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HOW INDUSTRIAL PRODUCTION AFFECTS CARBON EMISSIONS IN THE ARAB COUNTRIES VS EUROPEAN UNION COUNTRIES DURING THE PERIOD 1990-2020

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ABSTRACT
The study aimed to investigate the relationship between the industrial sector production and carbon emissions in the European Union countries versus the Arab countries group. Using the methodology of econometrics during a time series of nearly 30 years, by applying Granger Causality Test, then the Autoregressive Distributed Lag (ARDL) Model to investigate the long-run relationship. The study found a positive causal relationship between industry and Co2 emission in European countries, but each of the two variables also causes the other one. For Arab countries, the result shows that ARABINDUST does not Granger Cause CO2ARAB, this is a logical result as the size of the industrial sector and production in the Arab countries is still below the level that raises carbon emissions, and on the contrary in the case of European countries, where the volume of industrial production increases and carbon emissions rise with it, this result is consistent with Ghana Eric Abokyi & others(2019). The results also showed that for Arab countries as well as European countries, the relationship between industrial production and carbon emissions is a positive relationship in the long run. Carbon emissions increases with every increase in industrial production, which is a logical result that matches the actual reality to a large extent so far, this result is consistent with Zhang Xiaoqing & Ren Jianlan(2011). The study recommends that dedicated effort is needed to reduce industrial emissions focusing on the industries that contribute the most share (>70%) of emissions, including chemicals, cement, and iron and steel petrochemicals, this is consistent with Tamaryn Brown & others (2012). On the other hand, quantifying the emissions from industrial processes is critical for understanding the global carbon budget and developing a suitable climate policy, and this is consistent with Zhu Liu(2015).
KEYWORDS: Industry- Industrial production- Carbon Emissions- Arab Countries- European Union Countries

INTRODUCTION
According to the 2007 IPCC Fourth Assessment Report, the main source of greenhouse gases is the burning of fossil fuels, which release 95.3% of the total CO2. Many domestic scholars discuss the relationship between economic growth and energy consumption as well as CO2 emissions from the perspective of qualitative and quantitative studies. However, fewer scholars analyze the relationship between a low-carbon economy and industrial restructuring, and the studies often focus on qualitative analysis. In this study, the relationship between Co2 emissions, industrial production measured by added value in the industrial sector, in the Arab countries and EU countries are examined.
Meanwhile, according to US EPA (2016), fossil fuel consumption is the primary source of

emissions of CO_2 globally. The impact of CO_2 from fossil fuels is also supported empirically (Kwakwa and Alhassan, 2018); (Nnaji et al., 2013).

This study aims to test the hypothesis: H0: Industrial production is the main responsible for carbon emissions, applying to the Arab countries compared to the European Union countries during the period 1990-2020.

H1: Industrial production is not the main responsible for carbon emissions, applying to the Arab countries compared to the state of the European Union countries during the period 1990-2020.

The study adopts the methodology of econometrics by applying Granger Causality Test, then the Autoregressive Distributed Lag (ARDL) Model to investigate the long-run relationship, after testing the stationarity of the data series.

Engle-Granger test is often used to test the cointegration relationship between two variables and includes two-step, the first step is cointegration regression, Granger causality tests are further used to verify the relationship between the (CO_2) variable and (Indst) variable in the selected countries.

The study used annual time series data covering the period 1990–2020 from World Bank Data Indicators WDI (2021) version. This period was used since data on emissions of CO_2 in the Arab countries and EU countries were available. Data was collected on variables of interest such as CO_2 emissions (metric tons per capita), CO_2 emission (for each dollar from GDP in 2021 prices), CO_2 emissions from fossil fuel as a percentage of the total CO_2, Industrial sector value added (As a percentage of GDP), Industrial sector value added (In dollar 2010 prices).

LITERATURE REVIEW

From the energy consumption point of view, (Marshall Wise&others, 2007) in their study provides an overview and scenario findings from the created long-term model of energy consumption in the industrial sector in the United States, which included as a module in the ObjECTS-MiniCAM integrated assessment model. This new industrial model permits the evaluation of the industrial sector's response to climate policy within a framework of global modeling and focuses on energy technology and fuel choices over a 100-year time frame. The study explained that the definition of an aggregate level that could capture the dynamics of industrial energy demand responses to prices and regulations while remaining tractable over a long time horizon was a major problem.

