
RESEARCH ARTICLE

The Correlational Analysis between the Industrial Sector and Agriculture Sector towards Economic Development

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ABSTRACT

The Correlational Analysis between the Industrial Sector and Agricultural Sector towards Economic Development. This research aims to determine the current situation of the Construction, Manufacturing and Agriculture industry in the Philippines and the significant relationship of the manufacturing and construction industry towards the agriculture sector. The researchers gathered data from the Philippine Statistics Authority Using the Manufacturing and Construction Industry as the Dependent variable and Agricultural Sector as the independent variable. The researchers used statistical methods and measurements using Pearson correlation and Multiple Regression to determine their results. The Pearson correlation results indicate that there is a strong positive relationship between Manufacturing-Agriculture and Construction-Agriculture Industry. Our findings from the regression analysis suggest that there is a positive effect between the manufacturing industry, construction industry and agricultural sector.

KEYWORDS

Economic Development, Agriculture, Manufacturing Industry, Construction Industry, Pearson Correlation, Regression Analysis

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1. Introduction

In the Philippines, a land that contributes most of the Agricultural resources that man needs was nurtured and untouchable. It is filled with beauty and the abundance of flora and fauna, a land that provides the resources of most agricultural products for its country. It's thirty million (30,000,000) hectares of land, which compromises forty-seven (47) percent of agricultural land. The Philippines is known for producing agricultural products where farming, fisheries, and livestock are a source of life. The Philippines produces crops such as rice, corn, coconut, sugarcane, bananas, etc., and these crops can be found in most rural areas in the country where most citizens still live.

As the world continues to evolve, the Philippines are progressing into shifting its country and molding it to become an industrialized country and economy. In the process of evolving the country into a new generation of resources, Manufacturing and Construction industries continued to grow exponentially. Manufacturing Industries in the Philippines produces products; semiconductors, electronic components, petroleum, peripheral equipment and processed foods. Moreover, half of the Philippines ' industrial sector is Manufacturing. In the long-run, the Philippines is considering becoming globally competitive and continuing to establish an innovative manufacturing industry for auto electronics, machinery and food. Investing in innovation makes the country more industrialized. Construction industries began deep excavations for coals and other minerals; they began constructing skyscrapers for corporates as it continues to bring land-surface disturbances. This industry has a wide range of products varying from different enterprises. Moreover, most of the construction industries are still within major firms, building sites for companies and factories as the Philippines continues to evolve around by major companies who buy lands and begin constructing a skyscraper for future firms with different agendas.

Economic development has different factors that could lead to its effectiveness in a country. Collecting data reading studies shows that economic development will not thrive without the intermediaries between the development of an economy to the industrial and agriculture industry. Policies could also help in addressing the issues in global development moving forward. (Nunn, 2020)

Truly, growth in the industrial and agricultural sectors is key in boosting a nation's economy, but in the Philippines, as observed by the researchers, this hasn't been the case. There are industries that rapidly improve their output, particularly the construction and manufacturing industries. On the other hand, there are industries that have a slow development or even declining output, just like the agricultural sector. This scenario between the difference in the economic growth of the industrial sector and the agricultural sector in the Philippines hasn't been proven clearly to be related. The Philippines being an agricultural country, the researchers believe that it is a problem that needs to be addressed. Agriculture plays a vital role in the Philippines' economy, and the reasons for its bad performance in the past years should be analysed. There is a need for objective analysis to determine if there is a significant relationship between the industrial and agricultural sectors in the Philippines. Transforming Philippine agriculture into a dynamic, high-growth sector is essential for the country to speed up recovery, poverty reduction and inclusive growth. Modernizing the country's agricultural sector is a very important agenda for the Philippines. (Diop, 2020)

The researchers want to establish a study that would determine the relationship between the manufacturing industry and construction industry to the agricultural sector. Hence, the researchers knew that they would need to provide extensive and in-depth data and analysis in their study titled; *The Correlational Analysis between the Industrial Sector and Agricultural Sector towards Economic Development*.

