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The Effects of Employment and Trade Exports on Economic Development Across 2017-2022: A Case of Industrial Sector of the Philippines



Netzer M. Quimno¹, Joan Dacia Cashmere M. Delos Reyes², Aljay B. Lapinig³, Raphael Jay N. Benitez⁴, Leana Christina T. Cayabyab⁵, Anaisha C. Rinibatan⁶, Irene Jessa Dumaplin⁷, Shaukat Rahman Ansari⁸

¹⁻⁸Bachelor of International Program of Accounting, Universitas Muhammadiyah Yogyakarta, Indonesia

¹⁻⁸Mindanao State University – Iligan Institute of Technology, Philippines

¹⁻⁸Accountancy, Business and Management of MSU-IIT Integrated Developmental School, Philippines

ABSTRACT: The Industrial sector is essential to innovation, economic development, and job creation, it also significantly influences how economies are shaped internationally and domestically. As such, this study examines the effects of the industrial sector on the annual economic development of the Philippines historically and currently, with a focus on critical periods such as prepandemic and pandemic periods utilizing variables like employment and trade balance. The major assumption underlying this study is that the industrial sector plays a significant role in driving the Philippines' economic development, particularly during the specified periods. To compute the relevance of the factors, the data sets from PSA and World Bank of the variables: Employment and Trade exports were generated independently and paired with GDP values and analyzed using the Pearson Regression Test. The r-coefficients for Employment and Trade exports independently paired with GDP are 0.950 and 0.831, respectively, indicating significant positive linear relationships. Additionally, with a p-value of 0.004, employment has a significant effect on the GDP. However, the same cannot be said for the Trade export variable. With the p-value of 0.041, it signifies that Trade export has no significant effect on the GDP. Results indicate that Employment, Trade Exports, and GDP Distribution did not exhibit statistically significant differences between the pre-pandemic and pandemic periods, suggesting resilience within the industrial sector despite external shocks. To effectively teach students, educators and administrators must grasp how employment and trade balance affect the Philippines' economic development. Based on the results of the study, more focus should be placed on education about the topic of employment. Collaboration with local media is critical for disseminating economic information and pressing the government to develop methods for widespread employment and managing trade imbalances in order to stimulate economic development in the face of chronic poverty, paving the way for a bright future.

KEYWORDS: Industry, Economic Development, Pandemic, Employment, Trade Export, GDP

1. INTRODUCTION

Nations all over the world are always looking for ways to understand and harness the forces driving economic development to achieve sustained economic development. The industrial sector is a cornerstone of any nation's economic landscape, encompassing a myriad of activities that drive economic development, foster innovation, and create employment opportunities (Bistarkey, 2022). However, the industrial sector, much like every other aspect of global society, has been profoundly affected by an unexpected and unparalleled disruptor: the COVID-19 pandemic. This juncture underscores the necessity to delve into the intricate dynamics that have reshaped the contributions of industries to the economic development of the Philippines.

The industrial sector is crucial in determining how a country's economy develops, and the Philippines is no different. Significant changes in the Philippines' industrial sector during the past ten years have presented both possibilities and difficulties for the country's economic development (Rodlauer, 2000). The industrial sector has consistently played a substantial role in the Philippines' GDP, peaking at nearly 45% in the 1980s and declining to just under 28% by 2021 (Bajpai, 2023). The industrial sector is one of the major drivers of this expansion, which has been driven by a number of different industries. Other sub-sectors including mining, manufacturing, and construction have also contributed to the development of the nation's infrastructure while creating

jobs and increasing exports (Kniivilä, 2004). This study ventures into the profound implications of these shifts, transcending temporal boundaries to scrutinize the sector's role not only during the pandemic but also before and after. By unpacking this trajectory, we unearth valuable insights into how the industrial sector in the Philippines has navigated through adversity, revealing adaptable strategies, vulnerabilities, and potential avenues for resurgence.

The choice to investigate the multifaceted effects of the pandemic on the contributions of industrial sectors is driven by the urgency to comprehend the sector's resiliency and potential vulnerabilities in the face of unforeseen disruptions. The study's significance extends beyond a trivial chronicle of challenges; it elucidates the sector's adaptive capacities and strategic responses. Moreover, by exploring the pre-pandemic and post-pandemic phases, a comprehensive narrative emerges, enabling us to gauge the sector's trajectory, identify trends, and facilitate data-driven policy recommendations for fortifying economic development. In essence, this study is an endeavor to understand not just the worry but also the course of resilience within the industrial sector of the Philippines. It aspires to furnish stakeholders, policymakers, and researchers with insights that transcend the pandemic's immediate aftermath, illuminating a path toward sustainable development and enhanced preparedness for potential future disruptions. This study intends to evaluate the role that industrial sectors have played in the Philippines' economic development of the Philippines.

The research is going to focus on filling the gap in understanding the following questions about the effects of employment and trade exports on economic development from 2017 to 2022.

- 1. What is the effect (in terms of percentage and value) of the industrial sector to the economic development of the Philippines?
- 2. How have the factors: Employment and Trade Export propelling economic development within the industrial sector evolved across 2017-2022?
- 3. How do the contributions of the industrial sector to economic development vary across pivotal phases, particularly the pre-pandemic and pandemic periods?
- 4. Is there a significant correlation between the two factors: Employment and Trade Export to Economic Development?

This study delves into the field of understanding the contributions of the industrial sector to economic development in the Philippines, encompassing the periods before, during, and after the COVID-19 pandemic. The focal point rests on dissecting the industrial sector's significance within the nation's economic landscape, particularly its pivotal role in employment generation, fostering innovation, and steering overall economic development. To achieve these objectives, the study embarks on a thorough analysis of an array of relevant data sources, which include economic reports, industry statistics, and expert evaluations. The intention is to identify visible patterns, evolving trends, and transformative shifts that characterize the industrial sector's influence on the economy. Additionally, the research aims to spotlight the flamboyant strategies that industrial sectors have adopted to adapt and counteract the unprecedented challenges posed by the pandemic, as well as other analogous disruptions.

