RESEARCH ARTICLE

Intra-manufacturing export performance among ecowas member states

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Abstract

The study examined role economic integration and trade facilitation in promoting manufacturing export among ECOWAS member states The objectives of the study were achieved using descriptive, statistical and econometric analyses of annual data covering the period 2015 – 2020. The descriptive analysis helped in assessing the level of economic integration among ECOWAS member states. The econometric analyses were use examine the effect of economic integration on trade facilitation as well as the role of trade facilitation and economic integration in promoting manufacturing exports among ECOWAS member states. The findings reveal the level of trade facilitation in ECOWAS is below world average. That is ECOWAS member states has higher bureaucratic processes with greater costs of exporting/importing. Furthermore, results from econometric analyses reveal economic integration can significantly help in promoting manufacturing exports among ECOWAS member states. Again, economic integration and trade facilitation can significantly influence manufacturing exports across ECOWAS member states, while manufacturing production had direct and significant impact on manufacturing exports. Some policy recommendations that would help to facilitate trade flow to improve manufacturing exports across ECOWAS member states were recommended.

1. Introduction

The increasing fragmentation of cross-border production requires countries to establish open, predictable and transparent trade and investment systems, such as tariffs, non-tariff barriers and other restrictive measures that affect foreign suppliers and domestic producers. International market competitiveness largely depends on the ability to import world-class inputs to improve a country's export capacity. Barriers to the import of intermediate or finished products increase production costs and reduce a country's ability to compete in the international market: tariffs and other non-tariff barriers (such as inefficient border procedures) reduce the competitiveness of exports. [1]

Evidence suggests that the complexity of cross-border operations is a key obstacle to intraregional trade, coping with many documentation requirements, unstable and insufficient non-transparent procedures and formalities, high fees and charges, and long and complex conformity assessments (sanitary and phytosanitary requirements and technical barriers to trade) obstacles to trades. An ITC survey on non-tariff measures for ECOWAS in 2016 indicates the supply chain barriers was 73% of procedural obstacles face by firms, procedural obstacles sometime are informal or unusually high payments, time constraints, administrative burdens related to regulations and discriminatory behaviour of officials. Trade facilitation reforms address most of these issues by creating a conducive cross-border environment. More specifically, trade facilitation reforms improve intraregional trade and foster regional economic integration. Thereby attracting investors and multinational corporations to invest in the region and outsource their supply chains with trade facilitation reforms as their key decision criteria. [2]

However, the reduction in trade costs will increase production growth of indigenous firms to export and increase their trade volume and indigenous

firm's competitiveness in international trade. ECOWAS member country's lack of production capacity to convert its resources into consumables and attract added value has always been its worst plague and the curse of the uprising poverty rate. ECOWAS countries has been relatively stagnant over time, due to the homogeneity of export products, which are basically primary products; 11.5%, 12. 8%, 10.1%, 12.5% and 12.9% in 2002, 2007, 2012, 2017 respectively with marginal increase for 2020 due to COVID 19. Over-reliance on exports of similar commodities and the weak processing capacity of ECOWAS countries prevailed making North America's and Europe's favourite trade partner, and reduced intra trade, even with the it economic integrations. [3]

ECOWAS member states exports to the Europe union stood at 34.3%, 35.7%, 23.2%, 27.2% and 26,9% in 2002, 2007, 2012, 2017 respectively and decline in 2020 due to COVID 19, its imports were 55.1%, 46.6%, 49.8%, 42.0%, 36.4% and 37.2 % in 2002, 2007, 2012, 2017 respectively and increase marginally in 2020 due to import of COVID 19 vaccine (ECOWAS Trade Data and World Trade Indicators). The transfer of productivity gains caused by the weak production capacity in ECOWAS has made ECOWAS economies vulnerable to changes in demand and has become a victim of world trade. [4]

Obstfeld and Rogoff state that economic problems of international macroeconomics can be examined from the position of trade costs. Olayiwola et al., states, the cost of trade in the national economy determines the distribution of surplus and the cost of adjusting policies and shocks between regions and country. However, trade costs have received less empirical attention, it impacts on ECOWAS member states intra manufacturing trade is still not determined. [5]

The previous literature mainly assumed that in the absence of other policy tools such as trade barriers and exchange rates that hinder the flow of goods and services between countries, trade frictions within countries are negligible. Until recently, studies have increasingly shown that even in advanced economies such as China, Canada and the United States, intra-country trade costs can be high. Of note, is that the distribution of trade costs within a country affects the trajectory of regional development, thus, reduces the incentive for countries to implement regional commitments.

Given the unsatisfactory regional economic integration (REI) in promoting intra-manufacturing trade among ECOWAS member states. The general objective of this study is to find out the influence of REI in promoting intra-manufacturing trade among ECOWAS member states. To achieve the stated objectives, the study explores the following questions:

Can REI promote intra-manufacturing trade among ECOWAS member states? What are the major obstacles to REI in promoting intra-manufacturing trade among ECOWAS member states? What major evolving concepts that could be included to promote and redress obstacles to REI in promoting intra-manufacturing trade among ECOWAS member states?

Following the introduction chapter is section 2. Basically, literature review on integration and trade facilitation and empirical reviews. Section 3: reveals the study methodology and statistics. Section 4: present the result of the analysis, interpretation of the results, and the discussion of the result. Section 5: Summarise the thesis, conclusions, and recommendations. [6]

2.0 Literature Review
2.1 Concept Review
2.1.1 Regional Economic Integration (REI)

REI is the process that lead to no discrimination between national economies. It is an agreement among countries in a geographic region to reduce, and ultimately remove, tariff and non-tariff barriers for free flow of goods and services between each other, regional integration is for driving the growth and increase economic wellbeing of any county, help in the creation of regional value chains that increase economic efficiency. The objectives of regional economic integration are; increase in economic wellbeing of any county and reduce the economic inequalities of integrating countries by the creation of a larger market, fostering competition and to enable economies of scale, regional economic integration increases innovation, reduces inputs and consumer prices, helps specialization of economies and motivate the development of regional production activities. For the developing and least develop countries, regional economic integration is the major driver poverty reduction, reduce social equalities, and economic divergence through trade, and investment cooperation. [7]