2. Literature Review

2.1 Agricultural Sector

Civilization started with agriculture which, to this day, remains very important and plays a significant role in our lives. And while its significance may be even more pronounced in some countries than others, the reality is that every country depends on agriculture to sustain itself in one way or another. Agriculture plays an essential role in sustaining and driving the economy. It's the backbone of everything that drives us. In addition to providing food and other raw materials, it also provides employment opportunities. (Impoff, 2019)

As of 2018, agriculture only represents 3% of the world's GDP, down from 4% in 2010. Even though agriculture represents a small share of the world's economic output, this industry employs almost 30% of all workers. Developing countries are more likely than developed countries to rely on agriculture as a larger percentage of GDP. Overall, agriculture as a share of total GDP is highest in countries in Africa and South Asia. (Amoros, 2019)

Agriculture in the Philippines is one, if not the essential industry in the country. It consists of forestry, crop production, livestock farming, and aquaculture cultivation. Its output sustains the local demand and is considered to be an essential commodity within the country. Commercial crops assist both the agricultural export industry as well as domestic demand and consumption. Growing crops for food consumption and fiber have been lifelong activities in the Philippines. (Sanchez, 2020)

Agriculture remains of crucial importance in the economy of the Philippines, albeit its relative contribution to gross domestic product (GDP) has been declining over the years. From 1998 to 2009, the sector accounted for 13 to 14% of the total GDP. This steadily declined to 10% by 2017. However, gross value added (GVA) to agriculture in constant prices has been growing during the same period, which means agriculture is not shrinking in absolute size. (Brown, 2018)

Agriculture is dying. This is a sad reality of the country. Agricultural land is being developed into industrial areas, shopping malls and subdivisions. Farmers are growing old, and their children have shifted into other careers. The agriculture industry has not progressed in ages. Even if the Philippines is primarily an agricultural country, we have not done anything to 'cultivate' this sector. (Guzman, 2018)

Based on the Philippine Statistics Authority or PSA, there is a steady decline of an average of .53 to 1.39 percent on the country's agricultural employment rate from 2013 to 2015. There were at least 31 million male and female Filipinos involved in agriculture in 2013, but it decreased to 29.1 million in 2015. This is devastating news considering that the Philippines was once the envy of its neighbouring countries where students used to enrol in Philippine universities to study agriculture. (Carbon, 2019)

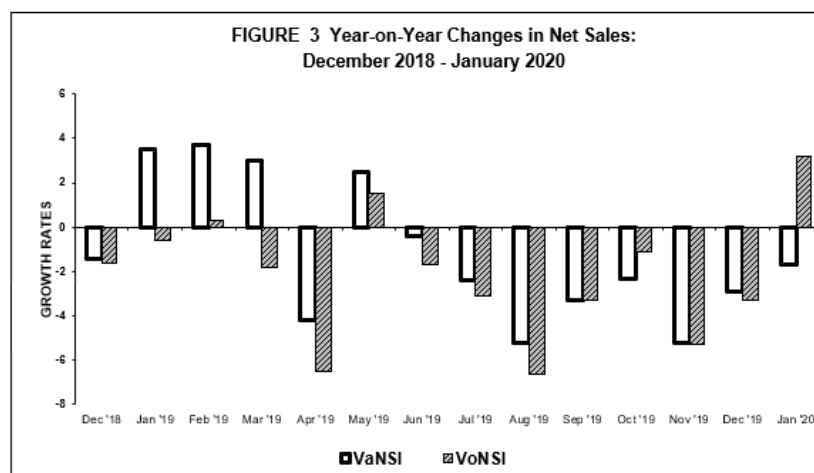
2.2 Manufacturing Industry

The nature of the manufacturing sector in the Philippines contributes the largest to the growth of its economy. Through the course of the economic growth year by year, the manufacturing industry is one of the driving forces of its country consisting of different sub-sectors and several components; the food manufacturing being the largest sub-sector and in the field of electrical machinery, electronic manufacturing components taking most of the largest employment. (De, La Salle University, 2019)

Since the 1990s, the average growth of the manufacturing sector has been steadily increasing, and from 1991-2000 the sector increased an average of 2.5%. In 2001-2010 it increased by 4.1%. Through the years starting 2011-2014, it exponentially increased by 7.1%. In 2017 the manufacturing industry growth rate of 8.6% increased from its previous year, which is 7.0% in 2016; the Philippines' goal on its structural transformation roadmap is to maintain the competitiveness of industries in the country. In the short-run, an advantage in the manufacturing industry will strengthen the upcoming and evolving industries. It would solidify the strength of industries that have been in the market for a long time. Furthermore, it is also a plan to integrate innovative manufacturing into agricultural and service industries in the medium-run. Manufacturing doesn't only exist throughout the world; it plays a significant role in the economic development process of a country to connect from the world with innovative industrial upgrading. (Wei Li & Huang, 2018)

