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Analysis of The Logistics Performance Index Based on Regional Economic Integration: Evidence from ECOWAS

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Abstract

The regional economic integration mainly aims to eliminate national borders for generating a worldwide market. The construction of logistical infrastructure functions as the crucial foundation since it allows member countries to meet their economic development goals. The Logistics Performance Index (LPI) success rankings of the Economic Community of West African States (ECOWAS) were analyzed employing the LOPCOW and CoCoSo techniques. As a result, different criteria emerged as prominent factors affecting the high levels of LPI success rankings of countries throughout the years.

The "infrastructure" criterion was defined as a key factor over the years 2023 and 2012 in Benin, whereas the "timeliness" criterion has been crucial in 2018, and the "customs" criterion was effective in 2010. The "tracking and tracing" criterion functioned as an important factor throughout 2016 in Burkina Faso. The "international shipments" criterion was successful during 2014 in Nigeria.

The "tracking and tracing" criterion in 2023 and the timeliness criterion in 2012 proved to be the main reasons for low LPI success rankings in Burkina Faso. The "customs" criterion proved important for Liberia in 2018, but the "infrastructure" criterion stood out in 2016. The "logistics competence and quality" criterion served as a key factor in Guinea-Bissau during 2014, but the "timeliness" criterion delivered results in 2010.

Key words: Logistics Performance Index, ECOWAS, LOPCOW, CoCoSo

JEL Code: L91, F02, F15

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1. Introduction

In recent years, the African Union has become a focal point for policymakers and researchers regarding issues such as regional integration, common markets, and a common currency among African countries (Krantz, 2025; Asongu & Diop 2025). The logistics sector assumes an effective role in the planning of production, distribution, and marketing activities for countries in national, regional, and international trade. Considering the increase in international trade volume due to globalization, logistics is seen as a significant determinant of both economic development and growth as well as competitiveness for countries (Stack et al., 2024). Therefore, the topics of regional economy and logistics from the perspective of West African countries motivate this research.

Economic communities and regional trade agreements create positive results that drive nations to join regional integration according to Ejones et al. (2021). Various initiatives and programs have been implemented to achieve regional integration in West African countries, such as the ECOWAS, the West African Trade Program (WATP), and the West African Economic and Monetary Union (WAEMU) (Shuaibu, 2015). The ECOWAS was established on May 28, 1975, with the Lagos Treaty in Lagos, Nigeria (Onwuka, 1980; Cole, 1985). In 1993, a revised treaty was signed among the ECOWAS member countries to establish a common currency and market, enhance political cooperation, and accelerate economic integration (Badmus & Isiaka, 2009).

The ECOWAS includes member countries such as Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Ghana, Guinea, Guinea-Bissau, Togo, the Gambia, Liberia, Niger, Nigeria, Mali, Senegal, and Sierra Leone (Ojo, 1980; Yabi, 2010). ECOWAS is based on the core theme of eliminating obstacles for the free movement of goods, services, and labor to enhance regional cooperation and facilitate free trade among member countries (Peprah et al., 2016). An increase in production within a country is an effective factor in the growth of domestic and regional trade (Ajakaiye & Ncube, 2010). The significance of human and natural resources in enhancing production is substantial. Despite the considerable potential of the ECOWAS members in terms of such resources, the regional economic integration process has not yet achieved its targeted potential. The current situation demonstrates why ECOWAS requires additional research according to Berahab and Ali (2019).

Today, logistics is seen as one of the most important elements of regional integration. Effective and efficient logistics activities help governments facilitate foreign trade and gain a competitive edge (Navickas et al., 2011; Peprah et al., 2016; Dang & Yeo, 2018; Jayathilaka et al., 2022; Ejones et al., 2021). As a result, the study addresses the notions of ECOWAS and logistics in an interconnected structure. The logistics performance success rankings of the members were established using Multi-Criteria Decision-Making (MCDM) methods. This study

uses LOPCOW and CoCoSo to evaluate logistics performance, setting it apart from previous studies (Gürler et al., 2024; Stević et al., 2024; Gökdemir, 2025).

The majority of academic literature on the Logistics Performance Index (LPI) explicates high-income economic regions such as OECD, EU and G20 countries (Hadžikadunić et al. 2023; Pehlivan et al. ,2024; Jonasíková et al. ,2025). Nonetheless, the number of research studies conducted at the level of economic communities within the context of African countries has been insufficient.