2.1.2 Trade Facilitation

Trade facilitation (TF) is a holistic efforts use at the national, regional and multilateral level with objective to reduce trade transaction time and costs. Trade facilitation negotiations have increase recent in time with the WTO trade policy negotiations, before now trade facilitation is detail in the General Agreement on Tariffs and Trade (GATT) in a relative little detail. With other multilateral tools like the Kyoto Convention, which have fell to produce the desire result. In line with the WTO trade policy negotiations, is the regional trade integrations that is gradually been incorporated into trade facilitation dimensions. [8]

With the multilateral, regional and national trade reforms competing efforts to achieve same objectives, more likely they coexist due to their complementarities, and their comparative advantages of each reforms. [9]

2.1.3 The Supply Chain

The supply chain includes all the activities necessary to produce goods and deliver them to final consumers. These activities include purchasing raw materials, preparing transportation, applying for import licenses, preparing customs clearance documents, customs clearance, payment and delivery

to consumers. There are many variations of the supply chain. Therefore, from the perspective of the supply chain, a theoretical model needs to be used to simplify its complexity is needed as a reference model is needed.

The supply chain barriers model of economic regional integration focus on removing or reducing tariffs with third countries or regions cited in Olayiwola et al., 2015. The World Economic Forum list four main types of supply chain barriers which are:

i. Lack of transport infrastructure, inadequate road network, rail, sea and air transportation networks that increase the costs and reduce the move of goods and persons across borders. [10,11,12,13,14]

ii. Non-tariff measures, are safety and sanitary requirements, technical standards goods additional regulations that increase to the compliance costs of importing or exporting. [15]

iii. Border administration, are inefficiency border control and burdensome or non-transparent import or export procedures.

iv. Business environment, are discriminate and unstable regulatory environment, physical security issues along the way supply chain.

FIGUE 1 reveals supply value chains cost which make it imperative for policy makers to understand trade facilitation as tool for all countries to broke supply value chains barriers by incorporating policies aimed at facilitating trade into their long-term development agenda. [16]

2.1.4 Manufacturing Sector

Manufacturing is the production of merchandise for use using labour and machines, tools, chemical and biological processing, or formulation, it ranges from handicraft to high tech, but more industrial production, raw materials are transformed into finished goods on a large scale. The finished goods for further production of more complex goods (aircraft, household, appliances or automobiles, or sell them to end users and consumers. Manufacturing sector is one of most important sub-sector of an economy, accounts for nearly two-thirds of industrial GDP. Within manufacturing, the most important sub-sectors are food processing, basic metallurgy, machinery and equipment, and chemical products, the receive public incentives. [17]

2.2 Theoretical Framework
2.2.1 Endogenous growth theory

Endogenous growth theory states capital formation, technological change and knowledge accumulation are the equilibrium model of the main driving forces of economic growth. The endogenous growth theory shows that exports and imports have long-term effects on production growth. In order to explain the role of exports and imports in the long-term growth of any country economy, Romer modified Solow's neoclassical growth model to include the growth drivers of human capital and physical capital. And imports from developing countries makes it possible to model exports

and imports as long-term economic growth stimuli through the permanent transfer of knowledge, channel for technology to spread from advanced countries to less developed countries are the flow of foreign direct investment. The theory assumes that exports, FDI, and imports have a positive impact on economic growth, while fluctuations in inflows have a negative impact on economic growth. It then points out that exports, foreign direct investment and imports have a positive impact on growth by stimulating innovation to reduce R&D costs. [18]

2.3 Empirical Review

Despite the multitude of studies on trade facilitation and economic integration in West Africa only few used econometric methods to quantify the effect of trade facilitation and economic integration on trade flows among the ECOWAS member states. [19]

However, Safaeimanesh and Jenkins Osabuohien et al., and Seck used econometric methods to quantify the effect of regional economic integration and trade facilitation on trade flows in Africa. Specifically, Olayiwola, et al. they uses the system general method of moments (GMM) with instrumental variable (IV) estimation on a dynamic model of panel data from 15 ECOWAS member states to analyse how trade facilitation and regional economic integration affected intra-regional manufacturing exports, trade facilitation is proxy by the required processing days and documents, found that a 1% decline in the number of days to process the export of agriculture commodities correlated with an expansion of approximately 0.07% of manufacturing exports. They state that Trade facilitation measures would decrease border and documentary compliance time and costs of the administration of international trade. [20]

Regional economic integration and trade facilitation are comprehensive, integrated approaches to reducing the complexity and cost of the trade transactions process, thereby enhancing the trade flow efficiency, transparency and predictability of international trade. [21]

The major fallout from the extant studies reviewed, is that the issue of economic integration and trade facilitation has not been related to intra manufacturing export performance with focus on ECOWAS members. This study stands to address the fallout. [22]

3.0 Methodology

Descriptive, statistical and econometric analyses for the period 2006 – 2020 were employed in order to achieve objectives of the study. The descriptive analysis was considered appropriate in assessing the level of economic integration intra-manufacturing trade among ECOWAS member states. On the other hand, the statistical analysis mostly in the form of correlation analysis was relied on to examine the effect of economic integration process in promoting intra manufacturing

exports in ECOWAS. The econometric analysis was employed to examine the role of economic integration in trade facilitation. The data utilised were sourced from ECOWAS trade data, World Trade Indicators, World Governance Indicators and World Development Indicators. The last three sources of data are available online at World Bank Database (http://data.worldbank.org/). [23]

3.1 Model Specification

As specified by Olayiwola et al., and modify experimental research baseline model for analysis of country i's trade facilitation conditions – can be specified as:

$$\ln(X_{ijt}) = \pi_{ij} + \pi_t + \beta \ln M_{it} + \gamma \ln M_{jt} + aD_{ij} + \delta TF_{ijt} + \varepsilon_{ijt} \quad (1)$$

TF, proxied by the days required to process imports or exports – as a function of political institutions, infrastructure services, and general economic

$$TF = day_{si} = f(Institution, Infrastructure, Macro) \quad (2)$$

Where:

TF = Trade Facilitation proxied by one of the key indicators – number of days taken to p
rocess exports (xdays) or imports (mdays) by country i.

