linear Regression Analysis of the Effect of Organizational Commitment to Accident Prevention on Workplace Accidents

Variance	**Total Boxes**	**Degree of Freedom**	**Medium Boxes**	**Arithmetic Value (F)**	**Intangible value Sig**
Between groups	12.849	1	12.849	32.582	0.000
Within groups	40.224	102	0.394	At function level: Alfa=0.05	
Total Variance	35.073	103		R= (0.492)	R^2 = (0.242)

Source: Prepared by the researcher relying on the SPSS outcomes.

The table above (Table no 10) shows that the calculated value of (F) is (32.582) with degrees of freedom (1 and 102) and a significance level (Sig) of (0.000), which is less than the predetermined level of significance for this study. This necessitates rejecting the null hypothesis and accepting the alternative hypothesis, which suggests an effect between the organization's commitments to prevent workplace accidents and workplace accidents. This is confirmed by the correlation coefficient estimated at (0.4) and the coefficient of determination, which is (0.242), indicating that only (24.2%) of the variations observed in the dependent variable are attributed to the independent variable "organization's commitments to prevent work accidents".

Discussing the Results and Testing the Hypotheses

Discussing the Results

The results of this study clearly demonstrate that social responsibility dimensions have a statistically significant effect on reducing workplace accidents at ENAFOR, as all tested hypotheses were validated at a significance level of 0.05 (Sig = 0.000).

However, beyond statistical significance, the explanatory power (R^2) of each variable provides deeper insight into their relative effectiveness, revealing important managerial implications.

The majority of the study sample consists of males, with a lack of female representation. This result is reasonable in this type of work, which is more suitable for males than females. Additionally, most of the study sample falls within the age range of 35 to 40 years old, considered a youthful demographic capable of contributing to the organization's advancement. Furthermore, the results indicate that the majority of the study sample are married individuals, suggesting their ability to bear responsibility and cover family expenses due to the good wages provided by the organization

Moreover, most of the study sample are executive workers, which is natural as they are the most sought-after category in the petroleum industry. Regarding educational qualifications, the results indicate that the majority of the study sample have higher education degrees, suggesting that the organization carefully selects its employees, as it is a major contributor to the national economy, requiring knowledgeable and competent workers.

Lastly, the results indicate that the most experienced segment of the study sample has experience ranging from 15 to 20 years, indicating the job security and stability enjoyed by the organization's workers.

Awareness of workplace accident risks (R^2 = 23.7%)

The findings indicate that awareness plays a moderate but essential role in reducing workplace accidents. This suggests that when employees are informed about risks, their behavior becomes more cautious, reducing unsafe practices.

However, the relatively limited explanatory power (23.7%) indicates that awareness alone is insufficient. This aligns with safety literature, which shows that knowledge must be reinforced by organizational systems and supervision to translate into safer behavior.

This can be attributed to the institution's concern for its employees and their awareness of the dangers of workplace accidents. The institution achieves this through scheduling awareness-raising courses on work-related accidents, as observed within the

institution. Additionally, regular discussions among workers are held to address safety and security topics (Safety meetings). Furthermore, during a field visit to one of the construction sites, a group of warning signs was observed around certain areas in the construction site that require precautions when approaching them. Awareness is a necessary but not sufficient condition for accident prevention

Implementation of health and safety rules ($R^2 = 26.8\%$)

This variable exhibits a strong effect, indicating that formal safety procedures and compliance mechanisms significantly contribute to reducing workplace accidents, a result that is consistent with field observations conducted at a remote construction site. It was noted that a mobile medical systemisaccompanying the construction site, equipped with all necessary medical equipment and capable of providing emergency medical care, overseen by a general physician and a nurse. Additionally, the institution mandates periodic medical check-ups for its workers every six months, in addition to initial medical examinations for new hires, as stipulated by its internal regulations. As for the provision of safety equipment to workers, it is difficult for workers to obtain them, as reflected in their high rate of disagreement and neutrality in their responses. While the institution provides safety equipment to workers, they do not pay much attention to them, as observed in some construction sites where helmets and gloves are found discarded on the ground. Regarding the institution's concern for the psychological health of workers in case of workplace accidents, most of the study participants indicated a strong disagreement. The institution provides psychological medical supervision in case of major and serious accidents, which rarely occur. Additionally, it has a department responsible for addressing workers' psychological cases, overseen by a specialized psychiatrist. Workers can contact this department, but most of them do not have the time to do so due to theirwork schedules and the distances from the construction sites. This result reflects the importance of: Enforcement of safety protocols; Monitoring systems; Organizational discipline. Safety rules are effective only when actively implemented, not just documented.

designing training ($R^2 = 13.8\%$)

Training has the lowest explanatory power among all variables. This is a critical finding. Most of the institution,'s staff have benefited from training courses in occupational health and safety, enabling them to understand the risks associated with their positions and thereby help to avoid them. This indicates the success of these courses. Additionally, the institution identifies training needs based on its observation of the increase in accidents, which helps uncover the reasons behind them for the workers and ways to avoid them. It

suggests that: Training programs may be too theoretical; Lack of practical simulations; Weak follow-up after training. Training at ENAFOR may lack effectiveness and operational integration, limiting its impact on real behavior.

Social care for employees (R^2 = 29.3%) Strongest effect

This is the most influential variable in our model, Regarding the institution's tracking of the medical file of the injured worker, most ratings ranged between neutral and disagreement. At the institutional level, this process is well-managed; however, obstacles at the level of social security interests, including difficulties in investigating the victim in a workplace accident or in communicating with the worker who has stopped working and tracking their health status. Similarly, the institution's commitment to providing social services rights in case of workplace accidents yielded similar results due to the affiliation of the national company with the Petroleum Industry Mutual Aid Fund, which compensates workers in some cases resulting from workplace accidents (such as surgeries and medical treatments). However, the process involves monthly contributions from both the institution and the workers, leading to delays in workers benefiting from their rights, as observed through continuous complaints from workers. On the other hand, the item regarding the institution's declaration to social security authorities within the specified deadlines in case of workplace accidents received strong approval from workers, as evidenced by their responses and observations during the internship period. During this period, I/we supervised the preparation of a medical file for a worker involved in a workplace accident and the submission of both electronic and paper declarations to social security authorities within the legal deadlines. Additionally, the institution provides an alternative job position for the worker affected by the workplace accident and unable to continue in the previous position due to their health condition, as confirmed by the strong agreement in the workers' responses and their personal statements during interviews. This result highlights that workers who feel valued are: More engaged; More compliant with safety rules; Less prone to risky behavior. Safety is not only technical — it is deeply human and social.