In this study, the application of MCDM methods to the examination of the LPI at the economic community level offers a data-driven, transparent, and systematic evaluation framework. The research delivers vital data which enables the development of regional plans and directs strategic logistics investments and helps measure national performance across LPI components. The research investigation aims to develop new knowledge that enhances current academic understanding of this field.

The rankings provided by the LOPCOW and CoCoSo analyses can offer concrete data and comparisons for policymakers, facilitating the improvement of regional logistics policies. This study is expected to effectively pioneer concrete steps toward improving the logistics components of ECOWAS countries by providing significant contributions to regional logistics policies and decision-making processes.

2. Literature Review

In recent years, logistics is highly crucial for countries to maintain or increase their market shares as well as to ensure global competition and economic growth (Güler, 2008; Memişoğlu & Başer, 2023). When businesses plan their supply systems, after determining their distribution channel strategies, they choose their suppliers according to the selected distribution channel. As it is known, the selection of the appropriate supply channel and the determination of the supply chain system are based on meeting the main objectives of the enterprises such as making profit, meeting customer needs and ensuring the sustainability of the system (Gürler et al., 2011). In a dynamic market environment, it is necessary for companies to achieve a sustainable competitive advantage in order to maintain their existence. This situation necessitates the implementation of strategic decisions and efficient procurement methodologies in order for businesses to achieve their set goals (Ersoy, 2024). Strategic planning plays a key role for businesses in terms of providing sustainable competitive advantage and minimising the uncertainties of the future.

Without strategic planning, it is not possible for businesses to achieve sustainable competitive advantage (Demir & Yılmaz, 2010). Increasing the market shares of enterprises by developing marketing strategies helps enterprises to achieve sustainable growth and maintain continuity in the market (Tepeli & Mirgen, 2024; Erzurumlu, 2024). Globalisation has also altered the economic problems of nations. Modern logistics systems are critical to the effectiveness and efficiency of

transportation in the ever-changing globalization process (Beysenbaev and Dus, 2020). Effective logistics systems benefit both national economies and commercial firms (Dang & Yeo, 2018). To attain competitiveness, assure stable economic growth, enhance international trade (Jayathilaka et al., 2022), improve economic activities, and promote sustainability (Navickas et al., 2011), governments must effectively use logistics systems (Edirisinghe, 2013). Nayak et al. (2024) stressed the importance of infrastructure, economy, and telecommunications in the expansion of the logistics sector. Devlin and Yee (2005) defined logistics efficiency as a measure of the resources utilized during the process of ordering a product and delivering it to the client. They also argued that reducing costs and minimizing delivery prices are among the primary objectives of efficiency in logistics for both importers and exporters.

The logistics industry advancements together with international trade barrier elimination created an open market world which expanded product availability across borders while making businesses compete at a global level. International trade requires logistics operations to function because these operations create commercial links which promote economic expansion while lowering delivery expenses (Martí et al.,2014; Arvis et al.,2024). The authors believe that this role together with trade liberalization leads to better logistics service quality and increased service volume (Hausman et al. 2013). Logistics services serve as a bridge in connecting local economies to the international economy (Gani, 2017). Jonasíková et al. (2025) found that countries with slow customs procedures and rising international market competition and inadequate infrastructure face poor logistics performance because of their weak logistics systems. Nations experience elevated logistics costs because their weak infrastructure for logistics and inadequate service quality and restricted foreign market entry (Arvis et al. ,2024). Consequently, rising costs negatively impact the economies of countries in the global competitive environment and diminish their competitive advantage in the world market. The LPI serves as a fundamental indicator which drives international trade growth between countries (Martí et al. 2014; Hausman et al. 2013; Bugarčić et al. ,2020; Mešić et al. ,2022) but is also widely used to evaluate inter-country logistics performance (Edirisinghe, 2013).

Published by the World Bank in 2007 for the first time, the LPI index is prepared based on surveys for the comparison of performances among countries. It consists of the arithmetic means of the following components:

1. Customs: The efficiency of the customs process.
2. Infrastructure: The quality of infrastructure related to trade and transportation.
3. International Shipments: The organization of shipments at affordable rates.
4. Quality of Logistics Services: The adequacy and quality of logistics services.
5. Tracking and Tracing: The capability of tracking and tracing shipments,

6. Timeliness: The delivery of shipments according to the established schedule.

The Logistics Performance Index (LPI) combines six main measures to analyze sector performance (Mešić et al., 2022). The index components are rated numerically from 1 to 5, with 1 representing the weakest value and 5 representing the highest (Rezaei et al., 2018; Arvis et al.,2024). The LPI is a technique for comparing countries' global trade logistics performance (Jayathilaka et al., 2022; Göçer et al., 2022) and analyzing their relative performance (Çemberci et al., 2015; Dang & Yeo, 2018). Su and Ke (2017) highlighted this indication as critical to improving innovative procedures.