Institution = Political institutional factors proxied by rule of law index and control of corruption index. Data on political institution will be sourced from the World Governance Indicators (WGI). [24]

Infrastructure services = Service infrastructure measured by number of internet users per 100 inhabitants and Telephones lines (fixed + mobile) per 100 inhabitants. Data on Service infrastructure will be sourced from the World Development Indicators (WDI), to include electricity production/consumption as one of the indicators of infrastructure.

Macro = Macroeconomic factors measured by Per capita Real Gross Domestic Products (PCRGDP). Data on macroeconomic factors will sourced from the World Development Indicators (WDI).

In more explicit form, equation (1) in its static form is decomposed into number of days taken to process exports or imports equations and may be re-written as follows:

$$xdays_{it} = \delta_0 + \delta_1 institution it + \delta_2 infrastructure it + \delta_3 macro it + \in \quad (3)$$

$$mdays i = \beta_0 + \beta_1 institution it + \beta_2 infrastructure it + \beta_3 macro it + \varepsilon \quad (4)$$

Where:

$xdays_{it}$ = days to process exports of country i to country t;

$mdays_{it}$ = days to process imports of country i from country t; and

$\in$ and ε are error terms assumed to be.

On the priori ground, we expect: that $\delta_j < 0$ and $\beta_k < 0$. (where j, k=1,2,3), i.e., that processing days go down with better political institutions, infrastructure services, and economic conditions.

Other variables are as previously defined.

Dynamically this becomes

$$xdays_{it} = \delta_0 + \delta_1 xdays_{i,t-1} + \delta_2 institution it + \delta_3 infrastructure_{it} + \delta_4 macro it + \epsilon \quad (5)$$

$$mdays_i = \beta_0 + \beta_1 mdays_{i,t-1} + \beta_2 institution it + \beta_3 infrastructure it + \beta_4 macro it + \varepsilon \quad (6)$$

It is also expected, following theoretical relationships: $\delta_j < 0$ and $\beta_k < 0$. (where j, k = 2,3,4,5), i.e., that processing days also go down from higher processing days in the previous period.

The baseline model for analysis of manufacturing exports (measured as a percentage of a country's GDP1) is a function of the country's manufacturing production, political institutions, infrastructure services, regional integration, and trade facilitation (xdays) can be specified as:

$$manex = f(integration, institution, infrastructure, TF, manpdtn) \quad (7)$$

Where:

$manex$ = manufacturing export and measured as a percentage of country i GDP.

$Integration$ = trade integration variable and is proxy as intra-regional export share of country i.

lnstitutions = political institution variable and is proxied by the regulatory quality (RQ) indicator for country i.

TF = trade facilitation variable which is proxied here by number of days taken to process exports (xdays). This is because the emphasis is on the influence of trade facilitation on manufacturing export.

$manex$ is annual manufacturing production of country i.

$infrastructure$ remains as previously defined.

In more explicit form, eq (6) in its static and dynamic forms may be re-written respectively as follows:

$$manex_{it} = \gamma_0 + \gamma_1 integration it + \gamma_2 institution it + \gamma_3 infrastructure it + \gamma_4 TF_{it} + \gamma_5 manpdtnit + \varphi \quad (7)$$

$$manex_{it} = \pi_0 + \pi_1 manex_{it-1} + \pi_2 integration it + \pi_3 institution it + \pi_4 infrastructure it + \pi_5 TFit + \pi_6 manpdtnit + \omega \quad (8)$$

For manufacturing exports of country i to country t in year y; where φ and ω are error terms assumed to be randomly and normally distributed.

In terms of theoretical relationship, we expect: γ_0, γ_1, γ_2, γ_3, $\gamma_5 > 0$; and $\gamma_4 < 0$ and π_0, π_1, π_2, π_3, π_4, $\pi_6 > 0$; and $\pi_5 < 0$, i.e., that exports go down with xdays but up with everything else.

3.2 Model Estimation Techniques

The gravity model as used by Olayiwola et al. (2015), while Olayiwola et al measures for agriculture export, this study is modified to measures for the effects of REI and trade facilitation on intra manufacturing exports in ECOWAS region. The gravity model is most used to explain trade flows between countries, trade flow from supply potential (proxy by manufacturing exports ratio to GDP) of the exporting states to the market demand potential (proxy by real GDP) of the importing states and the trade cost (proxy by days and

numbers of documents needed to export and import) between the exporting and importing countries. [25]

Classically, the gravity model is specified to show GDP and distance variables augmented with observable trade cost variables (trade agreements, days and numbers of documents needed to export and import) (Olayiwola et al., 2006). To take care of these econometric problem, the study specifies an empirical baseline model as:

$$\ln(X_{ijt}) = \pi_{ij} + \pi_t + \beta_{ln}M_{it} + \gamma_{ln}M_{jt} + aD_{ij} + \delta TF_{ijt} + \varepsilon_{ijt}$$

where Xijt measures trade flow between countries i and j at time t; αij is the dyadic country fixed effects; αt are the time dummies; εijt is the error term and M[i(j) t] is the vector of monadic variables of the exporter (importer) in the gravity equation, and they consist of GDP, MRT and Infrastructure. Included in the set of monadic variables are also political indicators that can affect trade flows. [26]

Again, in using the Generalized Methods of Moments (system GMM). The problem of endogeneity in dynamic panel models is always a major problem. Instrumental Variable (IV) estimation is majorly use as a tool to deal with the problem. But, the IV estimation method is only useful if the instruments are good. In other words, the instruments must be strongly correlated with the potential endogenous variables, and must be genuinely exogenous to the model, so as to over-identify the model to allow tests for exogeneity and excludability. The two commonly used methods in IV estimation are the Two Stage Least Squares (TSLS) and the Generalized Methods of Moments (GMM). The GMM method produces identical results to TSLS for just identified models, but can give more precise estimates with over-identified models. Besides, the GMM method uses internal instruments unlike the TSLS method where there is need to search for suitable external instruments.