The following terms are the main concepts related to this study. Each term provides adequate theoretical and operational definitions to guide readers in understanding the paper.

Table 1 Theoretical and Operational Definition of Alternative Terms used

Terms	Theoretical Definition	Operational Definition	
Industrial Sector	A collection of productive businesses or organizations that provide commodities, services, or revenue sources. The four main categories of economics in primary, secondary, tertiary, and quaternary; secondary industries are further divided into heavy and light categories. (Britannica, 2022).	In this study, the industrial sector that will be mentioned and discussed thoroughly are the industrial firms that are situated within the country's (Philippines) border. Such as those firms from mining, manufacturing, electronics, etc.	
Pandemic	An outbreak of infectious disease that occurs	Since the researchers will be	
	over a wide geographical area and that is of	primarily focusing on economic	

Effects	high prevalence, generally affecting a significant proportion of the world's population, usually over several months. Pandemics arise from epidemics, which are outbreaks of disease confined to one part of the world, such as a single country (Britannica, n.d.) A change that results in when something is done or happening: an event, condition, or state of affairs that is produced by a cause (Britannica, n.d.)	development in the Philippines, particularly in the 21st century, the specific pandemic that the study would be focusing on is the COVID-19 pandemic during the years 2017 - 2022. The term "effects" in this study describes the primary contributions towards the economic development of the industrial sector in the Philippines after evaluating the
		variables' Employment and Trade exports using statistical methods.
Real GDP	An inflation-adjusted measure that reflects the value of all goods and services produced by an economy each year. Real GDP is expressed in base-year prices. It is often referred to as constant-price GDP, inflation- corrected GDP, or constant-dollar GDP. Put simply, real GDP measures the total economic output of a country and is adjusted for changes in price (Ganti, 2024).	Real GDP in this study will be focusing on the industrial sector of the Philippines. The data contained in this research can be annually, quarterly, and monthly. The data for Real GDP depends on reliable sources such as the PSA.
Employment	Employment definition is termed as a paid mutual work arrangement between a recruiter and an employee. This term applies to an individual who is hired for a salary or compensation to initiate work or tasks for an organization.	The employment variable in this study relates to the industrial sector, and data collection for employment will be focused on the Philippines aspect and its contributions towards the economy.
Trade Export	Exports are goods and services that are produced in one country and sold to buyers in another. Exports, along with imports, make up international trade. Instead of confining themselves within their geographical borders, countries often intentionally seek external markets around the world for commerce, achieving greater revenue and transactional opportunities (Segal, 2024).	By determining the difference between imports and exports, we might assess that imports are greater than exports in the Philippines. Trade export in this study is the variable that correlates with employment, and it is analyzed using statistical methods.
Economic Development	Programs, policies, or initiatives aimed at enhancing a community's economic health and standard of living.	Economic development in the study, which is the only independent variable, serves as the primary measure for assessing how trade exports and employment affect the Philippines' economy's performance.

2. LITERATURE REVIEW

Employment

Employment is considered an important macroeconomic category. According to Vietnam's Labor Code, "employments are activities that generate incomes that the law does not prohibit." (Vietnam's National Assembly, 2012). Employment is measured by such indexes as employment or unemployment rates, structure of jobs by industries, economic sectors, demographic features, etc. Employment can be examined from extensive and intensive economic development. Regarding extensive development, employment is more important than the quality of the labor force, and economic development is determined by ways of making use of idle labor while intensive development depends on education, R&D, IT, and innovation. Thus, to promote intensive economic development, it is essential to enhance public education level and quantity of workforce, etc. Various models are used to determine the relationship between economic development can create new jobs at a level varying over periods and countries. This reflects different reactions by labor markets to economic development. Schmid (2014) suggests that both extensive and intensive growth models are important to the possibility of job creation. Thus, economic development as a reaction to increases in aggregate demand can be achieved in different situations, such as increases in inputs, productivity of factors, or both of them.

Private Sector Assessment

The loss in output is mainly in manufacturing industries making export products such as semiconductors and wire harnesses. Because investment growth has been low, it cannot further adversely affect the economy by declining. The relative weakness of the private sector in the growth process, manifested by its feeble contribution to the country's progress, may partly be traced to its lack of internal dynamism. Particularly absent is a robust menu of manufactured products that would indicate competitiveness of its industry sector at world standards. The absence of a healthy, competitive industry sector suggests the inability of the private sector to respond to the opening of the economy and its entry into global markets. It also hints at some weakness in the public–private partnership, the robustness of which characterizes strong industrial economies (Paderanga, 2011).

Manufacturing Industry

Traditionally, manufacturing industries have focused on product-related strategies for technological innovation, quality improvement, and cost reduction, depending on their market position. Recent changes in the business environment, such as the increased competitiveness of developing countries, the globalization of markets, heightened consumer awareness, and shifts in customer demand, have made it difficult to rely exclusively on these traditional strategies. As a response to these new challenges, an increasing number of manufacturing firms are shifting their focus from pure manufacturing to a combination of manufacturing and services (Matthyssens & Vandenbembt, 1998; Wise & Baumgartner, 1999).

According to Eslami et. al. (2018), manufacturing companies face several challenges, such as physical resource depletion, stricter laws and regulations, economic stagnation, and customers' demand for higher product quality. The paradigm of sustainable manufacturing has attracted a great deal of attention over the last decade as an emerging manufacturing approach meant to empower enterprises to cope with these challenges and guide them to stand out in today's competitive environment.