Designing Safe work environment (R^2 = 20.3%)

The physical and technical work environment has a moderate effect, indicating that equipment quality, ergonomics, and workplace design directly influence the occurrence of workplace accidents. This was further supported by direct observations made during the second visit to one of the company’s construction sites, where various alarm devices, including sirens and warning lights, were identified. Additionally, the construction site contained a storage area with all the personal protective equipment designated for the

workers. Furthermore, the construction site was equipped with all safety equipment, such as small and large fire extinguishers, fire extinguisher covers, and oxygen masks. A safe environment reduces risk exposure but must be combined with human and organizational factors.

Organizational commitment (R^2 = 24.2%)

The commitment of the organization reflects: Leadership involvement; Safety policies; Strategic orientation. The majority of workers agree that the organization fulfills its obligations in preventing workplace accidents, as reflected in the strong agreement with its items based on the responses of the study participants. This was indeed observed during the internship period, where the institution's concern for reporting workplace accidents by the construction site supervisor and investigation by a special committee was noted. Additionally, through reviewing the institution's internal regulations, which stipulate the obligation to respect health and safety rules set by everyone (workers or officials), leaving no room for any leniency in case of negligence. Furthermore, during visits to a group of construction sites, it was noticed that each construction site has an HSE supervisor whose job is to monitor the workers' compliance with safety rules and precautions, warning them in case of non-compliance. This explains the strong agreement with the items of this axis. The results confirm that when management is committed, safety performance improves. Top management commitment is a key driver of safety culture.

Based on the objectives of the study and the principles of corporate social responsibility defined by ISO 26000, the analysis focused on examining the relationship between social responsibility practices and workplace accidents at the National Drilling Company (ENAFOR). The empirical findings provide evidence supporting the assumption that the application of ISO 26000 guiding principles contributes to a reduction in workplace accidents.

The results indicate a strong and statistically significant relationship between social responsibility practices and the reduction of workplace accidents. These findings suggest that the implementation of ISO 26000 principles plays a critical role in enhancing occupational safety and minimizing accident risks within ENAFOR. Among the examined dimensions, the “Social Care for Employees” indicator emerges as the most influential factor in the model, demonstrating the strongest explanatory power (R^2 = 29.3%). This result can be explained by the fact that employee-centered policies such as organizational support, improved working conditions, social protection, and responsiveness to workers’

needs foster a climate of trust and engagement, which in turn promotes safer behaviors and significantly reduces accident risks.

Furthermore, the analysis shows that employees' awareness of workplace hazards has a statistically significant and positive effect on reducing accidents. The results indicate that increasing awareness and understanding of occupational risks encourages safer employee behaviors and effectively prevents accidents.

In addition, the application of occupational health and safety rules demonstrates a significant impact on accident reduction. Compliance with safety procedures and regulations strengthens workplace protection and significantly decreases the occurrence of occupational accidents.

Finally, the design of a safe working environment emerges as a key factor in accident prevention. The evidence confirms that improving workplace design and safety conditions substantially contributes to reducing workplace accidents by minimizing exposure to physical and organizational hazards.

Overall, these results collectively support the expected relationships derived from the literature and ISO 26000 guidelines, confirming that CSR-oriented practices related to occupational health and safety constitute an effective mechanism for reducing workplace accidents at the National Drilling Company (ENAFOR).

This study extends existing CSR literature by empirically examining the impact of ISO 26000 guidelines on workplace safety within the Algerian context, particularly in the petroleum sector. While previous studies, such as those by Bautista-Bernal et al. (2024) and Koo and Ki (2020), have established a clear connection between CSR and workplace safety outcomes in developed countries, little research has been conducted in developing countries, especially in regions like Algeria, where workplace safety is critical due to the hazardous nature of the industry.

By focusing on the application of ISO 26000, this research uniquely contributes to the literature by addressing how CSR, as operationalized through ISO guidelines, can lead to significant reductions in workplace accidents. Additionally, it explores how employee engagement, safety culture, and risk management contribute to organizational performance in a non-Western context—a gap that has not been thoroughly explored in the CSR field.

Conclusion

The findings of this study provide strong empirical evidence of the significant positive impact of the ISO 26000 guidelines on workplace safety performance within the

National Drilling Company (ENAFOR) in Algeria. The results demonstrate that the implementation of CSR-oriented practices particularly employee social care, occupational health and safety rules, awareness of workplace risks, and training programs contributes effectively to reducing workplace accidents. Among all examined dimensions, social care for employees emerges as the most influential factor, highlighting its critical role in strengthening employee well-being, building organizational trust, and fostering a supportive work environment that directly enhances safety outcomes.

The results further confirm that a structured and proactive safety culture, supported by systematic risk management practices and continuous employee engagement, plays a central role in minimizing occupational accidents. In this regard, employee training and risk awareness are important preventive tools; however, their effectiveness becomes significantly stronger when they are combined with strong organizational commitment to employee welfare and safety-oriented CSR practices.

From a theoretical perspective, this study contributes to the existing literature by providing robust empirical evidence from a developing country context, where research on CSR and workplace safety remains limited. It extends the understanding of how CSR practices especially employee-centered social responsibility translate into measurable safety outcomes, thereby filling an important gap in previous studies that have largely focused on developed economies.

From a practical and managerial perspective, the study demonstrates that integrating CSR principles into organizational systems is not merely an ethical requirement but a strategic tool for improving operational performance. The findings suggest that investing in employee well-being and social support mechanisms leads to tangible reductions in workplace accidents and enhances overall organizational efficiency. This makes CSR a key driver of sustainable performance, particularly in high-risk industries such as oil and gas.

To enhance the implementation of social responsibility practices and further reduce workplace accidents, several targeted recommendations are proposed. First, organizations should ensure both the availability and mandatory use of updated occupational safety equipment to minimize exposure to risks. Second, greater attention should be given to employees' mental health following workplace accidents through structured follow-up mechanisms, including site visits and individual or group support sessions. Third, accident analysis systems should be strengthened, especially for recurring incidents, in order to identify root causes and adapt training programs more effectively. Finally, employee participation should be actively encouraged in the development and improvement of

occupational health and safety programs, as greater involvement enhances safety awareness, ownership, and compliance.

