THE RELATIONSHIP BETWEEN ASSET MANAGEMENT EFFICIENCY AND FINANCIAL PERFORMANCE OF INDUSTRIAL MANUFACTURING COMPANIES LISTED N THE PHILIPPINE STOCK EXCHANGE

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Abstract

The main purpose of the study is to determine the relationship between asset management efficiency and financial performance. The asset management efficiency was measured through inventory turnover, fixed asset turnover, and total asset turnover paired with return on assets as proxy for financial performance. A total of 25 companies from (a) chemicals, (b) food, beverage, and tobacco, and (c) electrical components and equipment subsectors were selected as participants determined using cluster sampling technique. The study adopted the quantitative descriptive-correlational research design. Secondary data were taken from the published annual financial statements covering a period of five years (2015-2019). Panel data regression analysis was carried out through the use of Stata software. The results of the study showed that there were no significant differences on the asset management efficiency ratios and financial performance among the three subsectors. It was also revealed that inventory turnover has a significant negative relationship with financial performance, whereas total asset turnover has a significant positive relationship with financial performance. On the other hand, there was no significant relationship between fixed asset turnover and financial performance. Nevertheless, the three variables, taken altogether, was found to have a significant relationship with financial performance. It was recommended that the management of these companies should, among other things, implement modern techniques that would translate the asset turnover to corporate performance.

Keywords: Asset management efficiency, inventory turnover, fixed asset turnover, total asset turnover, financial performance, return on assets

Introduction

The term asset management has been extensively used to cover various areas such as general management, operations, production, financial, and human aspects. It has been chiefly described as an effective method for asset operation, maintenance, upgrade, and disposal. It is where an organization effectively manage its assets and its associated expenditures and risks in order to achieve its target performance.

Asset management evolved from maintenance management with the intention to produce a holistic approach in handling assets, placing greater emphasis on optimizing its contribution to the overall company performance. An efficient asset management is a primary performance driver for asset-intensive firms. The central objective is to attain high level of utilization. Existing approaches on asset management include the engineering and governance perspectives (Mardiasmo et al., 2008). The former concentrates on the technical and operational aspects, while the latter focuses on the organizational-level factors.

The commitment of establishments to asset management has received substantial attention both in theory and practice. The typical underpinning assumption is that refining a firm's activities will increase its financial performance. A company's performance can be evaluated using two facets (Almajali et al., 2012). The first dimension is productivity which relates to the process of transforming inputs into outputs efficiently. The second dimension is profitability which refers to the firm's level of earnings. Industries are interested to understand the factors that will give them the best financial return. Consequently, firms

always pursue continuous improvement of asset utilization in short- and long-term basis.

The motivation of this study stems from the fact that only few studies have explored this factor to explain the performance of industrial manufacturing companies. Although there has been extensive literature, the study on manufacturing companies is still in its formative years. Specifically, there are no econometric studies that have examined the influence of asset management efficiency on financial performance concerning the manufacturing firms in the Philippines. To date, no undertaking has been conducted to explore the same matter relating to these companies even though these enterprises have been making notable contribution to the country's economy. This study proposes that there is measurable linkage between asset management efficiency and financial performance. The present study seeks to fill this specific research gap.

There is a need to identify which sectors have consistently played a primary role in augmenting the economy over time. The service and industry are like two hands of the Philippine economy, without which the country can neither function nor survive. The industrial sector is imperative for economic growth and industrialization. A well-established industrial sector can provide a platform for strengthening the country's economic system. It elevates the productive capacity of the people and generates employment opportunities. In most parts of the country, continuous growth was seen in the manufacturing industry despite the prevailing frail economic conditions. The Philippine Statistics Authority (PSA) reported that the manufacturing industry posted a triple-digit growth (Cabuena, 2021). On that account, manufacturing firms are of great interest since their performances are most likely to have a constant impact on the industrialization process of the country.

This academic paper aims to unfold a challenging gap in the literature by offering new support on the factors of

financial performance, reviewing the financial performance, scrutinizing and observing the factors that would possibly manipulate the financial performance, providing proposals based on evidence, and endorsing the companies towards its stakeholders. This study is significant as it involves investigation of an uncharted area in the context of an emerging economy. It is, in some way, comprehensive in the sense that a number of factors were considered to assess its potential influence on the companies' financial performance. In turn, this study will eventually allow the companies to steer these factors in their favor.

Review of Related Literature

From an accounting standpoint, assets are an essential element of companies' success. Regardless of the nature of their businesses, organizations and establishments consider an asset as a significant determining factor of their wealth. Fundamentally, the way these firms utilize their assets is believed to be highly critical.

Several authors have their own characterization of profitability. Nevertheless, it remains to be the ultimate objective of all business endeavors (Amran et al., 2021; Anwar & Gunawan, 2020; Hala, 2020). From the perspective of an enterprise, the absence of income will adversely affect its capacity of going further. Without profitability, these businesses have a little or no chance of surviving in the long run (Adjirackor et al., 2017; Widagdo & Sa'diyah, 2021). On that premise, measuring any firm's performance in terms of its profitability becomes vital. The way a business uses its assets greatly affect its financial performance.

Financial Performance. An all-inclusive assessment of a company's overall standing is termed financial performance (Corporate Finance Institute [CFI], n.d.). The most impartial way to evaluate a firm's financial performance is through the use of financial statement analysis which requires a company to use different financial ratios as principal measurement tools.

In this study, the last group of financial ratios enumerated above is the category to be used in measuring financial performance. To be more specific, the return on assets, which is calculated as net income divided by the average total assets, is the selected means of measurement. It is the principal concern of a business to give substantial attention to return on assets due to its implications to its survival (Cyril & Ogbonna, 2013).