Industry sector

The industrial sector is a sector of the economy composed of companies that assist other companies in manufacturing, shipping, or producing their goods. The industrial sector is classified as a secondary sector because the products and services it provides are primarily marketed to other businesses rather than directly to consumers. (NAICS, 2022) The industrial sector, particularly manufacturing, has been crucial for driving economic growth and development. During the Industrial Revolution in the 18th and 19th centuries, the rise of manufacturing and industrialization was a major catalyst for the transition from agrarian to industrialized and urbanized economies in Europe and North America. (Klevtsova1 et al., 2021) There is clear evidence that a thriving manufacturing sector is key to increased productivity and economic growth. Manufacturing offers several productive advantages, including economies of scale, strong linkages to other parts of the economy, and being the primary source of innovation and technological advances. (Yong & LI Yong, 2021) The industrial sector plays a crucial role in driving economic growth and development beyond just production. As Rodrik (2014) highlights, the manufacturing industry has the ability to absorb large numbers of less-skilled workers, thereby fostering inclusive economic growth. The expansion of the industrial sector is often linked to substantial improvements in labor productivity. This increase in labor productivity, in turn, propels overall economic advancement. Moreover, industrial activities are intertwined with services such as logistics, finance, and information technology, creating a multiplier effect that stimulates broader economic activities. (Haider, 2018). In the context of developing economies, the industrial sector is often seen as a pathway to achieving economic diversification and reducing dependency on agricultural and extractive industries. For instance, Francis (2016) argues that industrialization is a key driver for economic catch-up and

development in low and middle-income countries, facilitating structural transformation and integration into global value chains. Industrialization facilitates structural transformation by enabling the reallocation of resources from low-productivity sectors, such as agriculture, to higher-productivity manufacturing and services. This shift in economic structure is a hallmark of successful development, as it boosts overall productivity and creates more diverse employment opportunities._Collectively, these perspectives underscore the critical importance of the industrial sector in both historical and contemporary economic landscapes. Understanding its role provides a foundation for analyzing its impact on economic growth, particularly within the specific context of the Philippines. This knowledge is crucial for formulating policies that leverage industrial capabilities to drive sustainable economic development.

Gross Domestic Product (GDP)

GDP measures the monetary value of final goods and services—that is, those that are bought by the final user—produced in a country in a given period (say a quarter or a year). It counts all the output generated within the borders of a country. GDP is composed of goods and services produced for sale in the market and includes some nonmarket production, such as defense or education services provided by the government. An alternative concept, gross national product, or GNP counts all the output of the residents of a country (Callen, 2008).

Trade Export

Although exchange rate changes have long been a subject of interest, the focus of this interest has evolved considerably since the generalized floating era. Movements in the exchange rate have effects on imports and exports, and nominal depreciation or appreciation of the exchange rate is presumed to change the real exchange rate and, thus, have a direct effect on a country's trade export. In particular, movements in the nominal exchange rate, whether depreciation or appreciation, are presumed to induce changes in the real exchange rate, thereby directly impacting a nation's trade export (Arize, et al., 2017).

Economic Development

Economies did not grow very much from ancient times to the Industrial Revolution of the 1700s, rather some experienced a sharp uptick in development in the 19th and 20th centuries after a millennium of very slow development (Maddison, 2007).1 A typical person in Japan or Sweden earning two to three dollars per day in 1800 can now earn and spend about \$100 a day. Only the wealthiest nobles had that much to spend in 1800, whereas today an average person in a developed economy has that much. Even countries that rejected the industrial and institutional reforms transforming economies in the 19th and 20th centuries (and are only now starting to accept them) are experiencing development takeoffs (McCloskey, 2010). Moreover, if improvements in the efficiency and output of products (such as the vast reductions in the cost of lighting, for example) are included in this calculation, the real daily earnings figure goes up to as much as \$200 to \$300 per day (Nordhaus, 1997) representing a 100-fold improvement from 1800. This improvement in economic development has added greatly to public health, life expectancy, and standards of living in much of the world (McCloskey, 2006; Rosling, Rönnlund, & Rosling, 2018). In recent years, incomes have reached historically high levels in many countries of the world. Though some have argued that economic development has slowed down recently (Gordon, 2016), this is only correct if China and India are excluded, which they should not be, as these two countries represent about 40% of the world's population. Indeed, if China and India are included, world economic development has in recent decades been running at 4.8% annually, which is actually faster than the previous fast development rates of the late 1800s and the postwar period (McCloskey, 2017).

Financial Development

Rajan and Zingales (1996) studied the relationship between industrial performance and financial development across countries. The study opined that industries that rely heavily on external funding grow comparatively faster in countries with well-developed intermediaries and stock markets. Khan et al (2005) investigated the link between financial development and economic development in Pakistan over the period of 1971-2004 by employing the autoregressive distributed lag approach. It was observed that financial intensity exerts a positive impact on economic development in the long run but the relation was insignificant in the short run. De Gregorio and Guidotti (1995) as well as Barthelemy and Varoudakis (1998) employed panel analysis with random effects for the period of 1950 to 1985 and between 1960 and 1990 respectively in Latin American countries and found that there is a strong negative correlation between financial development and economic development. Apergis et al (2007) identified the link between financial depth and economic development using panel data analysis for 15 member countries of the OECD and 50 non-OECD countries. The study found that a positive relationship exists between financial depth and economic development. In another study conducted by Sola et al (2013), it was confirmed that investment, capacity utilization, and import were the major determinants of manufacturing performance for sustainable development. The study also observed

that manufacturing sector performance was enhanced when firms exerted more effort on the export-oriented drive. Udoh and Ogbuagu (2012) employed an autoregressive distributed lag approach to analyze financial development and industrial production in Nigeria between 1970 and 2009. However, financial sector development was observed to have a negative effect on industrial production. However, when linked with development, Aiyedogbon and Anyanwu (2016) found that the contribution of banks positively enhanced industrial development and economic development in Nigeria.