Overall, this study offers significant scientific and practical value. Scientifically, it enriches the CSR literature by providing empirical evidence on the relationship between social responsibility practices and workplace safety in a developing country context, an area still underexplored. Practically, it provides actionable insights for organizations seeking to improve safety performance through CSR integration. The study also demonstrates that employee social care is a key strategic lever for reducing accidents and improving organizational resilience. Ultimately, the research highlights that embedding CSR practices within organizational strategies can serve as an effective pathway toward sustainable development, improved working conditions, and enhanced long-term organizational performance, offering a transferable model for other companies operating in similar high-risk environments

Study Limitations

- Temporal Limitations**:** This study was conducted during the second semester of the 2023-2024 academic year, spanning a period of 4 months, from February 12, 2023, to May 3, 2023.

- Spatial Limitations: The study was conducted at the National Drilling Company (ENAFOR) in Hassi Messaoud municipality – Wilaya (province) of Ouargla.

- Human Limitations: The study was limited to a specific category of workers within the institution, namely, the construction site workers.

- Topic Limitations: Our study was limited to the sixth clause of the International Standard for Social Responsibility, ISO 26000, which pertains to work relationships and conditions.

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Economics and Management
ISSN: 2683-1325
Volume: XXIII, Issue: I, Year: 2026, pp. 150-171
DOI: 10.37708/em.swu.v23i1.8

UNDERSTANDING WORKPLACE BULLYING AND EMPLOYEE PERFORMANCE IN TERTIARY HEALTHCARE INSTITUTIONS IN NIGERIA: THE MEDIATING ROLE OF JOB ALIENATION

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Received: 22.02.2026, Accepted: 22.05.2026

Abstract

This study investigates the effect of workplace bullying on employee performance in tertiary healthcare institutions in Nigeria with the: mediating role of job alienation. The study is anchored on the Conservation of Resources Theory. A quantitative research design was adopted in particular survey and cross-sectional research designs, and data were collected from tertiary healthcare workers in Zamfara and Kaduna States through an online questionnaire. Judgmental and snowball sampling techniques were employed to reach respondents across different professional categories, and out of the questionnaires distributed, 239 were correctly filled and returned, forming the basis for analysis. The results revealed that workplace bullying and job alienation had a significantly negative effect on employee performance. Furthermore, job alienation partially mediated the relationship between workplace bullying and employee performance. The study recommended that management should enforce the Employee Discrimination Act to punish erring employees to serve as deterrent to others ensuring a workplace free of bullying

Keywords: *workplace bullying; employee performance; job alienation; conservation of resources theory.*

JEL Codes: *M30, M31, M37*

Introduction

The healthcare sector, particularly tertiary healthcare institutions, represents a critical pillar of Nigeria's socio-economic development, as it is central to human capital development, disease management, and overall national productivity. Tertiary healthcare

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institutions provide specialized medical services, advanced diagnostics, research, and training of healthcare professionals, thereby strengthening the entire health system (Ogunleye et al., 2022). Through effective service delivery, these institutions contribute to improved population health outcomes, reduced mortality, and enhanced quality of life, which are essential for sustainable economic growth (Cerf, 2023). However, the effectiveness and efficiency of tertiary healthcare institutions are largely dependent on the performance, commitment, and psychological well-being of their employees, including doctors, nurses, pharmacists, and allied health professionals (Aluko, 2023). Healthcare employees are responsible for direct patient care, clinical decision-making, and administrative coordination, making their performance indispensable to patient safety and service quality (Ogunleye et al., 2022).

Despite the strategic importance of healthcare workers, evidence suggests that many employees in Nigeria's healthcare sector work under adverse psychosocial conditions. One of the most pervasive of these conditions is workplace bullying, which involves repeated exposure to negative acts such as intimidation, verbal abuse, humiliation, social exclusion, and misuse of power (Okikiola and Ruth, 2022). In hierarchical and high-pressure environments such as tertiary hospitals, bullying behaviours may be normalized or overlooked, thereby increasing employees' vulnerability (Cerf, 2023). Studies have shown that workplace bullying is associated with reduced job satisfaction, emotional exhaustion, psychological distress, and declining job performance among healthcare workers (Alam et al., 2025; Olanipekun & Ikechukwu, 2022; Pradhan & Joshi, 2019.). In Nigeria, where healthcare systems are already strained by inadequate funding, staff shortages, and high patient loads, the presence of bullying further undermines employee effectiveness and organizational outcomes (Onwuakagba, et al., 2025; Afolaranmi, et al., 2022).

Employee performance in healthcare settings is particularly sensitive to psychosocial stressors because healthcare work demands sustained attention, emotional labour, teamwork, and ethical responsibility. When healthcare workers are subjected to bullying, their ability to concentrate, collaborate, and deliver quality care may be significantly impaired (Afolaranmi, et al., 2022). Beyond its direct effect on performance, workplace bullying may also trigger deeper psychological reactions that weaken employees' connection to their work. One such reaction is job alienation, characterized by feelings of powerlessness, meaninglessness, isolation, and self-estrangement from one's job role (Erdem, 2021; Ojeleye, Bakare, Umar, & Ojeleye, 2021). In tertiary healthcare institutions, persistent exposure to bullying can erode employees' sense of professional identity and purpose, leading them to emotionally withdraw from their work and organization.

Empirical evidence showed that workplace bullying is linked to job alienation (Hazratian, Mohajeran & Ghalavandi, 2021) and job alienation to poor employee performance (Al-khazrajy, 2025; Aslan, 2025 & Nodehi, 2020). Alienated healthcare workers may comply minimally with job requirements, show reduced initiative, and disengage from patient-centred care, thereby compromising service quality and organizational effectiveness. However, despite growing global interest in workplace bullying and employee outcomes, limited empirical attention has been paid to the psychological mechanisms through which bullying affects performance in Nigeria's tertiary healthcare sector. In particular, the mediating role of job alienation remains underexplored, especially within the Nigerian context where cultural norms, power distance, and institutional rigidities may intensify both bullying experiences and alienation responses.

Based on this identified gap, the present study examines the effect of workplace bullying on employee performance in tertiary healthcare institutions in Nigeria, with specific emphasis on the mediating role of job alienation. By integrating these constructs, the study seeks to provide a more nuanced understanding of how bullying translates into performance deficits, thereby offering evidence-based insights for healthcare administrators, policymakers, and stakeholders committed to improving employee well-being and performance in Nigeria's tertiary healthcare system.

Review of Related Literature and Theoretical Framework

This section reviews the related literature on employee performance, workplace bullying, job alienation, empirical review and theoretical framework.