The GMM method of IV estimation will therefore be consider appropriate for estimation in this study. Equations (2, 3 and 7) will be estimate using the panel fixed effect estimator and equations and (4, 5 and 8) will be estimate using the system GMM). [27]

4.0 Data Analysis and Interpretation of Results
4.1 Introduction
In this section, the study presents the results of data analysis. The section begins with summary of descriptive statistics to check the quality of the data set. All the variables were transformed into logarithm to correct for heteroscedasticity. It should be noted that higher the values of the trade facilitation variables give better trade facilitation outcomes. Intra- Manufacture trade share of total trade volume within ECOWAS is presented in Table 1. The figures covered in Table are from 2012 to 2020 as reported in ECOWAS trade data.

Table 1, reveals imports from ECOWAS as a percentage of total import value range between 9.6 and 15.5%. Exports on the other hand for ECOWAS as a percentage of total export value are between 13.6 and 21.0%. Looking at the regulatory environment and service infrastructure in Table 2, it is not impressive, the average of regulatory quality for ECOWAS are all negative on a scale of between -2.5 and 2.5 revealing the regulatory quality is very low for the region. Again, the average for ECOWAS is lower to the world average and the average for WTO members. On the other hand, for service infrastructure, internet users per 100 people in the ECOWAS region range between 0.01 and 4.56 compared to the world average which ranged between 1.46 and 23.38 during the years 2014 to 2020. Again, ECOWAS values is very low to those of WTO average 1.54 and 27.39 for the same period. [28]

Table 3 reveals trade facilitation indicators for ECOWAS member countries, as use in the study, they are number of documents required for exports/imports, number of days required for processing exports/imports and cost to export/import. In all the trade facilitation, indicator variables, average figures for ECOWAS member countries are higher than the averages for the world and the WTO members, that is, trade facilitation indicators in ECOWAS member countries is low when compared to the rest of the world and the WTO members. [29]

Among the ECOWAS member states, Niger has the highest number days required for export that is 58 days in 2019, 58 day's double that of the world, WTO and ECOWAS averages, making Niger the least performer among ECOWAS member states. On the other hand, in Senegal it requires13 days to process documents for export in 2019 which is less than the averages for the world, WTO and other ECOWAS member states. For the number of days required to process documents for import, Niger still has the highest number of days at 60 days making Niger the least performer among ECOWAS member states. Again, it doubles the World and WTO averages for the period. Burkina Faso come second with 52 days to process documents for import in 2019. Among ECOWAS member states, the best performer in terms of number of days to process documents for import is Liberia, Cape Verde second and Senegal third with 13, 17 and 18 days respectively. Note, which are less than the averages for the world, WTO and ECOWAS sub-region. For cost of exporting and importing, it cost $3,545.00 to export/import a container in Niger in 2019. Also in Burkina Faso, it cost $2,262.00 to export and $3,380.00 to import in 2019. Niger and Burkina Faso are the most expensive countries to import or export among ECOWAS member states for the year 2019 which is very greater than the averages for the world, WTO and ECOWAS sub-region. Guinea has the lowest cost of exporting $820.00 and Gambia has lowest cost of importing $922.00. Obviously, those cost are less than the averages for the world, WTO and other ECOWAS member states. From the descriptive statistics it is reveal that ECOWAS member states has the highest number of days to process documents for import/export and the highest cost to import/export. The findings have implication which need recommendations on efforts to reduce the bureaucratic of document processing, thus, reducing the cost of importing/exporting which will facilitate the

process of intra-manufacturing trade among ECOWAS member states. Number of documents required for export/import with the number of days to process documents for export/import and manufacturing exports had negative correlation coefficients values between them (about -5.01). That is, reduction in the number of days for processing export/import, lead to increase manufacturing export. 4.2 Econometric Results and Interpretation Table 4 are from two estimators; the fixed effects and the one-step system GMM models for number of days required to process export and import with manufacturing export. Dynamic system GMM estimation has the advantage to make all variables from the regression that are not correlated with the error term (lagged and differenced variables) to be use as valid instruments. So, the optimal set of endogenous instruments are used on the collapse option in the system GMM results. All estimations are check for heteroscedasticity or autocorrelation, irrespective of whether they are considered under fixed effect or the system GMM. In the dynamic panel data models, the lagged dependent variables (xdays and mdays) is use as predetermined endogenous variables. Therefore, the study control for endogeneity of dependent variables in its lagged form as regressors by using internal instruments (lagged levels of the standard differenced equation and lagged differences of the levels equation).

From the result revealed in Table 5, it is obvious from the estimation of rho that almost all the variation in xdays, mdays and manuex are reflection of the differences in number of days needed to process exports/imports and manufacturing exports across ECOWAS member countries. The F- tests residuals are zero indicating significant country level effects, so the use of the pooled OLS estimate is inappropriate. For the system GMM, the Arellano-Bond test for autocorrelation is used on the differenced residuals to take care of the idiosyncratic errors, that is, unobserved factors that impact the dependent variables. [30,31,32]

The results are reveal as AR (2) in table 5. The null hypothesis is rejected at a level of 0.05. If $p-value < 0.05$. But, if the errors are serially uncorrelated, then the null of no serial correlation will be rejected at order 1 but not at higher orders. So it is obvious that there is no evidence of serial correlation at the 5% level of significance making the estimates consistent. The study uses Sargan statistic to test for instrument validity by comparing the number of instruments in each case and it related parameters. In the one-step, non-robust system GMM estimation, the minimized value of the Sargan statistic is best applicable for the one-step system GMM criterion function. Here, the null hypothesis that the

Table 4.1 Bankruptcy Costs

population moment condition is valid is not rejected if $p-value > 0.05$. [34]