Economic Decline

The economic decline in Norway driven by a plunge in the crude oil price commenced in 2014. Since the Norwegian economy was dominated by the oil industry and the slowing oil production also caused negative spillovers to other economic sectors, the oil price crisis directly led to a significant economic decline. Traditionally, a technical definition of an economic recession is that a nation's gross domestic product (GDP) has been measured as a decline in at least two successive quarters (Eaton, Kortum, Neiman, & Romalis, 2016). Although on a yearly basis, the Norwegian GDP decreased between 2014 and 2016, according to World Bank data (The World Bank, 2019), it did not show a decrease in every successive quarter. Therefore for the overall Norwegian GDP decline in this period, we call it economic decline instead of economic recession in the study. The economic decline weakened the local currency and therefore increased the price competitiveness of the tourism sector in Norway. The period of decline accompanied by the weakening of the local currency from 2014 to 2016 was associated with a 24% increase in the number of leisure tourists' hotel overnight stays (Statistics Norway, 2019). It is not obvious what should be the outcome of an economic development causes tourism growth due to the significant positive effect of income-elastic tourism demand. Based on this reasoning, a decline ought to reduce tourism demand. The negative impact of the world economic recession on the global tourism demand during 2008 and 2009 was documented by Smeral (2010).

Productivity

This definition applies to an enterprise, a sector of economic activity, or the economy as a whole. The term "productivity" can be used to assess or measure the extent to which a certain output can be extracted from a given input (Duran, Cetindere, Aksu 2015: Kanawaty, 1992). Productivity has been generally defined as the ratio of an extent of output to the unit of all of the resources used to produce this output. Operational efficiency is used as an indicator that reveals the level of effectiveness in using production resources such as raw materials and supplies, manpower, land, buildings, machines, equipment, and energy. As is known, the production process uses other production inputs besides manpower. Hence, knowing the efficiency levels of other inputs, which determines the relationship between these inputs and production, as well as manpower, and observing trends of these inputs under various conditions and replacing one or several of these inputs by changing their qualities and quantities enable businesses to achieve the maximum level of production through the optimum input combination (Duran, Cetindere, Aksu 2015; Dogan, 1989). The economic development of a country is usually measured by its increase in production or the gross domestic product (GDP), which comes from two sources: a larger quantity of production factors used (inputs) and/or an increase in productivity. Productivity is therefore considered to be a component of growth (Duran, Cetindere, Aksu 2015; Galarneau and Dumas, 1993).

3. EMPIRICAL LITERATURE

Exports During Pandemic

The country is among the top traders in East Asia (Thorbecke and Pai, 2015) and it was one of the most affected nations by the virus in the region. It accounted for 31% of total East Asian COVID-19 cases by the end of December 2020, making it the second most infected country in the region after Indonesia. The number of infections was more than 160,000 by mid-August 2020, making the Philippines the hardest-hit country in terms of COVID-19 cases in East Asia. In response to this, total exports of goods and services in the Philippines experienced the largest decline in four decades in 2020, declining by nearly 50%, while imports contracted by over 65% by April 2020. The combined drop in exports of goods and services was larger than in the Asian financial crisis in 1998 (-14.7%) and the global financial crisis in 2008-2009 (-11.8%). The drop in both goods and services was unlike previous episodes where services exports proved more resilient.

Contribution of manufacturing businesses to employment rate

Manufacturing has emerged as a pivotal driving force behind the Philippine economy, as substantiated by the Philippine Statistics Authority (PSA). In the first quarter of 2023, manufacturing businesses contributed 29.9% of GDP. This sector has been instrumental in fostering employment opportunities, with millions of Filipinos securing gainful occupations due to its robust presence. The impact of manufacturing businesses on employment rates, job creation, and the socioeconomic status of the community has been a subject of study in various research papers. Several studies have employed quantitative methods to

evaluate how much manufacturing activities contribute to job growth and economic development. A study on the impact of the manufacturing sector on economic development in Nigeria by Okon & Osesie (2017), examined the relationship between the manufacturing sector and economic development in Nigeria. The researchers employed quantitative analysis, including time series data and regression models, to assess the impact of the manufacturing sector on employment generation and GDP growth. The findings indicated that the manufacturing sector significantly contributes to job creation and overall economic development. Another study by Saha (2019) investigated the relationship between manufacturing employment and economic development in South Asian countries. Panel data analysis and fixed-effects regression models were employed to explore the impact of manufacturing employment on GDP growth. These analytical methods allow for examining trends and relationships over time while controlling for other factors that may influence GDP growth. By utilizing these quantitative techniques, the researchers aimed to assess the specific impact of manufacturing employment on overall economic development in the South Asian context. This analysis provides empirical evidence regarding the relationship between manufacturing employment and GDP growth and provides the significance of the manufacturing sector as a driver of job creation and its subsequent impact on sustainable economic development in South Asia. The results revealed a positive relationship between manufacturing employment and economic development, suggesting that the manufacturing sector plays a crucial role in job creation and economic development. The Impact of Manufacturing Sector on Employment in Thailand" by Thammawat and Meesomchai (2019) focused on the impact of the manufacturing sector on employment in Thailand. The researchers used time series data and an input-output model to assess the relationship between manufacturing output and employment. The findings showed a positive correlation between manufacturing sector growth and employment, indicating that the expansion of the manufacturing industry leads to increased job opportunities.

Gross Domestic Product Drop in 2020

The Gross Domestic Product (GDP) growth rate dropped by 16.5 percent in the second quarter of 2020, the lowest recorded quarterly growth starting from the 1981 series. The main contributors to the decline were: Manufacturing, -21.3 percent; Construction, -33.5 percent; and Transportation and Storage, -59.2 percent. Among the major economic sectors, Agriculture, forestry, and fishing increased with 1.6 percent growth. Industry and Services both decreased during the period by 22.9 percent and 15.8 percent, respectively. Regarding the outlay, the major items that declined were: Household Final Consumption Expenditure (HFCE), 15.5 percent; Gross Capital Formation (GCF), 53.5 percent; Exports, 37.0 percent; and Imports, 40.0 percent. On the other hand, the Government Final Consumption Expenditure (GFCE) posted positive growth of 22.1 percent.