Concept of Employee Performance

Employee performance has been widely conceptualized in management and organizational behaviour literature as the extent to which an employee successfully carries out job-related tasks and responsibilities in line with organizational goals. Gravina, Nastasi and Austin (2021) defined it as observable behaviours relevant to organizational objectives that can be measured in terms of proficiency, efficiency, and effectiveness in task execution. Similarly, Çalışkan and Köroğlu (2022) viewed employee performance as a multidimensional construct comprising task performance and contextual performance, emphasizing not only core job duties but also behaviours that support the social and psychological work environment. According to Hajiali et al. (2022), it reflects how well individuals apply their skills, knowledge, and competencies to achieve expected work outcomes within a specified period. Celik et al. (2023) described employee performance as a set of behaviours and actions under the employee's control that

contribute to organizational goals, highlighting its behavioural rather than outcome-based nature. In a related perspective, Muchiri (2022) opined that it is the degree to which employees effectively manage work demands, adapt to changing job requirements, and sustain productivity over time. Saidin, Wan, Halim and Solihah (2024) conceptualized employee performance as the cumulative value of an employee's contributions to organizational effectiveness, incorporating quality of work, productivity, and interpersonal effectiveness. Aguilera, De Massis, Fini and Vismara (2019) explained it as the measurable results and behaviours associated with achieving work objectives, shaped by individual effort, motivation, and the work environment. Ultimately, these definitions portray employee performance as a dynamic multidimensional construct encompassing task execution, behavioural contributions, adaptability, and the effective us of individual capabilities to support organizational success.

Concept of workplace bullying

Workplace bullying has been conceptualized by scholars as a persistent and systematic pattern of negative behaviours directed at an employee, which creates a hostile and harmful work environment. Misra and Sharma (2022) viewed workplace bullying as repeated exposure to negative acts such as harassment, social exclusion, or verbal abuse, in which the target finds it difficult to defend themselves due to a power imbalance. Similarly, Popa (2025), described it as psychological terror involving frequent and long-term hostile behaviours aimed at humiliating, isolating, or undermining an individual at work. According to Vijayakumar and Rajagopal (2024), workplace bullying refers to a situation in which one or more individuals are subjected to abusive conduct that threatens their dignity, well-being, and professional competence. Parker (2022), viewed it as repeated, health-harming mistreatment manifested through verbal abuse, offensive conduct, and deliberate work sabotage. Okikiola and Ruth (2022) conceptualized it as a social process embedded within organizational structures, where power asymmetries and enabling conditions allow aggressive behaviours to persist over time. Okolie (2021) noted that workplace bullying is a form of interpersonal mistreatment characterized by persistence, escalation, and the victim's perceived inability to stop the negative acts. More recently, Gaur and Sinha (2025), described it as a chronic workplace stressor involving systematic mistreatment that erodes employees' psychological health, work attitudes, and performance. Collectively, these definitions emphasized that workplace bullying is not a single incident but a sustained pattern of hostile behaviours rooted in power imbalance, with serious consequences for employees and organizations.

Concept of Job Alienation

Job alienation also known as job estrangement has been described in scholarly literature as a psychological state in which employees experience a sense of disconnection, powerlessness, and loss of meaning in relation to their work. Ojobu (2024) conceptualized job alienation as a multidimensional construct encompassing powerlessness, meaninglessness, normlessness, isolation, and self-estrangement, reflecting an individual's separation from the work process and its outcomes. Ghaleb (2024) perceived it as a condition in which workers feel little control over their tasks and perceive their work as monotonous and lacking intrinsic value. It represents a cognitive state of psychological detachment from one's job, arising when work fails to satisfy important personal needs or expectations (Ojeleye et al., 2021). Mehta (2022) described it as an employee's perception of being emotionally and psychologically distanced from work roles, coworkers, and organizational goals. Aslan (2025) viewed job alienation as a negative work attitude characterized by disengagement, reduced involvement, and a weakened sense of purpose at work. Elshaer, Azazz, Mansour and Fayyad (2025) described job alienation as the extent to which employees feel disconnected from the content of their work and perceive limited autonomy, recognition, and significance in their roles. According to Salloukh, Younis, Al-mousawi and Zeid (2025) it is a chronic psychological condition in which employees experience diminished identification with their work, leading to withdrawal behaviours and impaired performance. These definitions collectively, present job alienation as a complex psychological phenomenon marked by detachment, loss of control, and reduced work meaning, with significant implications for employee attitudes and performance.

Workplace bullying and employee performance

Empirical evidence across diverse sectors and national contexts consistently demonstrates that workplace bullying is a significant determinant of employee performance, with predominantly negative outcomes. Alam et al. (2025) using a robust SEM-ANN approach among garment industry workers in Bangladesh, found that workplace bullying significantly and negatively affected job performance, underscoring bullying as a critical productivity-reducing factor in labour-intensive industries. Similarly, Naseer, Safdar, Sami and Javed (2025) reported a negative relationship between workplace bullying and employee productivity in Pakistan's banking sector, with person-related bullying exerting a particularly strong detrimental influence on performance. In the Nigerian context, Olanipekun and Ikechukwu (2022) established that workplace bullying and harassment had a negative and significant effect on academic staff

performance, highlighting the pervasive impact of bullying across professional and educational settings. Likewise, Pradhan and Joshi (2019) found a negative association between workplace bullying and employee performance among hospital workers in Nepal, indicating that bullying undermines effectiveness in healthcare environments where performance is crucial. Although Singh et al. (2025) observed only a weak positive correlation between workplace bullying and job performance in Malaysia's public sector possibly reflecting contextual, cultural, or coping dynamics the overall body of evidence strongly supports the conclusion that workplace bullying generally diminishes employee performance. Collectively, these studies affirm workplace bullying as a harmful organizational stressor that disrupts employee functioning across industries, while also revealing contextual variations that justify further investigation into mediating and moderating mechanisms, particularly within underexplored settings such as Nigeria's tertiary healthcare sector. Hence, the study hypothesized that:

***$H1_a$*:** Workplace bullying significantly predicts employee performance in tertiary healthcare institutions in Nigeria.