In the studies of Kaldor's Law, Kaldor conducted an empirical, structural and comparative investigation about the key role of the manufacturing sector in economic growth. According to Kaldor, the industrial sector is responsible for the differences shown in an economic growth rate. Whereas the law assumes that the growth in production of manufacturing contributes to the productivity growth of an economy, making a self-sustained growth for the country's economy. However, other sectors in the economy contribute to its growth, and these sectors, once they emerge together, could produce higher income levels to serve the economic growth of a country. (Giovannini & Arend, 2017)

There are 11 major industries in the manufacturing sector that continue to contribute to the growth of the Volume of Net Sales Index, which is footwear and wearing apparel (27.6%), fabricated metal products (23.6%), printing (23.6%), chemical products (20.6%), transport equipment (13.5%), tobacco products (12.3%) and beverages (10.8%)



According to the Philippine Statistics Authority, the average capacity of utilization rate is at its highest for the month of January 2020. The aforementioned manufacturing industries above produce the most percentage, at least 80% capacity utilization. Manufacturing industries establishments operate at full capacity. (Philippine Statistics Authority, 2020)

Old ways how the economy and market operations will have an undersized contribution in the growth of an economy. Therefore, economies with more diverse industrial sectors tend to grow faster as they shift in innovative industries through globalization, molding their countries into becoming globally competitive to other countries. (Guisan, 2017)

Furthermore, discussions on which sector and industry contributed more to a country's economic growth, studies say that industrialization must be viewed as an engine in economic growth. A decline in the manufacturing sector will negatively affect the growth rate of other service sectors; it also accelerates the technological advancement of an economy. Manufacturing sectors have different sub-sectors, and it has different characteristics that are attributed to their sector; technological change and economies of scale. Hence, according to Asian Development Bank Institute (2016), the transformation from agriculture to manufacturing shows that there is economic development. However, there are debatable questions about manufacturing if it could still be the leading focus of industrial policy for most developing countries since the services sector in the world continuously increased. (Su & Yao, 2016)

2.3 Construction Industry

The Construction industry garnered the highest year to year growth rate as it tripled to 15.9% in 2018. The industry also contributed 33.9% to the Gross Capital Formation in the Philippines. This sector provides job opportunities due to multiple infrastructure projects. (Department of Trade Industry, 2018).

As the fastest growing economy among selected Asian economies, the Philippines is ranked 11th on 2016 Preferred Global Foreign Direct Investment and 10th in 2017 MNE's Top Prospective Host Economies. The investments in which most came from infrastructure investments in "build build build program". Investment reached from 26 billion pesos in 2016 to 131.6 billion pesos in 2017; starting the first semester of 2018, the construction industry shared 6.5% to economic growth. (Abiera, 2018)

Understanding the Construction industry in the Philippines must require a view on two different understanding. The first one is the activities and programs of the establishments that are primarily creating the building, infrastructures and land improvements. Second is the construction materials taken by construction firms. Through this, Construction is somewhat an investment, and it has its own share of the economy. It is a fact that job opportunities can be found in construction; it increases the employment rate. However, wage differentials may exist in the industry. Work experience in India is a significant factor that affects wages for construction, especially in developing countries; it may be influenced by labor market dualism. (Chheda & Patnaik, 2016)

The performance of Construction projects is important as they affect the outcomes of economic development. Improving technology and programs for infrastructure projects is important for positive economic development. Failing a construction project can be a result of performance problems. Causes of these performance problems could be health, quality, cost, client changes, business performance and other factors, as this could affect the contributions of the Construction industry in the economy. (Oke, Ogungbile, Oyewobi, & Tengan, 2016)

The economic impact of construction could attract more investments for firms that provide infrastructures. In China, the HRS construction provides positive economic development for the country. It is studied that construction firms build infrastructure according to the economic development level of certain areas. (Xu & Huang, 2019)