4. METHODOLOGY

This research employed a mixed-methods approach, combining quantitative data analysis with qualitative assessments. Quantitative analysis involved examining economic data, manufacturing output, employment figures, and GDP growth rates for the specified periods. By addressing this research problem, the study aimed to provide a comprehensive understanding of the dynamic relationship between the industry sector and economic development in the Philippines across the different phases of the COVID-19 pandemic.

Theoretical Framework



Figure 1 Export-Led Growth Model

Through balancing the balance of payments and foreign debts, the foreign exchange reserve contributes significantly to the establishment of dominance in the international market. In this study, total exports were utilized as a measure of economic growth, and engineering exports were used as a regression tool to investigate the theory of export-led growth (see Figure 1). This study employs a quantitative approach. Quantitative analysis involves the examination of historical economic data, GDP growth rates, industrial output, trade flows, and employment statistics to discern the trends and patterns across the specified periods.

Conceptual Framework



Figure 2 Conceptual Framework

Several theories and models have emerged to explain the factors contributing to a country's economic development. This study, focused on understanding the trajectory of the Philippine economy from 2017 to 2022, establishes its conceptual framework primarily on the Export-Led Growth Model. This choice is made considering the study's central objective: to investigate how industrial intervention influences the Philippine Economy. A fundamental metric for measuring economic development is Gross Domestic Product (GDP), a composite indicator influenced by a multitude of variables. Throughout the course of this research, the authors have opted to examine Employment and Trade Export as key determinants that affect the economic development within the industrial sector (see Figure 2).

Data Collection

The collected data are analyzed using regression analysis and trend analysis. Data values from archival data sets of the Philippines' GDP across the years 2017-2022, specifically pre-pandemic, and pandemic periods served as the basis of analysis. Regression analysis models and Trend Analysis graphs was also utilized to compare data values between the Trade Export of the industry sector of the Philippines across 2017-2022 and the country's GDP, as well as Employment in industry sectors across 2017-2022 and the country's GDP, as well as Employment in industry sectors across 2017-2022. Specifically, the effects of the Industry Sector of the Philippines on its economic development. The scope of this study encompasses the economic impact of the industry sector within the country's borders. The researchers will only focus on the industry-related businesses thus, all other types of businesses and their corresponding sectors will not be included. The researchers will examine the variables of trade exports and employment within this sector. All the data gathered for data analysis will strictly be from government websites only. This is to ensure the reliability of the gathered data.

Table 2 Data sources per variable

Variable	Title	Data Source		
Economic Development	29 Gross National Income (GNI) and Gross	Bangko Sentral ng Pilipinas		
(measured by: Gross Domestic	Domestic Product (GDP) by Industry	DOLE(GDP by Sector in amount)BSP		
Product)	Jobs and Labor Market Forecast			
	Philippines Selected Economic and Financial			
	Indicator			
Employment	Labor Market Profile: 2020 Issue	Department of Labor and		
	2018 Annual Labor and Employment Status	Employment Philippine Statistics		
	Labor Market Profile: 2021 Issue	Authority		

		Department of Labor and Employment
Trade Export	Highlights of the Philippine Export and Import Statistics August 2022 Philippine Export and Import Performance 2017 A Decade of Trade in the Philippines Philippine Exports by Commodity (2018) Highlights of the Philippine Export and Import Statistics August 2020	Philippine Statistics Authority PSA DTI Philippine Statistics Authority Philippine Statistics Authority

Table 2 shows the data collection for this study was done through online gathering of data from government websites. Due to the nature of the study using secondary data, the researchers employed the use of websites such as google scholar, and research gate to acquire the published research used in this study. Additionally, with the use of government websites such as PSA, DOLE, DTI, BSP. Data collection was centered on factors such as Employment, Trade Exports, Real GDP Distribution, and Economic Development.

Data Analysis

The study used Microsoft Excel (2019) for preliminary data analysis and graphical presentations. Line graphs were employed to show trends and patterns across time or across situations to help with the investigation of relationships within the dataset. Clustered column bar graphs were used to compare data across categories and make it easier to comprehend how different groups or situations differ. ANOVA was also used as it is a statistical approach for comparing group means that involves two or more. It evaluates if the group means for a single independent variable differ significantly from one another. When examining how a categorical variable affects a continuous result variable, this method is especially effective. Aside from Microsoft Word and ANOVA, the use of IBM SPSS (Statistical Package for the Social Sciences) version 26 was also utilized as computer software. It was utilized for more advanced statistical analysis. The following were conducted using SPSS:

1. Two-sample independent t-test: The two-sample independent t-test was employed to assess whether there were statistically significant differences between the means of two independent groups. This analysis helped in comparing the means of different groups and determining whether any observed differences were likely due to chance or if they were statistically significant. In the study, the two-tailed test was utilized to test significant differences in mean Employment between the pre-pandemic and pandemic periods.

2. Regression Analysis (Stepwise Method): Regression analysis, specifically the stepwise method, was used to explore linear relationships between variables and to predict the value of one variable based on the values of one or more predictor variables. This analysis technique helped in identifying significant predictors and understanding the strength and direction of relationships within the dataset. This was used to identify the relationships between Employment and Trade Export to GDP Distribution.

3. Pearson's correlation measures the link between the linear of the two variables. This was used to identify the relationships between Employment and Trade Export to GDP Distribution. It measures how much each of these factors changes collectively in a predictable way. It goes specifically from -1 to +1, where -1 indicates a perfect negative linear relationship, 0 indicates no relationship at all, and +1 represents a perfect relationship favorable linear correlation. In order to calculate the relationship between the factors, it is divided by the sum of their standard deviations. This normalization guarantees that the scale of the data has no bearing on the correlation coefficient variables. Several presumptions support Pearson's correlation, including linearity, independence of variables with a normal distribution, and observations. It's an effective tool in numerous study areas where knowing the direction and strength of correlations between factors is essential for coming to meaningful findings and making well-informed judgments.