Job alienation and employee performance

Plethora of studies have provided consistent evidence that job alienation exerts a negative and significant effect on employee performance. Al-khazrajy (2025) demonstrated among healthcare employees in Iraq that job alienation significantly reduced job performance, while also showing that ergonomic conditions could buffer this negative effect, underscoring the practical importance of work design. Similarly, Aslan (2025) found that work alienation significantly undermined nurses' job performance in Türkiye, highlighting the vulnerability of healthcare professionals to alienation-related performance decline. In the education sector, Nodehi, (2020) reported that job alienation significantly reduced the performance of high school teachers in Iran, confirming that alienation impairs effectiveness even in non-clinical professional roles. From a financial and governance perspective, Salloukh et al. (2025) revealed that job alienation negatively and significantly affected the financial performance of Lebanese banking institutions, extending the implications of alienation beyond individual outcomes to organizational performance indicators. Earlier evidence from Abdel-Qader (2017) in Jordan's industrial sector further confirmed a statistically significant negative relationship between work alienation and job performance, particularly through reduced autonomy, task variety, and managerial support. Collectively, these studies strongly affirm job alienation as a pervasive organizational problem that consistently diminishes employee and organizational performance across healthcare, education, banking, and industrial settings,

thereby justifying its examination as a critical explanatory mechanism in performance-related research.

***$H1_b$*:** Job alienation significantly predicts employee performance in tertiary healthcare institutions in Nigeria.

Job alienation as a mediator

A plethora of empirical studies have demonstrated the relevance of job alienation as an important mediating mechanism through which different organizational factors influence employee attitudes and behaviours in the workplace. For instance, Erdem (2021) established that alienation from work mediated the relationship between leadership styles and counterproductive work behaviour, showing that democratic leadership reduced counterproductive behaviour partly by lowering employees' feelings of alienation, whereas autocratic leadership intensified alienation and negative behavioural outcomes. Similarly, Ojeleye, Bakare, Umar and Ojeleye (2021) found that job alienation significantly and partially mediated the relationship between fear of COVID-19 and employees' turnover intentions among state-owned hospital workers in Zamfara State, Nigeria, indicating that heightened fear translated into withdrawal intentions largely through employees' psychological detachment from their jobs. Earlier evidence by Sulu, Ceylan and Kaynak (2010) further confirmed the mediating role of work alienation in the relationship between organizational injustice and organizational commitment, as perceptions of injustice fostered alienation, which in turn weakened commitment. In a related study, Ceylan and Sulu (2010) reported that work alienation partially mediated the relationship between procedural injustice and job stress, demonstrating that unfair procedures heightened stress levels through employees' sense of powerlessness and detachment. Collectively, these studies underscore job alienation as a robust psychological mechanism that translates adverse leadership practices, injustice, and environmental stressors into negative employee outcomes, thereby justifying its use as a mediator in organizational research

***H2*:** Job alienation mediates the relationship between workplace bullying and employee performance in tertiary healthcare institutions in Nigeria.

Conservation of Resources Theory

Conservation of Resources (COR) Theory was proposed by Stevan E. Hobfoll in 1989 and later expanded in his subsequent works (Hobfoll, 2001; Hobfoll, Halbesleben, Neveu, & Westman, 2018) to explain how individuals respond to stress and strain in demanding environments. The central assumption of the theory is that people are

motivated to acquire, protect, and retain valuable resources, which may include tangible resources (such as time, money, and physical energy), personal characteristics (such as self-esteem and resilience), social resources (such as support and respect), and condition resources (such as job security and status). According to Hobfoll, stress occurs when these resources are threatened, lost, or when individuals invest resources without adequate returns. Later proponents and contributors to the theory further emphasized the idea of resource loss spirals, in which initial resource depletion makes individuals increasingly vulnerable to further losses, and resource gain cycles, in which access to supportive environments helps individuals recover and build resilience. COR Theory has been widely applied in organizational and occupational research to explain burnout, disengagement, reduced performance, and withdrawal behaviours in high-pressure work settings.

Within the context of this study on workplace bullying and employee performance in Nigeria's tertiary healthcare sector, Conservation of Resources Theory provides a compelling explanatory framework. Workplace bullying represents a persistent threat to healthcare workers' key resources, including emotional energy, professional dignity, social support, and perceived control over work activities. Continuous exposure to bullying behaviours gradually depletes these resources, creating psychological strain and undermining employees' ability to remain engaged and productive. As resources are lost, healthcare workers may experience job alienation, manifesting as emotional withdrawal, powerlessness, and reduced identification with their work, which in turn negatively affects performance. In resource-constrained tertiary healthcare institutions already characterized by staff shortages, heavy workloads, and limited infrastructural support the effects of bullying are likely to be intensified, accelerating resource loss spirals. Thus, COR Theory helps to explain how workplace bullying indirectly reduces employee performance through job alienation, offering a nuanced understanding of stress processes and reinforcing the need for organizational practices that protect employees' resources and promote supportive work environments in healthcare settings.

Methodology

The study adopted a quantitative research design comprising survey and cross-sectional research designs, and data were collected from tertiary healthcare workers in Zamfara State and Kaduna State, Nigeria, using an online questionnaire distributed via shared electronic links. Judgmental and snowball sampling techniques were employed to reach respondents across different professional categories within tertiary healthcare institutions, and a total of 239 correctly completed questionnaires were returned and used for analysis. The structured instrument measured workplace bullying, job alienation, and

employee performance using validated scales adapted to the healthcare context. Preliminary diagnostic analyses were conducted, including checks for outliers, multicollinearity, normality, and non-response bias, while common method bias was addressed through both procedural and statistical remedies to enhance data credibility. The hypothesised relationships, including the mediating effect of job alienation, were analysed using SmartPLS 4, which is suitable for mediation analysis and complex structural models.

Measures

Validated scale from previous studies were adapted and used in the study; measured on a 5-point Likert scale ranging from 5 (-strongly agree) to 1 (-strongly disagreed). Workplace bullying was measured employing 4-item scale developed by Javed et al. (2023), with reported Cronbach‘s alpha of 0.853. Sample of item is: “I have been ignored or excluded from group activities at work”. Job alienation was assessed using the 10-item work alienation measures of Hirschfeld and Feild (2000), with a reported Cronbach’s alpha of 0.80 suggesting high internal consistency. A sample of the item is: “I don't enjoy work: I just put in my time to get paid”. Lastly, employee performance was conducted using the 10-item short version of the work performance scale developed by Azevedo, Queiroga and Valentin (2021). An example of the item used is “I take initiatives to enhance my performance at work.” The Cronbach’s alpha for the scale is stated to be 0.91.

Data Analysis and Presentation

Data were analysed using a structural equation model specifically smart-pls 4 comprising measurement and structural models.