The LPI is an effective tool for identifying innovative solutions (Mešić et al., 2022) and assessing market risks by analyzing global logistics opportunities and threats (Aboul-Dahab, 2020; Sergi et al.,2021). This scenario leads to an improvement in logistics performance optimization as a new concept. Optimized logistics performance improves resource management, lowers costs, and reduces delivery times, thus increasing customer satisfaction (Alnıpak et al.,2023).

Improving logistics performance has a positive impact on import and export operations, as well as trade facilitation processes. To assess the flow of commodities in commerce, Bensassi et al. (2015) determined that logistics was a significant component for export operations. Improving efficiency in goods commerce and accurately providing the relevant customs documentation facilitates trade (Shepherd, 2016). Additionally, Hasan et al. (2025) argued that the significant transformation and complexity in the structure of networks within the logistics performance process are primarily driven by key indicators such as the infrastructure component, the efficiency and quality of logistics services, and shipment tracking systems.

Some studies focus on the LPI measure countries' positions in international trade by considering the LPI alone, while others examine the LPI in conjunction with various components. Wang and Choi (2018) emphasized that improvements in the LPI have a stronger effect on exports and trade volume. Oruangke (2021) demonstrated that enhancements in logistics components result in a rise in trade flows. Kaplan and Bozyiğit (2021) argued that all logistics performance indicators, except for service quality, had a positive effect on a country's foreign trade. Diep et al. (2024) demonstrated that the quality of logistics services is a critical component in determining the Logistics Performance Index (LPI).

The LPI according to Arıkan Kargı (2022) created competition between multiple nations which led them to boost their logistics performance through their geopolitical advantages. According to Erkan (2014), the Global Competitiveness Index (GCI) weight impacts the LPI and a nation needs to enhance both railway and port infrastructure quality and efficiency before it can improve its logistics performance. According to Çemberci et al. (2015), a country needs to evaluate its logistics performance at the highest level to achieve top GCI ranking through better

logistics services. Goel et al. (2021) stated that improvements and developments in logistics performance within the supply chain led to positive growth. Sergi et al. (2021) highlighted that the GCI, geography, and a wide range of factors influenced countries' logistics performance. Jayathilaka et al. (2022) showed how the LPI affected GDP and net exports which would have created conditions for faster economic expansion of countries. Kalansuriya et al. (2023) established that the LPI acted as a critical element which enhanced global competitiveness through foreign direct investment (FDI) and GDP per capita, but the Corruption Perception Index (CPI) indicated no significant impact. Ababou and Benomar (2024) drew attention to the importance of the relationship between macroeconomic indicators and logistics performance in the development of the economy in today's globalized economic conditions.

3. Methodology

This section consists of the research objectives and scope, the research sample and dataset, the research limitations, the research methods, and the research findings.

Research Objectives and Scope

The study aims to explicate the concepts of the ECOWAS and LPI, which are fundamental elements of the regional integration process, in an interconnected manner. To achieve this objective, the logistics performance success rankings of countries within the ECOWAS community have been analyzed employing MCDM Techniques, specifically the LOPCOW and CoCoSo methods.

The LPI indicators of the countries such as Nigeria, Liberia, Guinea-Bissau, Guinea, Ghana, Burkina Faso, and Benin over the years 2010, 2012, 2014, 2016, 2018, and 2023, from which LPI data was obtained without any gaps, constitute the research sample. In the study, the score points for customs, logistics competence and quality, international shipments, infrastructure, tracking and tracing, and timeliness have been used as evaluation criteria. The following research questions have been formulated:

1. To determine the components with the highest and lowest significance levels in the formation of the LPI success rankings of the ECOWAS members between 2010 and 2023.
2. To identify the countries with the best and worst performances in the LPI success rankings of the ECOWAS members between 2010 and 2023.

Research Sample and Dataset

The data were obtained from the World Bank's "WB LPI -Global Ranking" database. The evaluation criteria and criterion codes are presented in Table 1.