5. RESULTS AND DISCUSSIONS

This chapter presents the culmination of data analysis and interpretation, offering insights into the impact of the industrial sector on economic development in the Philippines across the years 2017 to 2022. The results presented herein are derived from a comprehensive examination of key economic indicators, industrial output, and various influencing factors. The subsequent

discussion aims to contextualize these findings within the broader economic landscape and shed light on the implications for policymakers, stakeholders, and future research endeavors.

Historical and Current contributions of industrial sectors to the annual economic development of the Philippines

According to Perez and Soete (2018) in Kaldorian Theory and the Structural Approach, efficiently integrating technology contributes to increased labor productivity in the following countries, particularly in developing economies. The extent to which these countries absorb and adapt innovations from leading countries has a substantial impact on their total economic progress. This approach emphasizes the concept of cumulative causation, in which knowledge acquisition has a positive impact on both productivity growth and, as a result, the broader economic expansion of these countries (Nelson and Winter, 2002). The percentage of employment, trade exports, and GDP distribution are displayed in the table below during the pre-pandemic and pandemic periods, because the pandemic began around the year 2020, the percentage for all the variables indicates a decrease during that year.

	1 0	•		
	Employment in	Thousands TRADE: Exports	። FOB Value inGDP	Distribution
YEAR	(expressed	throughMillion USD (ex	xpressed through in Billio	n Pesos (expressed
	percentage)	percentage)	through p	ercentage)
2017	18.10	91.57	30.30	
2018	19.10	89.50	30.60	
2019	19.13	90.25	30.40	
2020	18.30	90.99	29.20	
2021	18.41	91.13	29.90	
2022	18.10	88.93	26.90	

Table 3 Factor value percentage of the industry sector from 2017-2022

Source: Philippine Statistics Authority

The figure below depicts the trend analysis of the industry sector percentage on the Philippines' overall GDP growth. Each year's employment (2017-2022) values are shown by the blue line. Furthermore, the red line reflects the annual trade export values. Finally, the orange line depicts the GDP distribution.



Figure 3 Economic Development in Terms of Period



Figure 4 GDP Distribution by Sector (2022)



GDP Distribution by Sector 2021









GDP Distribution by Sector 2017





Primary Factors propelling economic development within the industrial sector

According to Kniivilä, M. (2004), industrial development has been an important basis for economic development. Output expansion has been associated with export promotion, increased trade opening, economic liberalization, and an improved

business climate in most of the countries. However, import protection and selective government intervention have been employed as well.

YEAR	Employment (in Theucende)	TRADE (Exports: FOB Value in	GDP Distribution
	Employment (in mousailus)	Million USD)	(in Billion Pesos)
2017	7381	4426.82	5202.6
2018	7862	5470.072	5582.5
2019	8111	5688	5887.9
2020	7211	4666.7	5115.3
2021	8098	5959.86	5551.6
2022	8377	5700.78	5914.7

The main drivers of the industrial sector's economic development are discussed in this section, and the table that follows displays the figures for GDP Distribution for the industrial sector (in billion pesos), Employment for the industrial sector (in '000s, except for rates), and trade export (exports: FOB value in millions USD). Additionally, the graphs below illustrate how each variable's contribution has evolved over time.



Figure 10 Employment (in '000s except rates)

According to Trading Economics (2023), employment is defined as persons of working age who were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period or not at work due to temporary absence from a job, or to working-time arrangement. The line graph above shows how the employment (in '000s except rates) variable has evolved over periods between 2017 - 2022. As shown in the graph above, employment gradually increased through the years 2017, 2018, and 2019. It made a massive decline for the year 2020 because the pandemic occurred during these times and many people lost their job opportunities. However, despite the pandemic, the employment rate increased after the year 2020, and it increased between 2021 - 2022.





According to Statista (2023), the trade export is the value of exported goods minus the value of imported goods. A positive trade export signifies a trade surplus, while a negative value signifies a trade deficit. In 2022, the trade deficit of the Philippines amounted to around 65.69 billion U.S. dollars. The line graph above shows the advancement of trade (exports: FOB value in million USD) during 2017 - 2022. As depicted above, there has been a gradual increase in 2017 - 2019. But after that year, the year 2020 declined by about 20% in terms of million USD since the pandemic was declared that year, the exported products were lesser compared to the imported products also because of the restrictions on internal movements and internal travel controls. In the year 2021, it increased by about 50% and fluctuated again back to 6000 in 2022.



Figure 12 GDP Distribution (in Billion Pesos)

According to the study of Lumabao and Rosales (2023), Gross Domestic Product Growth (GDPG) is one of the driving factors of economic development. Economic shocks, particularly during the COVID-19 pandemic in 2020, resulted in a rapid decline in the Philippine economy. This decline is reminiscent of a similar downturn observed in the period between 1980 and 1990. The line graph shown above is the GDP Distribution (in billion pesos) for 2017 - 2022. As illustrated in the graph, the year 2017 -2019 was progressively increasing. According to The World Bank (2019), the fact that inflation fell to 1.7% in August 2019, the lowest in almost 3 years, indicates that the rate at which prices were rising for goods and services in the country had slowed significantly. A lower inflation rate is generally considered positive for the economy because it means that the purchasing power of the currency is relatively stable. In this context, the more accommodative policy stance by the Banko Sentral was likely intended to support economic development by maintaining favorable borrowing conditions and addressing any potential economic challenges associated with low inflation. When the pandemic was recognized and declared, the GDP Distribution decreased by about 14% since there was a decline in consumer spending as they were required to be lockdown. After that year, it increased and doubled after the decline.

Contribution of Industrial Sector to Economic Development across Distinct Phase

For Employment, the two-tailed t-test yielded a t-value of -0.269 with 4 degrees of freedom, resulting in a p-value of 0.801. This suggests that there is no statistically significant difference in mean Employment between the pre-pandemic and pandemic periods. The mean difference is approximately -110.67, indicating a slight decrease in Employment during the pandemic, although this difference is not statistically meaningful. The 95% confidence interval for this difference ranges from -1253.63 to 1032.30, indicating a wide range of plausible values for the true difference.