However, there could be a negative relationship between construction and economic development if it has not been managed or planned. Hence, depending on the construction, economic growth should be reviewed by the government. (Li, Luan, Zhang, & Su, 2020)

Productivity is the rate of output per unit of inputs. Measuring productivity is difficult in construction. Statistically speaking, producing productivity growth in this industry is different from producing a built environment; in a wider economy, the construction and building environment can produce major impacts on a country's productivity. (Green, 2016)

In the Solow Model, capital accumulation is said to be one of the factors contributing to economic growth. When investments grow, the labor force will increase with its productivity growth. Hence, structural change due to construction will have an impact on economic growth and productivity growth. (Chen & Xie, 2019)

2.4 Relationship between Agricultural Sector and Industrial Sector

The relationship of Industrial and Agriculture sector towards Economic Development. An extensive profile of different sectors and factors contributes to a country's economic growth; there are major manufacturing enterprises that supply large-scale growth for economic development. (Ndubisi, Zhai, & Lai, 2020)

It stated that there are small and medium manufacturing enterprises playing important roles in the economy. The Asian manufacturing sector mainly consists of small and medium manufacturing enterprises that provide help in meeting the demands for goods and services throughout their region. (Ndubisi, Zhai, & Lai, 2020)

On the other hand, the agriculture sector is said to be the backbone of an economy, providing mankind and materials for the Industrial sector. As the basic source of food that supplies across the nation and other countries that are underdeveloped, developing or developed, the demand for food continuously increased its rate. Failure of supplying food products will affect the growth of an economy. (Praburaj, 2018)

Moreover, an analysis shows that even there is a rapid structural change in China, its agricultural sector still exhibits a strong linkage to the rest of the economy. It is emphasized that despite its evolving economy, the agricultural sector still plays a significant role in sustainable growth, even though its role has evolved also. It is stated in the result of the study that agriculture in the present time has more impact on the supply side, unlike before, where it has more effect on the demand side. (Zhang & Diao, 2020)

2.5 Relationship between Agricultural Sector and Manufacturing Industry

According to World Bank, Agriculture and Manufacturing could possibly have unrelated relationships towards one another. The Philippine Statistics Authority stated that the manufacturing industry continued to expand while Agriculture continued to recover. The agriculture and Manufacturing industries are said to be interdependent on each other as they both nurture and provide both of their needs, especially when it comes to raw materials. The industry is not a replacement for agriculture; they are supplying inputs and outputs between them. It is without a doubt that agriculture boosts the economy of a country; agriculture is the source of livelihood for people living in rural areas. This sector also has major contributions to GDP. (Uddin, 2020)

The gross value added is one of the measures that contribute to the formation of the Gross Domestic Product. Agriculture, Forestry, Fisheries and Manufacturing sectors have been selected for analysis in this paper because of their importance in the national economies. The analysis for Granger causality between the variables selected failed to return statistically significant results. The models had similar behaviours, with some of them not passing even the stability or autocorrelation tests. (Motofei, 2020)

The Granger Causality test indicates a bidirectional relationship between agriculture and manufacturing industry output, which implies backwards and forward linkages in the input-output interface. This two-way linkage implies that government investment in the agricultural sector equally boosts manufacturing output and vice versa. Increasing output from the manufacturing industry will invariably cause an increase in agricultural productivity. (Osuagwu, 2018)

It is clear that there are sub-sectors of these two. It is mentioned that manufacturing has a large sub-sector in the new Industrial Policy of the Philippines. The government wants to merge agriculture and manufacturing, providing more economic growth and contributions to the economy. Being interdependent towards one another, agriculture provides raw materials that manufacturing industries will need in order to utilize their companies at full operations. Hence, in the new industrial policy, the manufacturing sector experienced significant growth that was sustained during the past years. (Rosellon & Medalla, 2017)

On the other hand, even though agricultural production can develop the manufacturing industry, there are issues that hinder it. An econometric regression suggests that it is not easy for all of the countries to adopt a model where industrialization is driven by agricultural production. Some factors identified in this drawback are low skill development, poor infrastructure and lack of education. (Kafando, 2018)