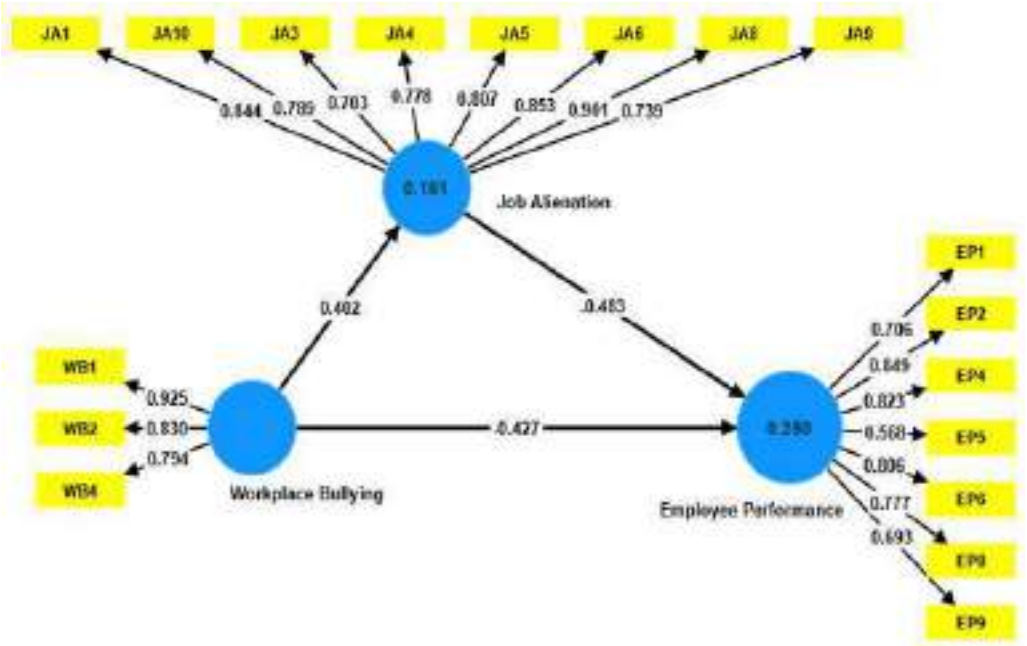
Assessment of Measurement Model

The measurement model was carried out to assess the outer loadings, reliability and validity of the exogenous and endogenous variable. Hair et al. (2022), recommended the retaining outer loading ≥ 0.7 and eliminating loading below. However, owing to the practicability of attaining loading < 0.7, Hair et al. (2022), suggested the retaining loadings of 0.4 ≥ 0.6 depending on the loading benchmark’s influence on convergent validity and construct reliability. Meanwhile, Hulland (1999) recommended the retention of outer loadings ≥ 0.5. Hence, following Hulland's (1999), the study retained outer loadings of ≥ 0.5. In accordance with the recommendation, the outer loadings EP3, EP7, EP10, JA2, JA7, and WB3 were discarded because their loadings were below the 0.5

threshold. The convergent validity was assessed using Average Variance Extracted. Fornell and Larcker (1981) argued that an AVE score of 0.5 or above indicates the convergent validity of a study's construct. In Table 1 below, the AVE values for the constructs are all > 0.5 threshold. Hence, the convergent validity is confirmed. Meanwhile, the reliability of the constructs was considered using Cronbach's alpha and convergent validity. Sekaran and Bougie (2016) posited that for a construct to be considered reliable, Cronbach's alpha should be > 0.7. A similar threshold is also employed for convergent validity. Table 1 below, the Cronbach's alpha and convergent validity are all > 0.7 benchmark. Thus, the study's constructs are consistent. Additionally, the coefficient of determination (R2) which explains the variance in the endogenous variable is 0.25 (25%). According to Hair et al. (2022), the coefficient of determination is small.

Measurement Model

Figure no. 1 Pictorial display of Measurement Model



Source: Authors' Systemisation of Smart-pls output, 2026

Table no 1: *Outer Loadings, Reliability and Convergent Validity*

Constructs	Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE	Decision
Employee Performance	EP1	0.706	0.871	0.900	0.565	Accepted
	EP2	0.849				
	EP4	0.823				
	EP5	0.568				
	EP6	0.806				
	EP8	0.777				
	EP9	0.693				
Job Alienation	JA1	0.844	0.923	0.936	0.646	Accepted
	JA10	0.789				
	JA3	0.703				
	JA4	0.778				
	JA5	0.807				
	JA6	0.853				
	JA8	0.901				
	JA9	0.739				
Workplace Bullying	WB1	0.925	0.827	0.887	0.725	Accepted
	WB2	0.830				
	WB4	0.794				

Source: Authors Systemization of Smart-PLS output, 2026

The Heterotrait-Monotrait (HTMT) correlation ratio was used to assess the discriminant validity of the components. Henseler et al. (2015) endorsed the HTMT ratio since the Fornell-Larcker Criterion and cross-loading fail to identify a deficiency in discriminant validity among conceptions with loadings between 0.65 and 0.85. Concurrently, researchers have proposed two standards (Kline, 2011; Henseler et al., 2015). Kline (2011) offered a stringent criterion of <0.85 for conceptually unique constructs, whereas Henseler et al. (2015) recommended a more lenient threshold of <0.90 for conceptually equivalent constructs. Consequently, given that the research constructs namely employee performance, workplace bullying and job alienation are conceptually unique, a threshold of less than 0.85 was used. Consequently, since the correlations across constructs are below 0.85, divergent validity is thus affirmed (See: Table 2 below).