Factor	t	df	p-value (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence of the Difference	e Interval
						Lower	Upper
Employment	269	4	.801	-110.66667	411.66518	-1253.63245	1032.29
							911
Trade Exports	446	4	.678	-247.48267	554.53429	-1787.11668	1292.15
							135
GDP	.100	4	.925	30.46667	304.45479	-814.83534	875.768
Distribution							67

Table 5 Test for Mean Difference of Pre-pandemic and Pandemic Periods

Similarly, for Trade Exports, the t-test resulted in a t-value of -0.446 with 4 degrees of freedom, and a p-value of 0.678. This indicates that there is no statistically significant difference in mean Trade Exports between the pre-pandemic and pandemic periods. The mean difference is approximately -247.48, but as with Employment, this difference is not statistically significant. The 95% confidence interval for this difference ranges from -1787.12 to 1292.15.mFinally, for GDP Distribution, the t-test yielded a tvalue of 0.100 with 4 degrees of freedom, and a high p-value of 0.925. This indicates that there is no statistically significant difference in mean GDP Distribution between the pre-pandemic and pandemic periods. The mean difference is approximately 30.47, which is not statistically meaningful. The 95% confidence interval for this difference ranges from -814.84 to 875.77. The mean difference, along with the wide 95% confidence interval, reinforces the notion that the observed changes are not considered statistically meaningful. There is no significant difference in mean values for Employment, Trade Exports, or GDP Distribution between the pre-pandemic and pandemic periods. These findings indicate that the variables' effects had no substantial changes due to the pandemic, at least within the context and time frame examined in this study. It is essential to recognize that these conclusions are specific to the context and timeframe of this study and may not necessarily generalize to broader economic dynamics or different timeframes. Collectively, these findings lead to the conclusion that, within the specific parameters and time frames considered in this study, the variables of Employment, Trade Exports, and GDP Distribution did not undergo substantial changes due to the pandemic. It is crucial to recognize the limitations of these conclusions, as they are context-specific and may not generalize to broader economic dynamics or different timeframes. Additionally, the wide confidence intervals underscore the inherent variability in these estimates, emphasizing the need for caution in interpreting these results beyond this study's scope.

Influence of Industrialization on the Philippines' Economic Development

After decades of nineteenth-century deindustrialization due to American and European competition, Philippine industrial growth accelerated in the early twentieth century. Like every other developing industrial nation, it was propelled by small-scale, labor-intensive manufacturing—with little inanimate power—that initially specialized in commodity processing. Still, in the decade or so up to 1913, Philippine industrial output expanded at 6.3% per annum, well beyond that attained by the three leaders, thereby catching up. Indeed, the Philippines was a regional leader, as it was the third Asian country to join the 5% industrial growth club. This outstanding industrial performance was also contained during the ISI years 1950-1972 when the Philippine industry grew 7% per annum, 1.8% faster than the three leaders even though the latter witnessed a postwar development miracle (De Dios & Williamson, 2015).

Factor	Ν	Mean	SD
EMPLOYMENT	6	7840.000	455.0121
TRADE EXPORT	6	5318.70533	622.401989
GDP	6	5542.433	333.9307

Table 6 Results of standard deviation calculations

The raw values of the calculated values of the components Employment, Trade Exports, and GDP are shown in the table above. Values for column 2 are computed by adding the total sample size, and the number of years. Column three was generated using the procedure for calculating the mean of a set of data. The mean is obtained by independently entering the data values for each factor from each year. Finally, the fourth column is calculated using the standard deviation formula on each of the factors individually and pairing them with GDP distribution values. The standard deviation of Employment which is 455.0121 is a significantly high number, therefore, data is spread out from the mean. The same with standard deviation of Trade xport which is 622.401989 and GDP's standard deviation is 333.9307 are both significantly high numbers, therefore, data is spread out from the mean. This would mean that the contribution of Employment, Trade export, and GDP is difficult to predict with only the standard deviation alone. This signifies that there is room for error in the calculations. It is crucial to recognize the limitations of these conclusions, as they are context-specific and may not generalize to broader economic dynamics or different timeframes. Additionally, the wide confidence intervals underscore the inherent variability in these estimates, emphasizing the need for caution in interpreting these results beyond the confines of this study's scope.

Table 7 Results for Pearson correlation test

Measures	r-coefficient	p-value
EMPLOYMENT VS. GDP	0.950	0.004
TRADE EXPORT VS. GDP	0.831	0.041

The values computed from the data set using the Pearson correlation coefficient formula are shown in the table above. To compute the r-coefficient and p-value, the data sets from Employment and Trade export were generated independently and paired with GDP values. With an r-coefficient of 0.950, this indicates that Employment and GDP have a significant positive linear relationship. The same can be said about the relationship between trade exports and GDP; with an r-coefficient of 0.831, the two variables have a significant positive linear association. With a p-value of 0.004, there is strong evidence against the null hypothesis. Therefore, Employment has a significant impact on the GDP. However, the same cannot be said for the Trade export variable. The p-value of 0.041, signifies that there is weak evidence against the null hypothesis. Therefore, according to the Pearson correlation computation, Trade export has no significant impact on the GDP.48

Table 8 Regression Model Summary

Model	1
R	0.950
R Square	0.902
Adjusted R Square	0.877
Std. Error of the Estimate	117.0270

The regression summary in Table 6 provides valuable insights into the model. The coefficient of determination, denoted as R-squared (R²), is a remarkable 0.902. This signifies that approximately 90.2% of the variability observed in GDP Distribution can be explained by changes in Employment. In simpler terms, this suggests a strong and positive linear relationship between Employment and GDP Distribution. It is crucial to recognize the limitations of these conclusions, as they are context-specific and may not generalize to broader economic dynamics or different timeframes. Additionally, the wide confidence intervals underscore the inherent variability in these estimates, emphasizing the need for caution in interpreting these results beyond the confines of this study's scope. The adjusted R-squared value, which accounts for the number of predictors in the model, remains notably high at 0.877. This indicates that even after considering the complexity of the model, it still effectively captures about 87.7% of the variability in GDP Distribution. The standard error of the estimate is 117.0270. This metric gives us an idea of how closely the actual data points cluster around the regression line. A lower value of this metric implies that the model has a smaller average error in predicting GDP Distribution based on Employment.