2.6 Relationship between Construction Industry and Agricultural Sector

Economically, the land is the most efficient wealth-generating asset for farmers and is also an important factor for economic growth. However, the limited and unrenewable nature of land supply creates fierce land-use competition, usually between the agricultural and non-agricultural sectors. This gives rise to agricultural land conversion (ALC), which significantly reduces agricultural land availability and threatens the food supply. Land rent analysis revealed that the peri-urban area has a lower value for agriculture but a higher value for housing. The result of the analysis reveals that agricultural land yielded a higher economic value after being converted (Rondhi, Pratiwi, Handini, Sunartomo, & Budiman, 2018)

The simplified land valuation method allows choosing optimal motorway variants. Motorway construction influences the indirect sustainable development of rural areas; motorway construction impacts directly on agricultural land; The soil quality class plays a great role in decreasing the land income value. The direct vicinity of a motorway is the reason for a drop in the value of agricultural lands. (Bacior & Prus, 2018)

The opportunity cost of any given land is its current productivity, and hence if it is shown that the proposed alternative land use will have higher productivity, then such benefit will outweigh the opportunity cost, which is by definition a cost foregone if the land resource is used differently. Land developers and owners of real estate enterprises, like Villar, are gainers, in addition to those who will benefit from the conversion of agricultural lands into malls, factories and subdivisions. This, even as farmers and their families are the losers. (Contreras, 2020)

Road constructions will improve the economic development in the Philippines. A study conducted in Nueva Ecija, as it is known to be the rice capital of the Philippines that produces metric tons of rice per year, could ease the transport of farms to its buyers in the market. The 'Build, Build, Build' Program could increase the socio-economic development for the growth of the country; it could provide interconnectivity between people and community to open job opportunities and investment for growth. (Gallego, 2017)

In addition, a study shows that growth in the construction industry leads to larger growth in the macro-economy. It is identified and recommended for the government to make a conducive environment where the construction firm can enhance its performance. It is forecasted that improving the construction industry could generate jobs and will allow workers from the informal sector to enter and be able to work in a formal sector. (Anaman & Osei-Amponsah, 2017).

3. Methodology

This research study uses a casual-comparative research design. Casual-comparative research design aims to establish a cause-and-effect relationship between 2 or more variables without manipulating the independent variables. It assists the researchers in understanding the process of proving a causal link between the variables. The casual-comparative research design provides the researchers with a process to make an objective analysis in finding the significant effect of the manufacturing industry and construction industry on the Philippines' agricultural sector. Data from the manufacturing industry and construction industry will not be manipulated to eliminate bias in the study and have a pure result. Through this research design, the researchers can conclude and be able to answer the problems of the study.

The researchers used secondary data for the evaluation and conclusion of the study. The data that was used is the gross value added of the manufacturing industry and the gross value added of the construction industry in the Philippines for its independent variables, while the gross value added of the agricultural sector in the Philippines was used as the dependent variable. These data are collected from the Philippine Statistic Authority database online. The data that was used and the study will mainly focus on the Philippine settings. The Data that were collected are from the year 2000 to the year 2020. The total number of observations is 21.

The gross value added of the manufacturing industry, the gross value added of the construction industry and the gross value added of the agricultural sector in the Philippines were used as the variables because it gives the total output and the past performance of the manufacturing industry construction industry and agricultural sector. These data are the key factors to determine the relationship between the manufacturing industry and the construction industry towards the agricultural sector.

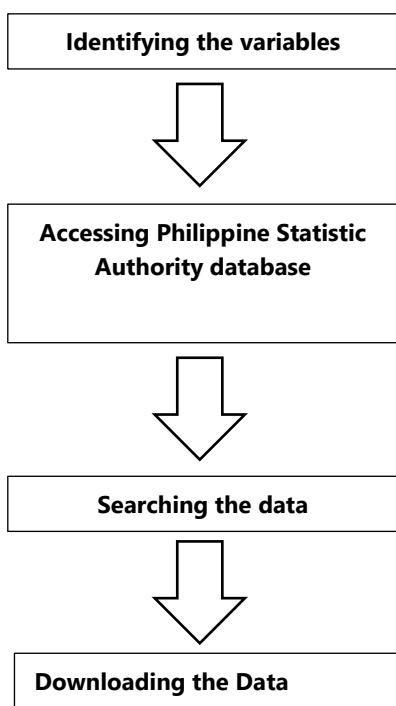
3.1 Research Instruments and Techniques

The main instrument that was used in the study to gather data and information was the Philippine Statistic Authority database. The data collected in the Philippine Statistic Authority are the gross value added of the manufacturing industry, the gross value added of the construction industry and the gross value added of the agricultural sector. Philippines Statistic Authority database was able to respond to the needs of the study by providing the total output of the manufacturing industry, construction industry and the agricultural sector. These total output of the manufacturing industry, construction industry and agricultural sector gives the past performance of the variables being assessed and will be able to make results to determine the relationship between the manufacturing industry and construction industry towards the agricultural sector.