While from an industrial production point of view, (Emilie Alberola & others,2008) analyzed the impact of industrial production for industries covered by the EU Emissions Trading Scheme (EU ETS) on spot pricing for emissions allowances during Phase I is critically examined in this article (2005-2007). In order to gauge economic activity in the industries covered by the EU ETS, sector production indices are first utilized as a stand-in. To determine how much an installation is restricted by the EU ETS, a ratio of allowance allocation to baseline CO_2 emissions is utilized. The study demonstrates that variations in carbon prices respond to industrial production in three sectors covered by the EU ETS: combustion, paper, and iron, as well as energy price forecasting mistakes and extreme weather occurrences.

While (Zhang Xiaoqing & Ren Jianlan, 2011) focused in their study on discovering the quantifying relationship between CO_2 emissions and industrial structure adjustment, using Cointegration tests the study found that there exists a long-term stable equilibrium relationship between industrial structure and CO_2 emissions in Shandong Province, and applying Granger causality tests show that the industrial structure is the reason for the change of the emissions, but the latter is not a reason for the former. By building the decomposition model of CO2 emissions, the contribution of economic growth, industrial structure, and technical efficiency to the growth of CO2 emissions are measured and three important conclusions are drawn: (1) the change in the total economy is the most important factor to promote the emissions;(2) the change in industrial structure has the different contribution to the emissions in different stages, in 1994-99 and 2006-09.

(Tamaryn Brown & others, 2012), found that an ongoing, dedicated effort is needed to reduce industrial emissions and the alternatives for lowering industrial CO2 are also described in this briefing paper. Focusing on the industries that contribute the most share (>70%) of emissions, including chemicals, cement, and iron and steel petrochemicals. The article provides a summary of industrial mitigation, technologies, including those that relate to specific processes as well as spread over the entire sector. The potential for these to reduce technology, their affordability and adoption challenges, as well as the policies to remove these obstacles are covered. The paper found that there still needs to be a focused effort to improve emissions measurements and benchmarking in order to understand the full extent of energy efficiency and emissions abatement opportunities. Barriers to the adoption of cross-cutting energy efficiency improvements should be identified and measures should be put in place to overcome them. These barriers are often 'social' such as organizational and managerial structures or lack of knowledge rather than financial. Energy efficiency improvements are often at low or even negative cost and could make significant CO2 savings. The substitution of fuels and raw materials with biomass and waste should be incentivized through appropriate mechanisms such as a carbon price, subsidies, or regulations

(Zhu Liu, 2015) tried in his study 'National carbon emissions from the industry process: Production of glass, soda ash, ammonia, calcium carbide, and alumina' to discover the relationship between industrial production and carbon emissions in China as one of the biggest industrial countries all over the world, by estimating the carbon emissions resulting from the manufacturing of 5 major industrial products, and calculate the emissions from 5 types of major industry production processes using the approach of based on bottom-up data sources, he found that quantifying the emissions from industrial processes is critical for understanding the global carbon budget and developing a suitable climate policy.

On the other hand, (Korhan Gokmenoglu & Others,2015) tried to investigate the same relationship in Turkey in the long run, and using the Granger causality test, they found that there is reveal a unidirectional relationship between financial development to carbon emissions.

(Robbie M. Andrew, 2018), found that estimating global process emissions from cement production is fraught with problems of data availability and analysis required strong assumptions. Over the last 3 decades, countries around the world have increasingly produced cement with lower clinker ratios, and the use of cement production data with constant emission factors has become untenable. The new global cement emissions database presented here increases the reliance on official and reliable data sources and reduces the reliance on assumptions compared with previous efforts. It is intended that the database will be used in the global carbon budget and updated annually with both data updates and methodological improvements. As more countries estimate their emissions and report them to the UN Climate Change Conference (UNFCCC) in detail, more data will replace assumptions in producing datasets. Work is still required in improving estimates of cement emissions from both China and India, in particular, as these are the world's two largest cement producers and official time-series estimates are lacking.

For developing nations like Ghana (Eric Abokyi & others, 2019) focused on the influence of fossil fuels on CO2 emissions are uncommon. This study used the ARDL method. examining the viability of using structural breaks and the Bayer-Hanck joint cointegration method the EKC hypothesis in the dynamic relationship between industrial development and carbon dioxide emissions (CO2) in Ghana, reflects the role of fossil fuel usage and economic growth. The elements are discovered to be cointegrated, and the long-run and short-run parameters both displayed signs of industrial expansion and CO2 emissions have a U-shaped relationship, which was further validated. by the U-test of Lind and Mehlum. In the short run, a single-direction causality runs from the use of fossil fuels to CO2 emissions. The study promotes effective policy implementation. The short-run causality showed a one-way causal relationship connecting the use of fossil fuels and CO2 emissions. The report promotes effective and low-carbon emission technologies for policy goals.