	Sum of Squares	df	Mean Square	F	p-value
Regression	502767.395	1	502767.395	36.711	.004 ^b
Residual	54781.238	4	13695.310		
Total	557548.633	5			

Table 9 ANOVA of Employment and GDP Distribution

The table above shows the test results after the Analysis of variables (ANOVA). It shows the full calculations of the Regression coefficient test of Employment paired with GDP Distribution. The table shows a summary of each of the data tests on both regression and residual excluding the Trade export variable.

Table 10 Coefficient Summarization

	Unstandardized Coefficients		Standardized Coefficients	t	p-value	95% Confidence Interval for B	
	В	Std. Error	Beta			Lower Bound	Upper Bound
Constant	78.673	903.031		.087	.935	-2428.544	2585.889
Employment	.697	.115	.950	6.059	.004	.378	1.016

Table 4.8 provides the result for the regression model coefficient of the predictor/s. It suggests that only the employment variable shows a significant p-value (p<0.05). This indicates that Employment is the best predictor variable that significantly influences the GDP Distribution. Therefore, Trade export will be excluded from further calculations.

Table 11 Excluded variable (Trade export)

					Collinearity Statistics	
	Beta In	t	p-value	Partial Correlation	Tolerance	
Trade Export	221 ^b	520	.639	287	.166	

Table 4.9 shows the excluded variable/predictor of the regression model. This is supported by the resulting p-value (>0.05) which is not significant. Thus, the regression model is



It is important to note that the variable "Trade Export" has been excluded from this model. This suggests that the model is exclusively focused on examining the relationship between Employment and GDP Distribution, without considering Trade Exports. Therefore, according to all the calculations, only the Employment variable has a strong impact on the GDP variable. Trade exports

do not have a significant impact on the GDP variable. It is crucial to recognize the limitations of these conclusions, as they are context-specific and may not generalize to broader economic dynamics or different timeframes. Additionally, the wide confidence intervals underscore the inherent variability in these estimates, emphasizing the need for caution in interpreting these results beyond the confines of this study's scope.

6. CONCLUSION, AND RECOMMENDATION

This study intends to evaluate the role that industrial sectors have played in the Philippines' economic expansion. This study aims to evaluate the historical and current contributions of industrial sectors to the annual economic development of the Philippines. Based on the results, the following conclusions are

1) The Employment variable, measured in thousands, fluctuated significantly between 2017 and 2022. Notably, there was a dramatic fall in 2020 due to the pandemic, which resulted in severe employment losses. However, despite the pandemic's long-term consequences, the employment rate recovered and exhibited an upward trend between 2021 and 2022. Similarly, trade increased steadily from 2017 to 2019, but fell 20% in 2020, owing to pandemic-induced interruptions in worldwide business and internal mobility constraints. However, commerce increased by 50% in 2021 before returning to 6000 in 2022. Meanwhile, GDP distribution increased gradually from 2017 to 2019. Notably, inflation fell to 1.7% in 2019, showing that the currency's buying power has stabilized. This trend was bolstered by the Banko Sentral's more lenient policy stance, which aimed to promote economic development by providing favorable borrowing circumstances and resolving possible issues linked with low inflation.

2) There is no statistically significant variation in mean values between the pre-pandemic and pandemic eras for Employment, Trade Exports, or GDP Distribution. These findings imply that, at least within the context and time range addressed in this study, these variables did not experience significant alterations as a result of the pandemic. These findings lead to the conclusion that, within the exact parameters and time range studied in this study, the variables of Employment, Trade Exports, and GDP Distribution did not experience significant changes due to the pandemic.

3) Results suggest that the model is exclusively focused on examining the relationship between Employment and GDP Distribution, without considering Trade Export. It's important to note that the variable "Trade Export" has been excluded from this model due to having minute significance on the GDP according to the calculations within the scope of our study. Therefore, according to all the calculations, only the Employment variable has a strong impact on the GDP variable. Trade exports do not have a significant impact on the GDP variable.

7. RECOMMENDATIONS

Educators and School Professionals: It is highly recommended that educators and administrators in schools comprehend the functions of employment and trade export in the industrial sector to effectively communicate to students how these aspects impact the economic development of the Philippines. These elements might have a big impact on the nation in the future, increasing its employability and trade exports, thus it's important to educate the next generation of students about the possible impacts of the industry sector to the economic development of the country. By fostering a holistic approach to economic education, students will gain a comprehensive understanding of how economic factors impact employment, trade exports, and overall national growth, ensuring they are well-prepared for the dynamic economic landscape in the Philippines and globally.

Community: The researchers advise the public to be aware of developments in the nation's employment and trade export to inform and gather feedback on the effects of these factors. Collaborating with local media outlets to disseminate information and promote economic literacy can also play a crucial role in ensuring that the public remains well-informed about the nation's economic developments. This will enable the government to make necessary improvements to these areas in the interest of a more prosperous and expansive future for our nation. The researchers are aware that communities have a significant impact on the nation as they inform the public about issues that are currently affecting the Philippines' economic development.

Government: For the government, researchers want to recommend that they find innovative ways so that many people would have the capability to be employed, especially for those people who have a hard time finding jobs for their families since poverty is still a big problem in our country at this moment. It is also highly recommended that the government be aware of the trade imbalance and that we should use our resources wisely and efficiently to prevent excessive imports of commodities from other nations rather than importing too much.

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