The summary statistics reveals that the one-step system GMM dynamic panel models for the 15 ECOWAS member countries have 12 instruments and 10 parameters each. This represents a total of 2 over-identifying restrictions in each case. There are 15 instruments and 11 parameters representing 4 over-identifying restrictions. So, the Sargan statistic cannot reject the Over-Identifying Restrictions (OIR), but confirms that the instrument set is valid. [35]

The F-statistic represent counterpart of the Wald (Chi Squared) statistic which measure the goodness of fit of the estimated models, the values in the specifications are reasonably satisfactory at 1% level of significance in each specification. An indication that all the exogenous variables jointly explained significantly the trade facilitation process and manufacturing exports across ECOWAS member countries over the study period. [36]

The fixed effect models estimations results are consistent with the theoretical relationship expectations and the results reveals that all explanatory variables significantly explain variations in the number of days required to process export (xdays) across the ECOWAS member countries with the exception of the political institutional variables (rule of law and control of corruption), Of note, the trade integration variable, xshare is negative and is highly significant at the 1% level. That is100 % increase trade integration variable will lead to about 23 % reduction in the number of days required to process export across the ECOWAS member countries given greater trade facilitation. [37]

Again, the macroeconomic variable, per capita GDP is negative and is highly significant at the 1 % level. The coefficient of this regressor reveals that a 100 % increase in per capita GDP will lead to about 105 % reduction in xdays for trade flow, that is greater trade facilitation. The service infrastructure variables itnet and tel are again negative and are significant at the 5 % level. That is, a 100 % increase in the number of internet users per 100 inhabitants will result in about 18 % reduction in xdays. And a 100 % increase in the number of telephone users per 100 inhabitants will result in about 6 % reduction in xdays that is greater trade facilitation across the ECOWAS member countries. The constant term of 96.46 is highly significant at the 1 % level, meaning that in the absence of all the explanatory variables in the models, it will require about 96 days to process export across the ECOWAS member countries. [38,39,40,41]

	N	Minimum	Maximum	Mean	Std. Deviation
DebtTotalAss	400	.01	8.34	.6611	.60882
WkingTotalAss	400	-7.34	5.93	.2546	.70037
Valid N					

Source: Field Data 2019
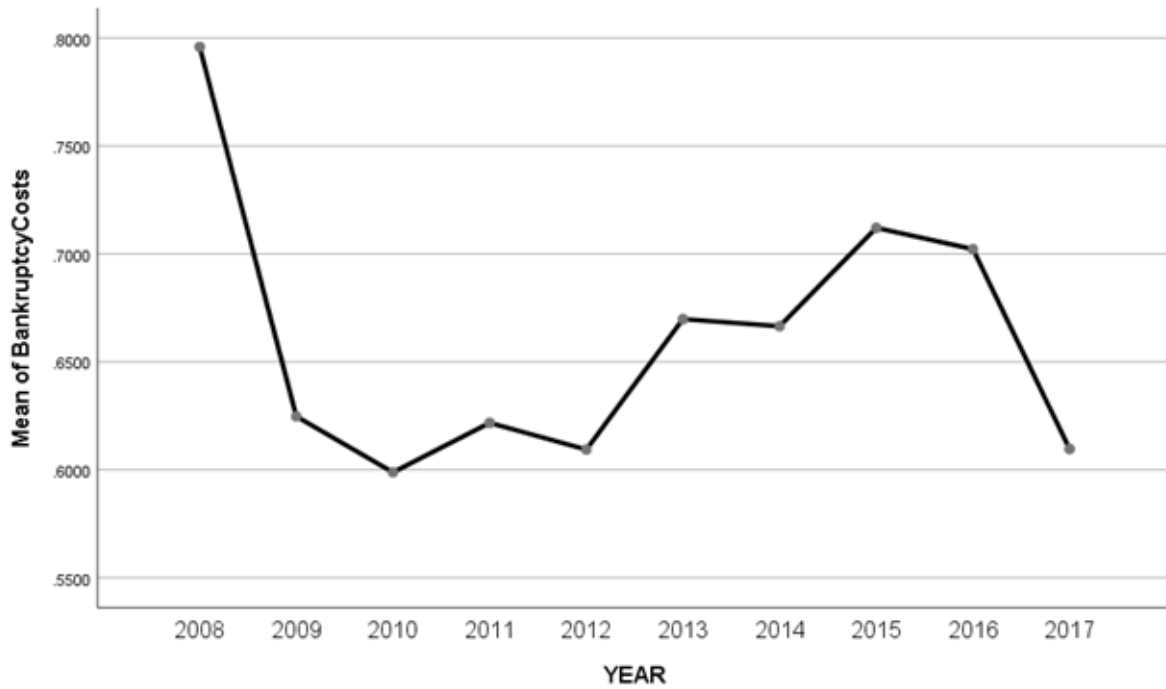
Figure 4.3: Bankruptcy Costs Trend

Table 4.2 Correlation between Bankruptcy Costs and Value of Firms

		FirmValue	**Bankruptcy Costs**
FirmValue	Pearson Correlation	1	.129**
	Sig. (2 tailed)		.010
	N	400	400
Bankruptcy Costs	Pearson Correlation	.129**	1
	Sig. (2 tailed)	.010	
	N	400	400

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Field Data 2019

Table 4. 3 Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.129a	.017	.014	224.30607106

Source: Field Data 2019

Table 4.5 ANOVA on Bankruptcy Costs and Value of Firms

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1 Regression	774628.042	2	387314.021	7.850	.000b
Residual	19588113.952	397	49340.337		
Total	20362741.995	399			

Source: Field Data 2019

To process import across the ECOWAS member countries (mdays)) most of the explanatory variables meet the expected negative sign. But, only the macroeconomic variable (PCGDP) and the service infrastructure variable (ITNET) are significant at the 1 and 10 % levels respectively. From the results, it is obvious that a 100 % increase in PCRGDP will lead to about 121 % reduction in mdays and a 100 % increase in ITNET will lead to about 19 % reduction in mdays. The constant term of 102.26 is highly significant at 1 % level, that is, when all the explanatory variables are zero, it takes about 102 days to process import across the ECOWAS member countries.