(Mabutho SIBANDA &Hlengiwe NDLELA, 2020) tried also to investigate the relationship between agriculture/ industrial output and carbon emission in South Africa using annual frequency data for the 1960-2017 data set, applied the Autoregressive Distributed Lag (ARDL) technique, they found that industrial output had no effect on carbon emission, but agriculture output negatively influenced by carbon emission and industrial output, then adversely affecting food security.

(Md. Zahidul Islam& others, 2017) focus on environmental consciousness and how it relates to economic growth. Since environmental degradation depends on sustainable growth, researchers have argued over the years that both should be minimized. This study examines the relationship between economic development, total energy consumption, and industrial production index growth in Bangladesh from 1998 to 2013 and environmental deterioration (using carbon emissions as a proxy for degradation). In order to examine how these variables affect carbon emission and vice versa, this study use the Vector Autoregression (VAR) Model and variance decomposition of VAR. The results of the VAR model indicate that there is a significant association between industrial production and GDP per capita and carbon emissions. Additional research using variance decomposition reveals that industrial output is consistently impacted by carbon emissions.

(Kelvin O. Yoro & M.O. Daramola, 2020), in the study of CO2 emission sources, greenhouse gases, and the global warming effect, the literature reviewed in this study shows that researchers have put in tremendous efforts to reduce the emission of anthropogenic CO2 into the atmosphere, this study confirms that different techniques such as adsorption, absorption, and membrane separation have been proposed and tested in the literature for CO2 capture. The available CO2 capture techniques are highly energy and material intensive in nature, making CO2 capture an expensive technology in many countries. However, this paper suggests that the application of process integration techniques through heat and mass exchanger network synthesis can be extended to reduce high energy and material requirements in the aforementioned CO2 capture techniques. In addition, the research efforts documented in this study reveal that human activities such as power generation, cement production, and transportation are the major contributors to greenhouse gas emissions and global warming. This study establishes that the combustion of fossil fuels (e.g., coal) for power generation may still continue with the incorporation of CO2 capture mechanism to the existing power plants.

(Muhammad Muhitur Rahman & Others, 2022), argue that The Kingdom of Saudi Arabia has been experiencing consistent growth in industrial processes and product use (IPPU). The IPPU's emission has been following an increasing trend. This study investigated time-series and cross-sectional analyses of the IPPU sector. Petrochemical, iron and steel, and cement production are the leading source categories in the Kingdom. In recent years, aluminum, zinc, and titanium dioxide production industries were established, The emissions from IPPU without considering energy use was 78 million tons of CO_2 equivalent (CO_2eq) in 2020, and the cement industry was the highest emitter (35.5%), followed by petrochemical (32.3%) and iron and steel industries (16.8%). A scenario-based projection analysis was performed to estimate the range of emissions for the years up to 2050. The results show that the total emissions could reach between 199 and 426 million tons of CO_2eq in 2050. The Kingdom has started initiatives that mainly focus on climate change adaptation and economic divergence with mitigation co-benefits, the mitigation opportunities for this sector include (i) energy efficiency, (ii) emissions efficiency, (iii) material efficiency, (iv) the re-use of materials and recycling of products, (v) intensive and longer use of products, and (vi) demand management.

CO_2 emissions inventory and its uncertainty analysis of China's industrial parks were discussed by Jian Zhang, Jingyang Liu Li Dong, and Qi Qiao(2022), Industrial parks are the key to achieving the carbon peak and neutrality in industrial sectors. Establishing the CO_2 emissions inventory is the first step to achieving industrial parks' carbon peak. In this study, a comprehensive CO_2 emissions inventory was established for industrial parks, including three parts: energy consumption, industrial process, and waste disposal. The study considered scope 1, 2, and 3 emissions and established an uncertainty analysis framework. By dividing the emissions into scopes 1, 2, and 3, scope 2 could be identified as the largest emissions source. In addition, the study conducted inventory uncertainty analyses that incorporated activity levels, emissions factors, and unspecific factors. Overall, these results may promote the establishment of greenhouse gas accounting standards for Chinese industrial parks.