Table no 2: *Heterotrait-Monotrait (HTMT) Ratio of Correlations Discriminant Validity*

Constructs	Employee Performance	Job Alienation	Workplace Bullying
Employee Performance			
Job Alienation	0.476		
Workplace Bullying	0.413	0.510	

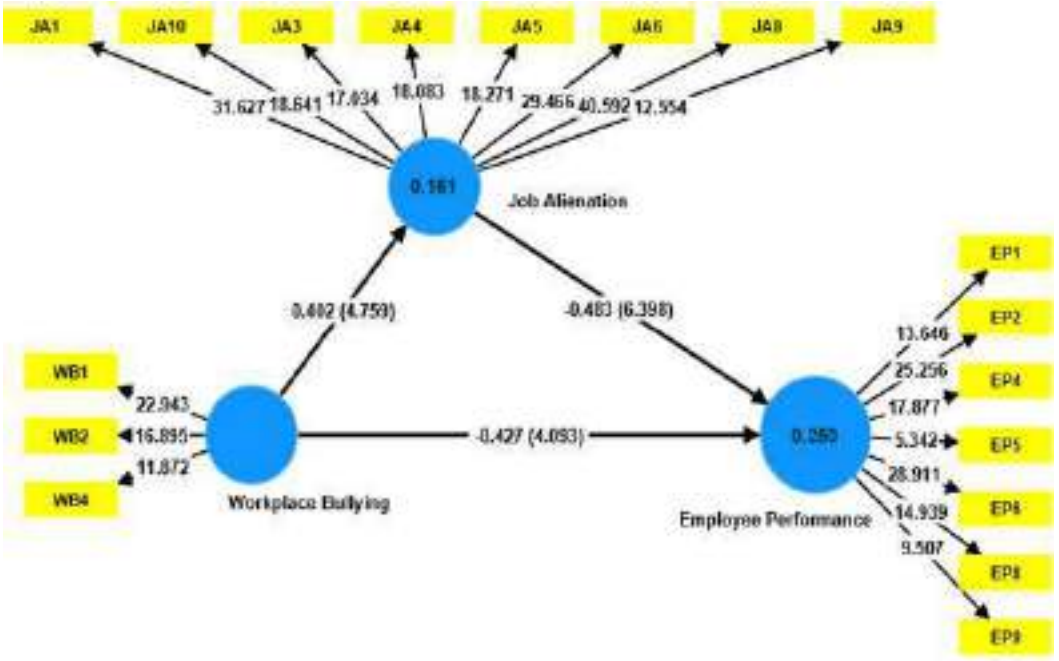
Source: Authors Systemisation of Smart-PLS output, 2026

Assessment of Structural Model

The structural model was conducted to analyse the direct and the hypothesised relationship between job alienation, workplace bullying and employee performance.

Structural Model

Figure no. 2 Pictorial display of Structural Model



Source: Authors Systemisation of Smart-pls output, 2026

Table no 3: *Hypothesised Relationship*

Hypotheses	Relationship	Beta	Standard Deviation (STDEV)	T Statistics	P Values	Confidence Interval 2.50%	Confidence Interval 97.50 %	Decision
H1a	Workplace Bullying -> Employee Performance	-0.427	0.104	4.093	0.000			Supported
H1b	Job Alienation -> Employee Performance	-0.483	0.076	6.398	0.000			Supported
H2	Workplace Bullying -> Job Alienation -> Employee Performance	-0.194	0.053	3.631	0.000	-0.083	-0.382	Supported
				$Q^2 = 0.127$				

Source: Authors Systemisation of Smart-PLS output, 2026

The results of the structural model in Table 4 indicate that workplace bullying has a significant negative effect on employee performance ($\beta = -0.427$, $T = 4.093$, $p < 0.000$), indicating that healthcare workers who experience bullying are less likely to perform effectively in their roles. Thus, H1a is there by supported. Similarly, job alienation was found to have a significant negative effect on employee performance ($\beta = -0.483$, $T = 6.398$, $p < 0.000$), suggesting that employees who feel psychologically detached, powerless, or disconnected from their work exhibit reduced performance levels. Hence, H1b is also rejected. These findings imply that both workplace bullying and job alienation independently undermine employee performance in tertiary healthcare institutions.

The mediation analysis (H2) further demonstrated that job alienation significantly mediates the relationship between workplace bullying and employee performance ($\beta = -0.194$, $T = 3.631$, $p < 0.000$, 95% CI [−0.382, −0.083]). This indicates that workplace bullying indirectly reduces employee performance by increasing employees' feelings of alienation from their jobs. However, because the direct effect of workplace bullying on employee performance (H1a) remains significant alongside the indirect effect, job alienation serves as a partial mediator rather than a full mediator in this relationship.

In addition, the Q^2 value of 0.127 indicates the model's predictive relevance. Based on Cohen's (1988) benchmarks, Q^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large predictive relevance, respectively. The obtained Q^2 value falls slightly below the medium threshold, suggesting that the model demonstrates limited predictive

capacity for explaining variations in employee performance among tertiary healthcare workers in Nigeria. This supports the adequacy and practical usefulness of the proposed model in explaining performance outcomes within the study context.

Discussions

Workplace bullying has consistently shown to exert a negative and significant effect on employee performance by undermining employees' psychological, emotional, and cognitive resources needed for effective work functioning. This is consistent with previous studies of Alam et al. (2025), Naseer et al. (2025), Olanipekun & Ikechukwu (2022), Pradhan & Joshi (2019). Persistent exposure to bullying behaviours such as intimidation, verbal abuse, humiliation, and social exclusion creates a hostile work environment that elevates stress levels and distracts employees from core job tasks, thereby reducing efficiency and accuracy (Olanipekun & Ikechukwu, 2022). As employees expend considerable energy coping with fear, anxiety, and emotional distress, their ability to concentrate, make sound decisions, and maintain productivity diminishes, leading to observable declines in performance (Pradhan & Joshi, 2019). Empirical studies further indicate that bullied employees are more likely to display withdrawal behaviours, reduced commitment, and minimal role compliance, all of which negatively affect individual and organizational outcomes (Alam et al., 2025). In high-demand sectors such as healthcare, where teamwork, attention to detail, and emotional labour are essential, the performance consequences of bullying are even more pronounced, as strained interpersonal relationships and loss of trust disrupt collaboration and service quality. Moreover, workplace bullying weakens employees' motivation and sense of professional identity, increasing the likelihood of errors, absenteeism, and reduced service delivery (Naseer et al., 2025). Ultimately, the significant negative relationship between workplace bullying and employee performance highlights bullying as a critical organizational stressor that erodes employees' functional capacity and underscores the need for proactive managerial interventions to safeguard performance and workplace well-being.