The political institutional variables also meet theoretical expectation but it is statistically insignificant. That is, there is a need to strengthen political institution across the ECOWAS member countries for greater and more significant role trade flow across the ECOWAS member countries.

The manufacturing exports estimation results are very consistent with the theoretical expectation. The trade integration variable (xshare) meet the theoretical expectation of positive sign but it not statistically significant. That is, there is need for more effort to generate greater trade flow to boost manufacturing exports across the ECOWAS member countries.

The service infrastructure variables itnet and tel are significant at the 5 % level but only tel is meet priori expectations. That is a 100 % increase in the number of telephone users across the ECOWAS member countries will increase manufacturing exports to the tune of about 4 %. The trade facilitation indicator (xdays) meet priori expectations, it is very significant at 1% level. That is a 100% reduction in the number of days required to process documents for exports increases manufacturing exports across the ECOWAS member countries to tune of about 7%.

The priori expectations are met for manufacturing production and are statistically significant at 10% level. The result for manufacturing production variable reveals a 10% increase in manufacturing production, increases manufacturing exports across the ECOWAS member countries to the tune of about 72%. The political institution variable, regulatory quality did not meet the a-priori expectations and it is statistically insignificant. That is a reflation of poor regulatory environment cause by weak institutions across ECOWAS member states.

The system GMM estimation are not impressive. But, some variables meet the a-priori expectations, however the variables are statistically insignificant. Revealing, that trade integration variable, xshare and the lagged xdays significantly explain variations in xdays at the 1 and 10% levels respectively. That is a 100% increase in xshare, reduces xdays to the tune of about 12%, thus, increases trade facilitation across the ECOWAS member countries. For the number of days required to process import across the ECOWAS member countries, only the lagged dependent variable, L.mdays and the constant term are significant. Again, some other independent variables meet the a-priori expectations.

Of note, results of the manufacturing exports estimation are statistically significant and meet the a-priori expectations. All independent variables in the estimation are statistically significant either at the 1 or 5%, only RQ that is statistically insignificant. The trade integration indicator, xshare is positive and reveals that a 10% increase in the intra-regional export share of total exports will produce about 1.18% increase in manufacturing exports across the ECOWAS member countries. The itnet variable did not meet the a-priori expectations but tel meet the a-priori expectations. That is a 100% increase in the number of telephone users increases manufacturing exports across the ECOWAS member countries to the tune of about 4.6%.

The trade facilitation variable, xdays meet the a-priori expectations, that is a 10% reduction in the number of days required to process exports increases in manufacturing exports across the ECOWAS member countries to the tune of about 0.8%. As expected, the macroeconomic factor measured by manufacturing production is positively signed and also statistically significant at 10% level. Revealing a 10% increase in manufacturing production increase in manufacturing exports across the ECOWAS member countries to the tune of about 86%. The regulatory quality variable meets the a-priori expectations and it is statistically insignificant due to political institutions weakness that do not promote manufacturing exports across the ECOWAS member countries.
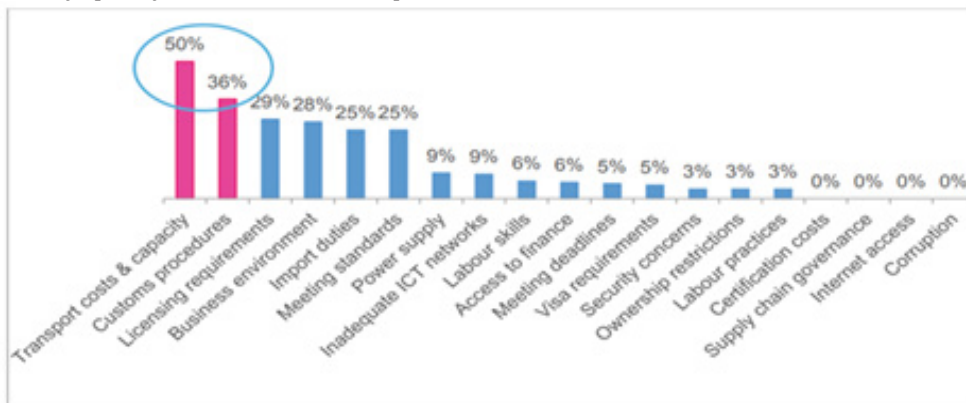
Figure 2: The main barriers in Supply value chains
Source: OECD/WTO Aid for Trade Questionnaire 2018.

Table 1: ECOWAS Member States Export and Import within the Group

	Imports from ECOWAS (as % of total imports value)						Exports from ECOWAS (as % of total Exports value)					
	2010	2012	2014	2016	2018	2020	2010	2012	2014	2016	2018	2020
Benin	11.0	13.7	19.9	26.7	24.9	39.4	13.5	24.0	21.9	22.0	21.3	18.3
Burkina Faso	32.2	22.0	87.8	23.8	32.2	25.6	23.8	27.2	44.6	27.6	25.9	25.8
Cape Verde	0.1	3.0	0.5	0.4	14.9	1.6	1.4	2.1	8.1	7.2	4.1	1.5
Cote d'Ivoire	20.8	24.6	17.5	24.8	28.7	26.1	15.0	20.7	16.2	25.7	5.9	32.8
Gambia	52.1	8.0	11.1	55.1	26.5	19.8	7.3	10.7	8.6	15.7	10.0	13.4
Ghana	10.4	7.6	11.6	9.7	32.1	7.8	9.9	15.3	18.6	17.5	10.4	14.1
Guinea	1.4	1.6	9.8	27.4	10.1	6.1	8.9	18.5	8.8	25.4	3.3	3.5
Guinea Bissau	...	0.1	0.1	1.5	0.1	...	...	22.9	18.8	53.9	39.2	...
Liberia	...	...	...	...	...	...	...	...	...	...	...	...
Mali	19.2	13.0	9.1	10.4	9.0	13.2	29.4	33.7	36.4	35.5	46.6	41.2
Niger	39.5	45.1	40.8	30.3	31.3	45.8	30.8	34.1	31.5	29.2	23.5	18.8
Nigeria	6.5	4.5	4.6	4.0	4.2	8.0	0.5	4.3	2.4	6.1	2.3	3.3
Senegal	16.9	17.1	26.5	30.0	37.4	31.9	10.2	19.9	22.8	21.9	17.3	26.2
Sierra Leone	33.0	65.3	28.2	11.6	47.4	91.9	26.7	34.4	28.5	33.6	87.4	44.3
Togo	16.0	46.2	46.7	53.5	60.0	68.7	19.9	14.2	14.1	13.3	12.2	14.3
ECOWAS	11.5	9.6	10.2	10.6	12.1	15.5	14.7	16.2	13.6	20.9	17.5	21.0