3.2 Data Gathering Procedure

The data used in the study were collected from the Philippine Statistic Authority by making the following procedures:

1. Identifying the variables – Identifying what the data needed for the success of the study are.
2. Accessing Philippine Statistic Authority database – going to the online website of Philippines Statistic Authority database. The website was <https://openstat.psa.gov.ph/Database>.
3. Searching the data – searching the data need for the study in the Philippines Statistic Authority database website.
4. Downloading the Data – the collected data was downloaded to the personal computer of the researcher.



3.3 Statistical Treatment of Data

The researchers used different statistical tools and methodology in evaluating the collected data. The primary software used in the testing of data is Microsoft Excel, EViews and Statistical Package for the Social Sciences (SPSS). The collected data were analyzed through the following statistical measurement:

Pearson R Correlation. The researcher uses it to test the strength of the relationship between the independent variables and the dependent variable. Below is the formula for Pearson's Correlation Coefficient (Glen, 2021):

$$r = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2} \sqrt{\sum (Y - \bar{Y})^2}}$$

r	Correlation Coefficient
$\bar{X}$	Mean of X variable
$\bar{Y}$	Mean of Y variable

Below is Pearson's correlation coefficient for interpreting the strength of correlation (Glen, 2021):

Strength of Association	Positive	Negative
<i>Weak</i>	0.1 to 0.3	-0.1 to -0.3
<i>Medium</i>	0.3 to 0.5	-0.3 to -0.5
<i>Strong</i>	0.5 to 1.0	-0.5 to -1.0

Multicollinearity Test. The researchers used the Multicollinearity test to identify if there is a significant relationship between the independent variables. It is significant to test if there is multicollinearity in the variables because it causes the coefficient to be undetermined and, at the same time, can cause the coefficient to have the wrong sign. The following are the test for multicollinearity (Gujarati, 1978):

- low t-values
- high R²
- Variance Inflation Factors (VIF)

$1 \leq \text{VIF} (\beta(\text{hat})) < \infty$ Multicollinearity is not serious if no VIF is greater than 10 $\text{VIF} (\beta(\text{hat})) = 1/1 - R^2$

Durbin-Watson Test. The Durbin-Watson test is to measure if there is autocorrelation in the Variables. It is important to test if there is an autocorrelation because it makes the standard error of the equation incorrect; at the same time, it makes the t-test, the f-test and the R² unreliable. Below is the formula for the Durbin-Watson Test (Gujarati, 1978):

$$d = \frac{\sum_{t=2}^{t=n} (u_t - u_{t-1})^2}{\sum_{t=1}^{t=n} u_t^2}$$

Where u_t are the residuals.

Below are the rules for Durbin-Watson decision (Gujarati, 1978):

- 2 is no autocorrelation.
- 0 to <2 is positive autocorrelation
- >2 to 4 is negative autocorrelation

Linear Regression. The researcher uses linear regression to predict the relationship between the agricultural sector to the manufacturing industry and the construction industry, respectively. Below is the formula for linear regression (Gujarati, 1978):

$$GVAA = a + b * GVAC \text{ and } Y = a + b * GVAM$$

Where:

GVAA = Gross Value Added in Agricultural Sector

GVAC = Gross Value Added in Construction Industry

GVAM = Gross Value Added in Manufacturing Industry

b = Slope coefficient

a = the intercept

Multiple Regression. The researcher uses multiple regression to predict the outcome if the manufacturing industry and construction industry will be regressed to the agricultural sector. Below is the formula for multiple regression (Gujarati, 1978):

$$GVAA = B_0 + B_1 * UPV + e$$

Where:

- GVAA = Gross Value Added in Agricultural Sector
- UPV = Unstandardized Predicted Value (Manufacturing industry and Construction industry)
- B_0 = the intercept
- B_1 = regression coefficient
- e = error term

4. Results and Discussion

In relation to the statement of the problems of the study, the summary of findings is disclosed and discussed below.