(Pipin KURNIA & others, 2020) look at four different aspects of firm value, including the impact of carbon emission disclosure on firm value, the impact of good corporate governance on firm value, the mediating role of financial performance between carbon emission disclosure and firm value, and the mediating role of financial performance between good corporate governance and firm value. 43 mining, agricultural, and manufacturing businesses are represented in the research sample. between 2015 and 2017 on the Indonesian Stock Exchange. A Global Reporting Initiative Series of Environmental Aspect indicator is used to gauge carbon emission disclosure. Scores for shareholder rights, boards of directors, outside directors, audit committees, internal auditors, and investor disclosure are used to gauge a company's level of corporate governance. Return on investment, a financial performance metric.

Before the UN Global Climate Summit in Paris, (Bakhyt K. Yessekina, 2015) examines current trends in global warming, GHG pollution, and discussions about the responsibilities of developed and developing countries in this article. The article discusses decarbonization as a national policy that includes sophisticated instruments for increasing energy efficiency, lowering CO_2 levels, and creating emissions trading networks. The author emphasizes that because Kazakhstan and Turkmenistan have the greatest potential to emit greenhouse gases (GHGs) in the region, they should be included in the UNFCCC and participate in the global effort to build national

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decarbonization programs. These policies enable these nations to participate in the global carbon trading market, access foreign financial resources, and substantially lower CO_2 emissions in the area.

Hence, all previous studies and literature in the field of studying the relationship between industrial production and carbon dioxide emissions did not agree on the direction of the relationship between the two variables absolutely, and none of them dealt with the study of the causal relationship between the two variables in the group of European Union countries compared to the group of Arab countries. The current study should be a good scientific addition in the field of analyzing the direction and strength of the relationship between industrial production and carbon emissions in two large blocs of countries, one of them is a model for developed countries and the other is a model for developing countries. The current study uses a mixture of research methods that were used in previous studies.

RESEARCH METHODS AND DATA SOURCES

DATA

The variables were chosen to examine how industrial production affects carbon emissions in the Arab countries Vs European Union Countries which are listed in table (1) below, during the period 1990- 2020. Table (1) provides a definition of each variable that is part of the econometric model. All of the annual statistics included in the model were gathered from world bank tables and span the years 1990-2020. The analysis of the data was conducted using E-Views 12.

Table(1): Economic variables included in the model.

Name	Code	Data Source	Definition
Industry (including construction), value added (% of GDP)	• EUINDUST (For Eu industry) • ARABINDUST(For Arab country's industry)	World Bank Database	This includes value added in mining, manufacturing (which is also given as a separate subgroup), construction, electricity and water supply, and gas. Value added is the net output of a sector after adding all outputs and subtracting intermediate inputs. It is calculated without making any deductions for the depreciation of manufactured assets or the depletion or degradation of natural resources. The data are expressed in constant 2010 US dollars.
CO2 emissions (kg per US$ of GDP in 2010 value)	• EUCO2 (For Eu co2 emissions) • ARABCO2 (For Arab countries co2 emissions)	World Bank Database	Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during the consumption of solid, liquid, and gas fuels and gas flaring

(Source: World Bank national accounts data, and OECD National Accounts data files) & .(https://tradingeconomics.com/united-states/co2-emissions-kg-per-ppp-dollar-of-gdp-wb-data.html)

METHODOLOGY

The study aims to determine how Industry (including construction) value added (% of GDP) affected CO_2 emissions (kg per US$ of GDP in 2010 value) in the Arab Countries group Vs European Union countries group between 1990 and 2020. Applying Granger Causality Test , then Autoregressive Distributed Lag (ARDL) Model to investigate the long-run relationship, and also applying, the main model will take the following formula:

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$$Y_{it} = \alpha + \beta 1X1_{it} + +\varepsilon_{it} \qquad (1)$$

Where Y_it is the dependent variable, refers to the CO2 emissions (kg per US$ of GDP in 2010 value

α is the intercept,

β1 represents the partial coefficients fo the independent variable 〖X1〗_it (which refers to Industry (including construction) value added (% of GDP)

In the study, this model will be applied twice. As it will be used to examine the effects of industrial value added on Co2 emissions in the Arab countries group. Then, it will be used to examine the same relationship in the European union countries group.