Source: Compiled from ECOWAS Trade Data and World Trade Indicators

Table 2: Indicator of Regulation and Infrastructures

		Regulatory Quality						Internet users (per 100 people)					
		2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
1	Benin	-0.11	-0.13	-0.40	-0.50	-0.44	0.46	0.05	0.23	0.70	1.18	1.54	1.85
2	Burkina Faso	-0.32	-0.08	-0.11	-0.35	-0.44	-0.32	0.04	0.08	0.20	0.39	0.63	0.92
3	Cape Verde	-0.26	0.12	-0.23	-0.30	-0.15	-0.02	0.47	1.82	3.52	5.32	6.81	20.61
4	Cote d'Ivoire	-0.07	-0.42	-0.48	-0.99	-0.94	-0.93	0.06	0.23	0.50	0.85	1.52	3.21
5	Gambia	-0.36	-0.23	-0.55	-0.37	-0.40	-0.44	0.21	0.92	1.80	3.31	5.24	6.88
6	Ghana	-0.10	0.00	-0.40	-0.31	-0.02	0.08	0.03	0.15	0.83	1.72	2.72	4.27
7	Guinea	-0.56	-0.54	-0.95	-0.91	-1.03	-1.15	0.01	0.10	0.40	0.51	0.64	0.92
8	Guinea-Bissau	-1.34	-1.28	-0.97	-1.14	-1.00	-1.22	0.02	0.23	1.02	1.81	2.06	2.35
9	Liberia	2.06	1.86	1.79	1.86	1.40	1.32	0.00	0.02	0.03	0.03	..	..
10	Mali	-0.28	-0.17	-0.37	-0.46	-0.39	-0.33	0.02	0.15	0.24	0.44	0.74	0.98
11	Niger	-0.68	-0.61	-0.66	-0.56	-0.60	-0.52	0.00	0.04	0.13	0.19	0.29	0.55
12	Nigeria	-0.93	-0.67	-1.23	-1.33	-0.99	-0.62	0.03	0.06	0.32	1.28	5.53	7.27
13	Senegal	-0.19	-0.07	-0.20	-0.26	-0.28	-0.29	0.08	0.40	1.01	4.39	5.61	8.35
14	Sierra Leone	-1.29	-1.37	-1.29	-1.02	-1.07	-0.86	0.01	0.12	0.18	0.20	0.23	0.25
15	Togo	-0.52	-0.67	-0.72	-0.77	-0.99	-1.05	0.31	1.91	3.60	3.78	5.21	5.42
ECOWAS Average		-0.60	-0.53	-0.69	-0.74	-0.68	-0.63	0.09	0.43	0.97	1.69	2.77	4.56
WTO Average		0.20	0.19	0.17	0.16	0.17	0.19	4.32	8.99	15.31	20.01	24.34	27.39
World Average		-0.03	-0.03	-0.04	-0.02	-0.01	-0.01	3.99	8.21	13.89	18.66	23.02	23.38

Source: Compiled from World Trade Indicators

Table 3: Trade Facilitation Indicators by country

Country	Distance to frontier	Documents to export (number)	Time to export (days)	Cost to export (US$)	Documents to import (number)	Time to import (days)	Costto export (US$)
Benin	55.67[23]	7.8[30]	30.4[31]	1043.6[11]	8.7[27]	32.9[27]	1401.1[16]
Burkina Faso	28.72[39]	10.5[50]	42.6[42]	2319.8[41]	12.5[49]	50.8[41]	4057.6[45]
Cape Verde	69.9[6]	7[14]	19.9[11]	1084.7[13]	7[13]	19.3[6]	943.5[8]
Cote d'Ivoire	44.75[34]	9[42]	24.2[19]	1632.7[30]	13[50]	38[29]	2176.9[33]
Gambia	71.8[35]	6[7]	20.8[12]	1074.1[12]	6[3]	21[9]	770.6[3]
Ghana	56.2[21]	6[7]	22[13]	776[6]	7[13]	42.3[35]	1146.5[11]
Guinea	52.3[28]	7[14]	35[36]	856[8]	8[21]	31.8[26]	1422[18]
Guinea-Bissau	64.42[10]	6[7]	25.8[23]	1476.2[27]	6[3]	22.8[12]	2031.8[32]
Liberia	47.74[31]	10[47]	17.4[8]	1267.2[23]	12[46]	13.4[20]	1273.2[14]
Mali	43.25[35]	6.4[12]	33.2[33]	2082.9[38]	11.4[42]	46.8[38]	3373.8[42]
Niger	26.01[45]	8[32]	58.5[51]	3402.5[49]	10[36]	60.9[50]	3466.9[43]
Nigeria	37.93[36]	9.1[45]	26.08[24]	1232.6[21]	13.4[51]	41.28[33]	1463.9[21]
Senegal	65.3[9]	7.5[27]	13[4]	1144.4[16]	7.8[20]	18.9[4]	1992[30]
Sierra Leone	54.2[24]	7.3[26]	27.2[26]	1216.8[20]	8[21]	31[23]	1334.8[15]
Togo	65.3[48]	6.2[11]	25[22]	893.7[10]	7.3[17]	30.1[19]	1084.6[10]

Source: Authors' compilation from World Trade Indicators
Note: Superscripts are rankings of countries for the indicators used.