Table 1. Evaluation Criteria and Codes of the Study

Criteria Codes	**Evaluation Criteria**
CS	Customs Score
IS	Infrastructure Score
ISS	International Shipments Score
LCQS	Logistics Competence and Quality Score
TTS	Tracking and Tracing Score
TS	Timeliness Score

Source: World Bank

Limitations of the Research

The LPI has been published by the World Bank in the years 2007, 2010, 2012, 2014, 2016, 2018, and 2023. Although it was planned to be published regularly every two years starting from 2010, the data for 2020 and 2022 were not published due to the global pandemic that occurred in 2020. With the reduction of the pandemic's impact, data were published again in 2023. The index published in 2007 was calculated using 7 indicators, while subsequent years were calculated considering 6 indicators; therefore, the data from 2007 were not included in the dataset to maintain consistency in the analysis. In this context, the period examined in the study, the sample, the dataset of the research, and the methods employed constitute the limitations of the study.

Research Methods

MCDM methods allow decision-makers to objectively evaluate alternatives by considering multiple dimensions, such as economic, environmental, social, and technical factors (Demir et al., 2024). Organizations should use MCDM as their preferred method to solve complex problems which need evaluation of various criteria from different viewpoints. Decision-makers can use the evaluation method to assess multiple options based on various criteria which goes beyond the limitations of single-factor evaluations (Amiri et al.,2024). The two main capabilities of MCDM methods include solution identification and complete alternative evaluation to support decision-makers in their selection process (D'Agostino et al.,2024). The LOPCOW method was employed to calculate the significance weight degrees of the criteria, whereas the CoCoSo method was employed to determine the annual LPE rankings fort his study.

3.1. LOPCOW Method

The LOPCOW method, developed by Ecer and Pamucar (2022), employs an objective way to determining the significance weight degrees of criteria without being influenced by negative values in the choice matrix (Dhruva et al.,2024). This approach has four stages (Ecer & Pamucar, 2022; Sumanto et al.,2024):

Stage 1: Creation of the Decision Matrix

The decision matrix is developed.

$$BKM = \begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \dots & C_n \end{array} \\ \begin{bmatrix} X_{11} & X_{12} & \cdots & X_{1n} \\ X_{21} & X_{22} & \cdots & X_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ X_{m1} & X_{m2} & \cdots & X_{mn} \end{bmatrix} \end{array} \quad (1)$$

Stage 2: Normalization of the Decision Matrix

The decision matrix is normalized to find values within the range of [0,1].

$$R = \begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \dots & C_n \end{array} \\ \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix} \end{array} \quad (2)$$

Maximization (benefit-oriented) criteria are found.

$$r_{ij} = \frac{X_{ij} - min\, X_{ij}}{max\, X_{ij} - min\, X_{ij}} \quad (3)$$

Cost minimization-oriented criteria are found.

$$r_{ij} = \frac{max\, X_{ij} - X_{ij}}{max\, X_{ij} - min\, X_{ij}} \quad (4)$$

Stage 3: Calculation of Percentage Values (PV_{ij}) for Each Criterion

The value calculated by the formula below is used to find the mean square value as a percentage of the standard deviations of all these criteria.

$$PV_{ij} = \left| \ln \left(\frac{\sqrt{\frac{\sum_{i=1}^{m} r_{ij^2}}{m}}}{\sigma} \right) . \quad 100 \right| \quad (5)$$

Here, σ denotes the standard deviation, and m represents the decision alternative.

Stage 4: Obtaining the Objective Significance Weights of the Criteria

The significance weight degrees of the criteria are calculated.

$$w_j = \frac{PV_{ij}}{\sum_{i=1}^{n} PV_{ij}} \tag{6}$$

3.2. CoCoSo Method

Yazdani et al. (2019) presented the CoCoSo approach, which combines the Simple Additive Weighting (SAW) and Exponentially Weighted Product (EWP) methods (Peng et al., 2020; Topal, 2021). The strategy allows decision-makers to evaluate many compromise alternatives (Hadad et al. 2023). The CoCoSo technique has five stages (Yazdani et al.,2019; Ayçin, 2023):

Stage 1: Creation of the Decision Matrix

The initial decision matrix is calculated.

$$X = \begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \dots & C_n \end{array} \\ \begin{bmatrix} X_{11} & X_{12} & \cdots & X_{1n} \\ X_{21} & X_{22} & \cdots & X_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ X_{m1} & X_{m2} & \cdots & X_{mn} \end{bmatrix} \end{array} \tag{7}$$

The values x_{ij} in the formula indicate that the j-th criterion has the i-th alternative.