Job alienation was found to have a negative and significant effect on employee performance by weakening employees' psychological attachment, motivation, and sense of purpose at work. This is in tandem with previous studies of Al-khazrajy (2025), Aslan (2025), Nodehi (2020), Salloukh et al. (2025). When employees experience feelings of powerlessness, meaninglessness, isolation, and self-estrangement, they become emotionally detached from their job roles, which reduces their willingness to invest effort and initiative in work tasks (Al-khazrajy, 2025). Alienated employees are more likely to engage in surface-level compliance rather than genuine commitment, resulting in lower productivity, reduced work quality, and diminished problem-solving capacity (Nodehi,

2020). Empirical evidence suggests that job alienation impairs concentration and intrinsic motivation, making it difficult for employees to sustain performance, especially in complex and demanding work environments (Aslan, 2025; Nodehi, 2020). In sectors such as healthcare, where performance relies heavily on emotional engagement, collaboration, and professional responsibility, alienation can translate into poorer service delivery, increased errors, and weakened teamwork. Moreover, job alienation often encourages withdrawal behaviours such as absenteeism, lateness, and reduced discretionary effort, all of which further undermine performance outcomes (Salloukh et al., 2025). Overall, the significant negative relationship between job alienation and employee performance underscores alienation as a critical psychological condition that erodes employees' capacity to perform effectively and highlights the importance of fostering meaningful, inclusive, and empowering work environments.

The finding showed that job alienation partially mediated the relationship between workplace bullying and employee performance indicating that bullying affects performance both directly and indirectly through employees' job estrangement. This result suggests that while workplace bullying independently undermines performance by creating stress, fear, and disruption, it also triggers feelings of powerlessness, meaninglessness, and emotional withdrawal that further weaken employees' capacity to perform effectively. Exposure to repeated bullying behaviours gradually erodes employees' sense of belonging and professional identity, leading them to become estranged from their roles, which in turn reduces motivation, commitment, and discretionary effort. In high-pressure work environments like healthcare, this mediating process is particularly salient, as estranged employees may disengage emotionally while still remaining physically present, resulting in minimal compliance rather than optimal performance.

Implications

Theoretically, the findings reinforce the explanatory strength of the Conservation of Resources (COR) Theory by demonstrating how workplace bullying operates as a chronic stressor that depletes employees' valuable psychological and social resources, ultimately impairing performance. The partial mediating role of job alienation aligns with COR's resource loss spiral, showing that sustained bullying erodes employees' sense of control, meaning, and professional identity, which accelerates withdrawal and performance decline. By empirically linking workplace bullying, job alienation, and employee performance within a tertiary healthcare context, the study extends the application of COR Theory to understudied environments and highlights job alienation as a critical mechanism through which resource loss translates into negative work outcomes.

Practically, the findings underscore the need for healthcare administrators and managers to proactively address workplace bullying as a performance-related issue rather than merely an interpersonal problem. Management should implement clear anti-bullying frameworks, promote supportive leadership behaviours, and strengthen reporting and grievance mechanisms to protect employees' psychological resources. Additionally, interventions such as counselling services, peer support systems, and job redesign initiatives can help reduce feelings of alienation by restoring employees' sense of purpose, autonomy, and belonging, thereby enhancing performance and service quality in tertiary healthcare institutions.

From a policy standpoint, the study highlights the importance of institutional and sector-wide regulations that safeguard healthcare workers from psychosocial hazards. Policymakers and regulatory bodies should enforce workplace policies that explicitly prohibit bullying, mandate employee well-being programs, and integrate psychosocial risk management into healthcare accreditation standards. At a broader level, government investment in workforce development, staffing adequacy, and supportive work environments can help reduce systemic stressors that enable bullying and alienation, ultimately strengthening employee performance and the overall effectiveness of Nigeria's tertiary healthcare system.

Conclusion and Recommendations

Workplace bullying is a critical psychosocial challenge that significantly undermines employee performance in Nigeria's tertiary healthcare institutions, both directly and indirectly through job alienation. The findings demonstrate that persistent exposure to bullying behaviours erodes healthcare workers' psychological resources, fosters feelings of powerlessness and detachment, and weakens their connection to their work, which ultimately impairs performance. The partial mediating role of job alienation highlights that while bullying independently diminishes performance, its detrimental impact is further intensified when employees become psychologically disengaged from their roles. Grounded in Conservation of Resources Theory, the study underscores how sustained resource loss in hostile work environments leads to reduced effectiveness among healthcare professionals. Overall, the study emphasizes the urgent need for healthcare administrators and policymakers to address workplace bullying and job alienation through supportive leadership, protective policies, and employee-centered interventions to enhance performance and ensure the delivery of quality healthcare services in Nigeria.

Based on the findings of the study, the following recommendations are proposed:

- Management of tertiary healthcare institutions should establish and strictly enforce comprehensive anti-bullying policies, including clear definitions of unacceptable behaviours, confidential reporting channels, and prompt disciplinary procedures. This will help reduce workplace bullying and protect employees' psychological resources, thereby improving performance.
- Healthcare administrators should introduce employee-support initiatives such as counselling services, mentoring programs, participatory decision-making, and job enrichment practices to restore employees' sense of meaning, autonomy, and belonging. Reducing job alienation will weaken the negative pathway through which bullying affects performance.
- Hospital leaders and supervisors should receive regular training on ethical leadership, conflict management, and supportive supervision, while regulatory bodies should monitor compliance with workplace well-being standards. Strengthening leadership capacity will help create a supportive work climate that discourages bullying, minimizes alienation, and enhances employee performance.

Limitations and Suggestions for Further Study

This study has some limitations that should be considered when interpreting the findings. First, the use of judgmental and snowball sampling techniques limits the generalizability of the results, as the respondents were selected based on accessibility and referral rather than random selection, which may introduce selection bias. Second, data were collected through self-report questionnaires, which may be susceptible to common-method bias, social desirability bias, and respondents' subjective perceptions, despite the procedural and statistical remedies applied. Third, the scope of the study was geographically limited to tertiary healthcare workers in Zamfara and Kaduna States, which may not fully capture the experiences of healthcare employees in other regions of Nigeria with different institutional structures, cultural dynamics, or security conditions. Lastly, the study examined only job alienation as a mediating variable, thereby providing a focused but limited explanation of the psychological mechanisms through which workplace bullying influences employee performance.

Future research should address these limitations to deepen the understanding of workplace bullying and its effect on employee outcomes in healthcare settings. Scholars are encouraged to adopt probability sampling techniques and to expand the study to other states or conduct nationwide or cross-sectoral studies to enhance generalizability. Longitudinal or mixed-method approaches could also be employed to reduce the limitations associated with cross-sectional self-report data and to capture changes in employee experiences over time. Furthermore, future studies should explore additional

mediating variables such as emotional exhaustion, depersonalization, work disengagement, and insomnia to provide a more comprehensive explanation of the pathways linking workplace bullying to employee performance. Examining multiple mediators simultaneously or testing moderated mediation models would offer richer theoretical and practical insights into managing psychosocial risks in healthcare organizations.

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