	No. of documents for export	Days Required for exporters	No. of documents for import	No. of Days for import	Cost to export a container (USD)	Cost to import a container (USD)
ECOWAS Average	7.56	28.60	8.07	33.73	1490.70	1864.30
World Average	7.15	24.68	7.51	27.48	1363.40	1577.70
WTO Average	7.01	22.15	7.23	24.76	1302.00	1512.50

Source: Author's compilation from World Trade Indicators

Table 4: Estimated Results

Dependent Variable	xdays (1)	mdays (2)	manex (3)	xdays (4)	mdays (5)	manex (6)
Estimator	Fixed effects	Fixed effects	Fixed effects	System GMM	System GMM	System GMM
Regressors						
l.xdays				1.329156* (6.51)		
l.mdays					1.233* (9.47)	
xshare	-0.233* (-3.15)		0.025 (0.79)	-0.119*** (-1.91)		0.118** (2.28)
mshare		0.031 (0.23)			-0.025 (-0.24)	
RL	-5.211(-0.72)	-8.275 (-0.86)		-0.662 (-0.15)	-1.274 (-0.28)	
CC	-3.338 (-1.09)	-2.388 (-0.56)		-0.447 (-0.09)	-0.572 (-0.11)	
PCRGDP	-1.054* (-4.52)	-1.216* (-3.72))		0.028 (0.45)	0.027 (0.47)	
ITNET	-0.181** (-2.27)	-0.193*** (-1.73)	-0.099** (-2.44)	0.094 (0.89)	0.052 (0.67)	-0.121** -2.02)
TEL	-0.064** (-2.26)	-0.031 (-0.79)	0.042** (2.48)	0.049 (0.88)	0.075 (1.34)	0.046** (2.30)
xdays			-0.071* (-3.02)			-0.086* (-2.95)
manpdtn			7.22*** (1.69)			8.65*** (1.65)
RQ			-0.674 (-0.43)			1.219 (0.89)
CONS	96.462* (6.70)	102.265* (5.36)	5.675** (2.65)	-16.884 (-1.39)	-20.209** (-2.41)	1.117 (0.64)
No. of Group	13	13	15	12	12	15
Instruments				12	12	12
Time dummy				Yes	Yes	Yes
rho	0.983	0.980	0.904			
R^2	0.366	0.126	0.003			
F-stat (P-value)	9.03 (0.000)	4.34 (0.003)	5.48 (0.0001)	25.30 (0.000)	28.94 (0.000)	8.89 (0.000)
F-stat (residual) (P-value)	12.40 (0.000)	21.05 (0.000)	25.81 (0.000)			
AR(2) (p-value)				(0.812)	(0.450)	(0.501)
Sargan (p-value)				(0.855)	(0.181)	(0.064)

Notes: t-statistics are reported in parenthesis below each coefficient
* (**) *** indicate significant at 1, (5) and 10 % level respectively.

5.0 Conclusions and Recommendations

This study examined the effect of economic integration and trade facilitation promoting intra-manufacturing exports across the ECOWAS member countries within the framework of the gravity model. Annual data covering the period 2015–2020 for a sample of 15 ECOWAS member countries. Several trade facilitation indicators, namely, time to export, cost to export, number of documents to export, time to import, cost to import, number of documents required to import. From the results presented and discussed above, some implications can be drawn as follows: First, the study reveal from export estimation that the economic integration indicator meets the a-priori expectations, and statistically significant at 1%. That is economic integration has the capacity of facilitating intra-trade flow across the ECOWAS member countries.

Meaning, if member states increase their political will for the agenda of economic integration, these will in turn increase trade facilitation and reduce number of days that will be required for preparing documents for export. So, there need for greater commitment to the issue of economic integration across the ECOWAS member countries.

Secondly, lag trade facilitation process in the present will positively and significantly facilitate trade flow in the coming year, the level of macroeconomic performance is crucial in determining the level of trade facilitation across the ECOWAS member countries. Given support to macroeconomic convergence criteria that when economies in a given sub-region are tending towards convergence, the extent of trade facilitation will be enhanced (McCarthy, 2002) cited in Olayiwola et al. 2015. Meaning, improvement in economic growth of

the integrating economies (ECOWAS member countries for instance) will have significant influence in facilitating trade. Again, service infrastructure, particularly, provision internet infrastructure significant influences trade facilitation. With the advancement in information and communication technology (ICT) there is need for ECOWAS member states to use ICT in its operations process to facilitate thereby reducing the bureaucratic delay that are associated with the time required to prepare documents for export. Institutional quality indicators particularly control of corruption and rule of law meets the a-priori expectations, but are statically insignificant. That is strengthening the institutional framework across the ECOWAS member countries reference to curbing corruption and adherence to the rule of law increases trade flows. So, there is need to fight corruption to increase the process of trade facilitation. For role of economic integration and trade facilitation on manufacturing exports, economic integration has positive influence on trade flow but it is statistically insignificant. Meaning trade integration should the major objective economic integration so as to promote manufacturing exports across the ECOWAS member countries.

For the trade facilitation indicator, it meets the a-priori expectations and it is highly significant. That is policies need to be designed to improve trade facilitation across the ECOWAS member countries as it will significantly help increase manufacturing exports across the ECOWAS member countries. Again, manufacturing production has positive, significant impact on manufacturing export. So, there is need for policies that will increase the level of manufacturing production to improve the level of manufacturing exports across the ECOWAS member countries.

Succinctly, economic integration and trade facilitation across the ECOWAS member countries have a vital role to play in promoting the performance of intra-manufacturing exports in the region. So, the ECOWAS regional manufacturing policy initiative and the ECOWAS free trade area need to be strengthened in order to achieve the goals of regional integration and improved trade facilitation, thus, increase intra-manufacturing exports performance.

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