Stage 2: Normalization of the Decision Matrix

The normalization of the decision matrix within the range [0,1].

$$X = \begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \dots & C_n \end{array} \\ \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix} \end{array} \tag{8}$$

Benefit-type criteria and cost-type criteria are calculated.

$$r_{ij} = \frac{X_{ij} - min\, X_{ij}}{max\, X_{ij} - min\, X_{ij}} \tag{9}$$

$$r_{ij} = \frac{max\ X_{ij} - X_{ij}}{max\ X_{ij} - min\ X_{ij}} \tag{10}$$

Stage 3: Calculation of (S_i) and (P_i) Values

The total weighted comparability (S_i) values for the alternatives are calculated.

$$S_i = \sum_{J=1}^{n} (w_j r_{ij}) \tag{11}$$

The total exponentially weighted comparability (P_i) values are obtained.

$$P_i = \sum_{j=1}^{n} (r_{ij})^{w_j} \tag{12}$$

In the formula, the value w_i indicates the degree of significance weight of the j-th criterion.

Stage 4: Calculation of the Relative Performance of Alternatives

In this stage, the triple evaluation scores for each decision alternative are calculated using Formulas 13, 14, and 15, respectively.

$$k_{ia} \frac{P_i + S_i}{\sum_{i=1}^{m} (P_i + S_i)} \tag{13}$$

$$k_{ib} = \frac{S_i}{\underset{i}{minS_i}} + \frac{P_i}{\underset{i}{minP_i}} \tag{14}$$

$$k_{ic} = \frac{\lambda(S_i) + (1-\lambda)(P_i)}{\lambda \underset{i}{maxS_i} + (1-\lambda) \underset{i}{maxP_i}} \tag{15}$$

Stage 5: Ranking of the Alternatives

Lastly, the performance scores expressed as k_i are obtained using Formula 16.

$$k_i = (k_{ia} + k_{ib} + k_{ic})^{\frac{1}{3}} + \frac{1}{3}(k_{ia} k_{ib} k_{ic}) \tag{16}$$