RESULT ANALYSIS AND DISCUSSION

DESCRIPTIVE AND TESTS FOR MODEL VARIABLES:

Table(2): Descriptive Statistics

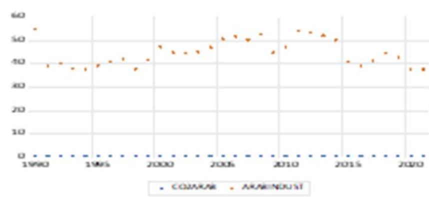
	EUINDUST	ARABCO2	ARABIN DUST	EUCO2
Mean	24.55967	0.722872	44.07716	0.278631
Median	24.32518	0.719568	43.92761	0.279984
Maximum	28.79976	0.755568	54.05218	0.393898
Minimum	22.37701	0.672249	36.81266	0.197994
Std. Dev.	1.977324	0.021091	5.583487	0.060701
Skewness	0.696297	-0.212088	0.330749	0.234189
Kurtosis	2.407565	2.330713	1.791957	1.856620
Jarque-Bera	3.053731	0.837160	2.529263	2.035595
Probability	0.217215	0.657980	0.282343	0.361390
Sum	785.9095	23.13189	1410.469	8.916197
Sum Sq. Dev.	121.2041	0.013790	966.4351	0.114222
Observations	32	32	32	32

Source: Calculated by the researcher using E-views 12, and world bank data

The descriptive statistics provide quantitative insights into the selected data series. Table(2) above presents the central measures and the standard deviation. The results show a positive mean of all the selected variables over the study period. Yet, a high standard deviation presents in the highest value in Industry (including construction), value added (% of GDP) in Arab countries variable, compared to the other variables used in the model.

In general, there are three steps to be followed according to the methodology of studying time series: The unit root test to determine the degree of integration, the co-integration test between this series, and the causality test. In this study, these three standard steps were followed according to Enders (1995) for the following reasons: 1st, to ensure that all variables under study are stationary whether at the levels or at the first differences (unit root test), 2nd, to identify the possibility of complementarity relationships between variables in the long run (cointegration tests), 3rd, to determine the direction of causation, further Autoregressive distributed lags (ARDL) model will be applied, as This model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modeling framework.

Figure (1): Trends of CO2 In Arab Countries and Arab Industrial Output



Source: World Bank Data Website

Figure (2): Trends of CO2 In EU Countries and EU Industrial Output

Source: World Bank Data Website

UNIT ROOT TEST:

A unit root test is applied to check the stationarity of the time series and to determine the order of integration of the data, Null Hypothesis: D(ARABCO2) has a unit root

So, the results of the unit root test in the first difference allow us to reject the null hypothesis of the presence of a unit root among the variables, as summarized in table(3)

Table(3): Unit Root Test Results Augmented Ducky- Fuller

Variables	Level		1st difference
	Test	Prob	Prob
EUINDUST (For Eu industry)	Fisher ADF	0.000044	0.0005
ARABINDUST(For Arab country's industry)	Fisher ADF	0.000000	0.0000
EUCO2 (For Eu co2 emissions)	Fisher ADF	0.000031	0.0004
ARABCO2 (For Arab countries co2 emissions)	Fisher ADF	0.000015	0.0002

Source: Calculated by the author, using WB data, and applied with E-views

JOHANSEN COINTEGRATION TEST

FOR ARAB COUNTRIES:

Table(4): Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	1.000000	1062.576	12.32090	0.0000
At most 1	0.066374	2.060374	4.129906	0.1782

Source: Calculated by the author, using WB data, and applied with E-views

The previous results indicate that the trace statistic is less than the critical Value (0.05) at the first deference, so we can accept H0 (Where there is just one cointegration between variables), and reject the alternative hypothesis H1, which means that there is more than one cointegration between variables for Arab country's group.

FOR EU COUNTRIES:

Table(5): Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	1.000000	1091.909	20.26184	0.0000
At most 1 *	0.297638	10.59918	9.164546	0.0265

Source: Calculated by the author, using WB data, and applied with E-views

The previous results indicate that the trace statistic is greater than the critical Value (0.05) at the first deference, so we can reject H0 (Where there is just one cointegration between variables), and accept the alternative hypothesis H1, which means that there is more than one cointegration between variables for the European countries group.