1. The study has found out that the agricultural sector, manufacturing industry and construction industry exhibit positive performance in their production. The agricultural sector, manufacturing industry, and construction industry have all shown growth in their production through the years. The study was also able to forecast that the agricultural sector, manufacturing industry, and construction industry will have continued growth in their production from the year 2021 to 2030, assuming that everything will be constant.

2. The study used Pearson correlation to calculate and illustrate the relationship between the variables of the study. The following results were drawn from the test.

- The agricultural sector and construction industry exhibit a "strong positive relationship" with a Pearson correlation value of 0.848, and it is significant at the P-value of 0.000.
- The agricultural sector and manufacturing industry exhibit a "strong positive relationship" with a Pearson correlation value of 0.965, and it is significant at the P-value of 0.000.
- The agricultural sector and the unstandardized predicted value, which includes construction industry and manufacturing industry together, exhibit a "strong positive relationship" with a Pearson correlation value of 0.981, and it is significant at the P-value of 0.000

3. The study used linear regression to calculate and illustrate if there is a significant prediction between the agricultural sector towards construction industry and manufacturing industry, respectively. The following results were obtained from the tests.

- The agricultural sector and construction industry show an equation equal to "GVAA = 166979.3145 + 0.8828*GVAC + e", which means that the agricultural sector will have a value of 166979.314 if the other variable is equal to zero, and in every additional unit in the construction industry there will be 0.8828 unit increase in the agricultural sector. The r^2 value is 0.718, which means that 71.8% of the total dependent variable can be explained by the independent variable.
- The agricultural sector and manufacturing industry show an equation equal to "GVAA = 32339.8091 + 0.5055*GVAM + e", which means that the agricultural sector will have a value of 32339.8091 if the other variable

is equal to zero, and in every additional unit in the manufacturing industry there will be 0.5055 unit increase in the agricultural sector. The r^2 value is 0.932, which means that 93.2% of the total dependent variable can be explained by the independent variable.

4. The study used multiple regression to calculate and illustrate if there is a significant prediction between the agricultural sector towards construction industry and manufacturing industry together. The following results were obtained from the tests.

- The Agricultural sector and the unstandardized predicted value, which includes construction industry and manufacturing industry together, show an equation equal to $GVAA = 0.00000000005821 + 1.00 \cdot UPV + e$. It means that the agricultural sector will have a value of 0.0000000000582 when all other variables are equal to zero, and in every additional unit increase in the other variables, there will be 1 unit increase in the agricultural sector. The r^2 value is 0.963, which means that 96.3% of the total dependent variable can be explained by the independent variables.

5. Conclusion

Given that the Philippines have become an industrialized country, agriculture still remains to be part of its economy. Thus, understanding the linkage between the two sectors is significant towards economic development. By answering the stated problems of the study, grounded with the data gathered and test results, the following conclusion was drawn:

The study has found out that the construction industry and the manufacturing industry, which are the independent variables of the study, and the agricultural sector, which is the dependent variable of the study, has an R-value of 0.981 that suggests a significant relationship between the variables. In addition, with the P-value calculated less than 0.05, the null hypothesis was rejected. Therefore, it is accepted that there is a significant relationship between the agricultural sector towards the construction industry and the manufacturing industry.

Although all independent variables have a significant relationship to the agricultural sector, the manufacturing industry exhibits a higher correlation with an R-squared value of 0.932 and Pearson correlation value of 0.965, compared to the construction industry, which has an R-squared value of 0.718 and Pearson correlation value of 0.848.

Overall, this significant relationship between the agricultural sector and the industrial sector is in alignment and in relation to the "urban-industrial impact model", where it is stated that the industrial sector stimulates agricultural development. (Udemezue & Osegbue, 2018) Furthermore, Kumar (2021) finds in his study that this positive relationship between the industrial sector and agricultural sector can be explained by its linkage, which are production linkage, demand linkage and saving-investment linkage.

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Conflicts of Interest: The authors declare no conflict of interest

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