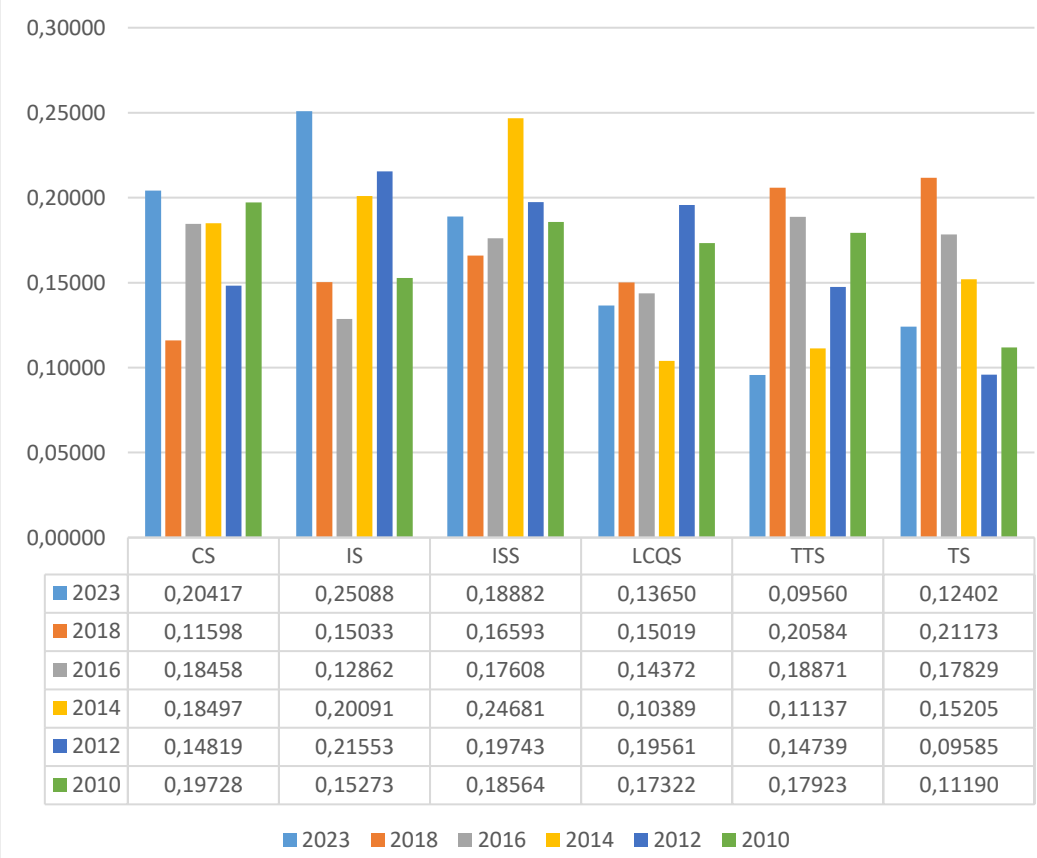
4. Findings of the Study

The results of the analyses conducted using the LOPCOW and CoCoSo methods are presented in Graph 1, Graph 2, and Table 2.

4.1. LOPCOW Method Findings

The significance weight degrees of the LPE components (w_j) published biennially by the World Bank between 2010 and 2023 were determined by following the steps of the LOPCOW method, and the obtained w_j values are given in Graph 1.

Graph 1: Calculated w_j values between 2010 and 2023.



	CS	IS	ISS	LCQS	TTS	TS
2023	0,20417	0,25088	0,18882	0,13650	0,09560	0,12402
2018	0,11598	0,15033	0,16593	0,15019	0,20584	0,21173
2016	0,18458	0,12862	0,17608	0,14372	0,18871	0,17829
2014	0,18497	0,20091	0,24681	0,10389	0,11137	0,15205
2012	0,14819	0,21553	0,19743	0,19561	0,14739	0,09585
2010	0,19728	0,15273	0,18564	0,17322	0,17923	0,11190

Source: Authors' calculations

According to the results in Graph1, the criteria with the highest significance weight degrees identified are as follows: for 2023, the IS criterion (0.25088); for 2018, the TS criterion (0.21173); for 2016, the TTS criterion (0.18871); for 2014, the ISS criterion (0.24681); for 2012, the IS criterion (0.21553); and finally, for 2010, the CS criterion (0.19728). The criteria with the lowest significance weight

degrees identified are: for 2023, the TTS criterion (0.09560); for 2018, the CS criterion (0.11598); for 2016, the IS criterion (0.12862); for 2014, the LCQS criterion (0.10389); for 2012, the TS criterion (0.09585); and for 2010, the TS criterion (0.11190).

4.2. CoCoSo Method Findings

The score values and rankings of countries' LPI performance achievements between 2010 and 2023 were determined using the CoCoSo Method. The resulting logistics performance rankings are presented in Table 2.

Table 2. Logistics performance rankings of countries from 2010 to 2023

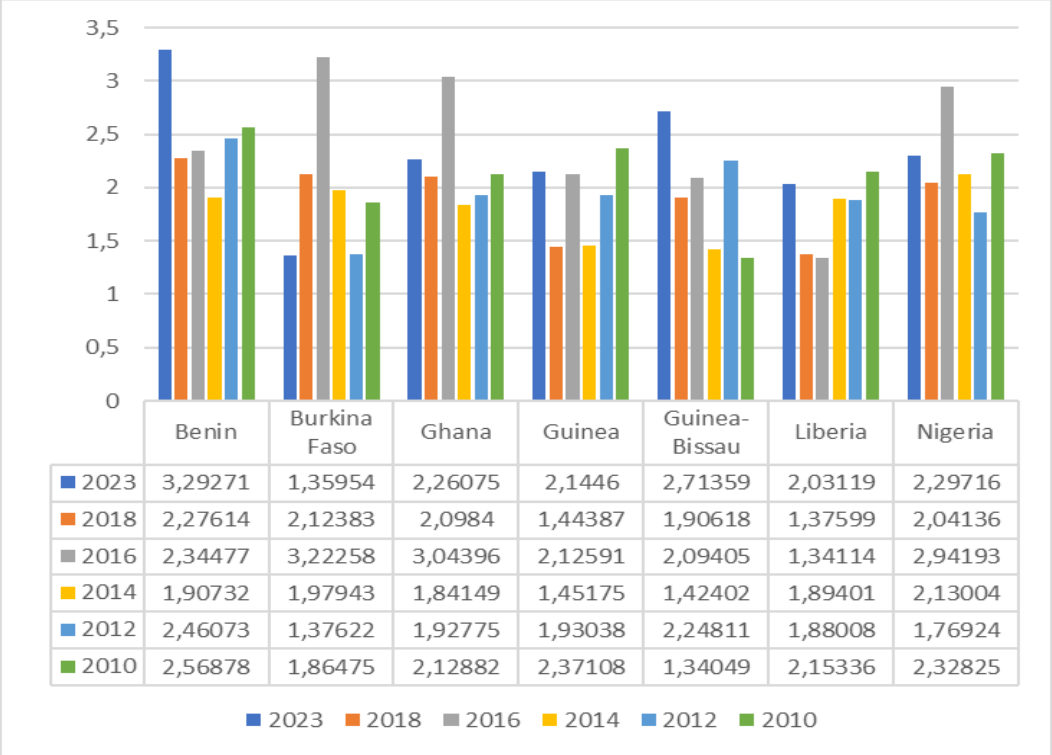
Countries	2023	2018	2016	2014	2012	2010
Benin	1	1	4	3	1	1
Burkina Faso	7	2	1	2	7	6
Ghana	4	3	2	5	4	5
Guinea	5	6	5	6	3	2
Guinea-Bissau	2	5	6	7	2	7
Liberia	6	7	7	4	5	4
Nigeria	3	4	3	1	6	3