GRANGER CAUSALITY TEST:

The Granger causality test is used to determine if one time series will be useful to forecast another variable by investigating causality between two variables in a time series. The method is a probabilistic account of causality; it uses observed data sets to find patterns of correlation. One good thing about time series vector autoregression (VAR) is that we could test 'causality' in some sense. This test is first proposed by Granger (1969); therefore, we refer to it as the Granger causality (Feroz Kazi,2020). So in this part, the study will apply the Granger causality test between Co2 emission and Industry (including construction) value added (% of GDP) in Arab countries and in EU countries respectively.

Table (6): Granger test results

Null Hypothesis:	Obs	F-Statistic
CO2ARAB does not Granger Cause ARABINDUST	30	0.02260
ARABINDUST does not Granger Cause CO2ARAB	0.93736	0.4050
Null Hypothesis:	**Obs**	**F-Statistic**
CO2EU does not Granger Cause EUINDUST	30	1.85407
EUINDUST does not Granger Cause CO2EU	1.20541	0.3164

Source: Calculated by the author, using WB data, and applied with E-views12

The results above show that :

CO2EU  EUINDUS

As F Statistic is greater than F Probability, then we accept H0 and refuse H1, so there is a causal relationship between variables. This means that there is a positive relationship between industry and Co2 emission in European countries, but also each of the two variables causes the other one.

ARABINDUST  CO2ARAB

But for Arab countries, the result shows that ARABINDUST does not Granger Cause CO2ARAB, this is a logical result as the size of the industrial sector and production in the Arab countries is still below the level that raises carbon emissions, and on the contrary in the case of European countries, where the volume of industrial production increases and carbon emissions rise with it, and the relationship here is mutual. This result is consistent with Ghana Eric Abokyi

& others(2019).

ARDL MODEL:
ARDL cointegration technique does not require pretests for unit roots, unlike other techniques. Consequently, ARDL cointegration technique is preferable when dealing with variables that are integrated of a different order, I(0), I(1), or a combination of both and, robust when there is a single long-run relationship between the underlying variables in a small sample size. The long-run relationship of the underlying variables is detected through the F-statistic (Wald test). In this approach, the long-run relationship of the series is said to be established when the F-statistic exceeds the critical value band. The major advantage of this approach lies in its identification of the cointegrating vectors where there are multiple cointegrating vectors. However, this technique will crash in the presence of an integrated stochastic trend of I(1) (Emeka Nkoro and Aham Kelvin Uko, 2016).

Table(7): ARDL (PMG) Test For arab countries

Variable	Coefficients	t statistic
Long Run Equation		
CO2ARAB(-1)	0.758864	3.485932
ARABINDUST(-1)	0.000997	0.777062

Table(8): ARDL (PMG) Test For For EU countries

Variable	Coefficients	t statistic
Long Run Equation		
CO2EU(-1)	0.934979	14.92671
EUINDUST	0.000935	0.461173

Source: Calculated by the author, using WB data, and applied with E-views

The previous results show that for Arab countries as well as European countries, the relationship between industrial production and carbon emissions is a positive relationship in the long run. Carbon emissions increases with every increase in industrial production, which is a logical result that matches the actual reality to a large extent so far. This result is consistent with Zhang Xiaoqing & Ren Jianlan(2011)

CONCLUSIONS AND POLICY RECOMMENDATIONS:
The study found a positive causal relationship between industrial output and Co2 emission in European countries, but each of the two variables also causes the other one. For Arab countries, the result shows that ARABINDUST does not Granger Cause CO2ARAB, this is a logical result as the size of the industrial sector and production in the Arab countries is still below the level that raises carbon emissions, and on the contrary in the case of European countries, where the volume of industrial production increases and carbon emissions rise with it, and the relationship here is mutual. This result is consistent with Ghana Eric Abokyi & others(2019), and Mabutho SIBANDA &Hlengiwe NDLELA(2020).
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The study recommends that dedicated effort is needed to reduce industrial emissions. focusing on the industries that contribute the most share (>70%) of emissions, including chemicals, cement, and iron and steel petrochemicals, this is consistent with Tamaryn Brown & others (2012). On the other hand, quantifying the emissions from industrial processes is critical for understanding the global carbon budget and developing a suitable climate policy, and this is consistent with Zhu Liu(2015). Industry must remain competitive not only inside Europe but also globally in order to continue to ensure prosperity and economic success. This calls for the kind of business environment that encourages innovation and reducing co2 that a contemporary industrial policy may establish. Fair competition is crucial in global marketplaces as well.

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