Source: Authors' calculations

The logistics performance success score values of the countries are presented in Graph 2.

Upon examining Table 2 and Graph 2, the countries with the highest performance success based on the LPE evaluation criteria were identified as Benin in 2023 (3.29271), 2018 (2.27614), 2012 (2.46073), 2010 (2.56878) and Burkina Faso in 2016 (3.22258) and Nigeria in 2014 (2.13004). The countries with the lowest performance success were determined to be Burkina Faso in 2023 (1.35954) and 2012 (1.37622), Liberia in 2018 (1.37599) and 2016 (1.34114), and Guinea-Bissau in 2014 (1.42402) and 2010 (1.34049).

Graph 2. Logistics performance score values of countries from 2010 to 2023



	Benin	Burkina Faso	Ghana	Guinea	Guinea-Bissau	Liberia	Nigeria
2023	3,29271	1,35954	2,26075	2,1446	2,71359	2,03119	2,29716
2018	2,27614	2,12383	2,0984	1,44387	1,90618	1,37599	2,04136
2016	2,34477	3,22258	3,04396	2,12591	2,09405	1,34114	2,94193
2014	1,90732	1,97943	1,84149	1,45175	1,42402	1,89401	2,13004
2012	2,46073	1,37622	1,92775	1,93038	2,24811	1,88008	1,76924
2010	2,56878	1,86475	2,12882	2,37108	1,34049	2,15336	2,32825

Source: Authors' calculations

5. Discussion and Conclusion

Recent changes and developments in the infrastructure of logistics activities have pivotal role in enhancing the competitive advantage of countries in the global market within international trade. The effective supply chain established through logistics activities facilitates the seamless delivery of goods and services produced in one part of the world to other countries across the globe. In this context, the examination of regional economic integration and logistics concepts together in the research is significant from various perspectives, including the integration of regional trade, logistics infrastructure, environmental sustainability, and global supply chain integration.

The ECOWAS is a major West African regional integration project that aims to promote economic and political unity by developing regional economic activities and improving population welfare (Jayathilaka et al., 2022), fostering regional cooperation (Ejones et al.,2021), and implementing long-term economic growth policies (Navickas et al., 2011; Peprah et al., 2016). The LPI allows countries to compete in the market while also giving valuable data for logistics management. The goal of this research is to evaluate the success rankings of ECOWAS members' LPIs using MCDM approaches, specifically LOPCOW and CoCoSo analyses.

Rezaei et al. (2018) discovered that the six components have different weights and demonstrated that using weighted averages of these components improves performance evaluation. To verify Rezaei et al.'s (2018) findings, the research methodology employs LPI component weights.

According to the LOPCOW analysis, the score values of the LPI components used in the study were weighted to determine the criteria with the highest significance levels. These were defined as infrastructure as of 2023 and 2012; timeliness as of 2018; monitoring and tracing as of 2016; foreign shipments as of 2014; and customs as of 2010. The CoCoSo research found the nations with the greatest annual success rankings as Benin as of 2023, 2018, 2012, and 2010; Burkina Faso as of 2016; and Nigeria as of 2014.

The findings obtained from the analyses indicate that Benin has the best logistics performance score rankings in 2023, 2018, 2012, and 2010. The fact that the infrastructure criterion holds the highest significance level in 2023 and 2012 underscores the significance of infrastructure in the development of trade and logistics. The study results support Wang et al. (2021), Sergeev et al. (2021) and Bensassi et al. (2015) emphasized that logistics sector infrastructure development enabled international trade and drove national economic expansion. The research revealed that the timeliness criterion was of utmost importance in 2018. Companies need to deliver products to customers on time to achieve effective supply chain management. The research of Song and Lee (2022) confirmed the necessity to enhance logistics service speed in global transportation which matches the results of this study. The study identified customs as the best criterion in 2010. In this regard, the findings of Kilibarda et al. (2017) highlighted the necessity of efficient customs processes for timely and easy passage through customs in the international supply chain process, as well as for effective supply chain management.

Burkina Faso was determined as the country with the best logistics performance score rankings as of 2016. Findings of Olyanga et al. (2022) align with this study by indicating that better international shipment tracking systems enhanced national competitiveness as reported.

Nigeria was identified as the most successful country in terms of the LPI as of 2014. Şişman and Nebati (2024) confirmed this study by indicating logistics infrastructure development resulting in higher levels of international delivery performances.

The LOPCOW analysis identified the criteria with the lowest significance levels as tracking and tracing as of 2023; customs as of 2018; infrastructure as of 2016; logistics competence and quality as of 2014; and timeliness as of 2012 and 2010. The CoCoSo investigation found that the nations with the lowest logistics performance success scores were Burkina Faso in 2023 and 2012, Liberia in 2018 and 2016, and Guinea-Bissau in 2014 and 2010.

The low values of the tracking and tracing and timeliness criteria in Burkina Faso in 2023 and 2012, respectively, have significantly impacted the country's performance rankings. Qazi et al. (2024) found that monitoring and tracking, as well as timeliness, were crucial in determining performance.

In Liberia, the low performance rankings for customs in 2018 and infrastructure in 2016 were identified as influential components. Fedorenko and Pokrovskaya's (2020) research confirmed this study because improved logistics and customs infrastructure in international transport corridors is critical for global supply chains in order to promote countries' foreign trade capacities and economic growth.

The 2014 LPI rankings for Guinea-Bissau showed low performance in logistics competence and quality and timeliness in 2010. Takele (2019) discovered that better logistics infrastructure combined with enhanced customs and border permits and superior logistics service quality led to faster supply chain delivery times and better international shipment organization and improved shipment tracking according to his research which supports the current study's outcomes.

When evaluated as a whole, the research findings indicate that the ECOWAS members can enhance their LPI performance by developing necessary strategies and policies concerning the components of the LPI. The yearly assessment of success score points through the MCDM Methods for each country enables better identification of the LPI high and low components which helps nations address their weaknesses while utilizing their strengths as opportunities. Therefore, the research findings can serve as a roadmap for countries in formulating strategies and developing policies aimed at improving their logistics performance.

The analysis methods employed, the periods examined, and the sample evaluated constitute the primary limitations of the study. MCDM techniques address decision problems from various perspectives, with each method serving distinct purposes, such as calculating proximity to ideal and anti-ideal solutions, utilizing combined ranking functions, determining criterion weights through logarithmic variations, or analyzing discrepancies between actual and expected values. Variations in the dataset, sample, or analysis method may lead to differing results. Therefore, it is suggested that future research incorporates the LPI data scheduled for publication in 2025, employ diverse analysis techniques tailored to research objectives, and conduct tests on alternative samples to contribute to the literature. Additionally, to enhance the generalizability of the findings, comparative analyses with results from similar studies are recommended.

The study is expected to provide benefits from both macro and micro perspectives by determining the weight of importance of LPI components for ECOWAS member countries and their annual logistics performance success rankings. The framework enables national public authorities to receive strategic direction while offering operational support to local logistics companies. In other

words, the policy implications derived from the study's findings enable evaluations at both country and business levels.

The results obtained from the study guide policymakers in developing comprehensive trade policies by ensuring the continuity of strong LPI components and facilitating improvements in weaker ones to enhance their countries' Logistics Performance Index (LPI) scores. According to the research findings, politicians should form international collaborations while standardizing global standards, protecting data privacy and security, improving supply chain operations, increasing investment for logistical infrastructure, and implementing digital and automated systems. Policymakers must provide financial support for flexible planning systems, accurate demand forecasting models, resource management, R&D investments, scenario analyses, personnel training and auditing, and inventory management and optimization in order for logistics businesses to thrive. The successful implementation of these policy recommendations will increase regional trade efficiency among ECOWAS members, boosting their global market position and creating conditions for long-term economic growth.

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