Asset Management Efficiency. The need for efficient asset management is no longer optional. Across the globe, substantial asset utilization challenges have caused problems on every business. Thus, finding a better way on how to effectively and efficiently utilize an enterprise's assets to produce higher returns is worthy of analysis (Davis, n.d.).

The presence of assets has a direct impact on the financial performance of a business. As Kovalchuk and Verhun (2019) stated, efficient asset management affects the end result of the firm's economic activities. They further emphasized that efficient asset management will enhance the companies' financial sustainability and competitiveness. If assets are not effectively and efficiently utilized, it results to poor financial performance (Patin et al., 2020). In order to secure continuity, addressing the challenges of asset management is necessary.

Inventory Turnover. Inventory turnover shows the number of times a company has sold and replaced its inventory. This specific type of efficiency ratio is used to measure a firm's ability in managing its purchases, allocating raw materials to manufacturing, and selling its finished goods. Generally, a high inventory turnover is an indication of an efficient inventory management. The longer a product stays in the firm's warehouse, the more likely that its earnings will suffer (Deputy Team, 2018).

Fixed Asset Turnover. Fixed asset turnover is used to measure a company's efficiency to generate revenues from

its fixed assets investments, in particular, the property, plant, and equipment. A higher fixed asset turnover is always looked at positively since it indicates that the fixed assets are not lying idle and are put to best use (Borad, 2017). Contrariwise, a lower fixed asset turnover is usually undesirable since it highlights that a firm is investing excessively in fixed assets but is not able to utilize it efficiently (Shaikh, 2021).

Total Asset Turnover. Total asset turnover is used to evaluate a company's efficiency in terms of utilizing its entire resources to produce revenues. A high total asset turnover indicates that a company is generating more revenue per peso of assets (Solanki, 2019). Conversely, a low total asset turnover normally shows that a firm is not efficiently using its assets in fueling revenues (Hayes, 2021).

Numerous researches were able to investigate the relationship between the total asset turnover and the financial performance. In their study, Nurlaela et al. (2019) found out that the total asset turnover has a significant effect on the financial performance (measured through the use of return on assets) of the companies under the consumption industry sector listed in the IDX from 2016 to 2018. Likewise, Nofiana and Sunarsi (2020) concluded in their research that the total asset turnover has a significant effect on the financial performance of PT. Hanjaya Mandala Sampoerna Tbk, the largest tobacco company in Indonesia, covering the period from 2009 to 2018.

Theoretical Framework

Agency Theory. Stephen Ross and Barry Mitnick, individually and roughly simultaneously, were the first academics to propose this theory. Ross (1973) theorized that a manager of a firm is essentially an agent of the shareholders. Mitnick (1975) explained that the management ("agent") is expected to serve the interests of the investors ("principal"). This theory supports the maximization of profits.

Profit Maximization Theory. This theory was developed by the classical economists who believed that the central objective of a company is to earn the highest possible profit. Although an enterprise has multiple corporate objectives, profit maximization remains to be the universally recognized main goal of any firm (ENotes World, n.d.).

Stewardship Theory. Donaldson and Davis (1991) posited that managers will act as good and responsible "stewards" of the corporate assets they control. The managers seek to diligently perform his job to achieve larger profits. They recognize themselves with the firm and are driven to maximize organizational performance (Al Mamun et al., 2013).

Conceptual Framework

The research paradigm of the study illustrates the presumed relationship between the variables being examined. As shown in the figure below, the independent variable is the asset management efficiency as determined by the efficiency ratios such as inventory turnover, fixed asset turnover, and total asset turnover while the dependent variable is the financial performance as determined by the return on assets.

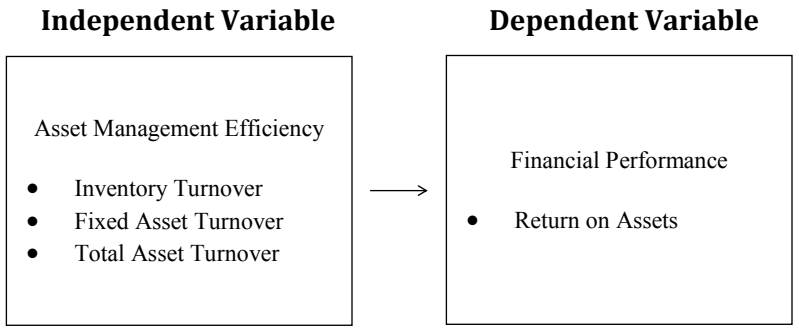

Figure 1. Research Paradigm of the Study

Statement of the Problem

This study aims to determine the relationship between asset management efficiency and financial performance of the industrial manufacturing companies listed in the Philippine Stock Exchange from 2015 to 2019. In order to address the major problem, the following specific questions were constructed:

1. How may the profile of the companies be described in terms of the following:
   1.1. nature of operation,
   1.2. years of operation,
   1.3. years publicly listed,
   1.4. average total assets,
   1.5. average net sales, and
   1.6. average net income?

2. How do the companies measure their asset management efficiency in terms of the following efficiency ratios:
   2.1. inventory turnover,
   2.2. fixed asset turnover, and
   2.3. total asset turnover?

3. How do the companies measure their financial performance in terms of return on assets?

4. Is there a significant difference on the asset management efficiency ratios when the companies' nature of operations is considered?

5. Is there a significant difference on the financial performance when the companies' nature of operations is considered?

6. Is there a significant relationship between asset management efficiency and financial performance of the companies?

Hypotheses of the Study

In reference to the statement of the problem, the following are the hypotheses indicated by the researchers to expound the matter of the study.

H01: There is no significant difference on the asset management efficiency ratios when the companies' nature of operations is considered.

H02: There is no significant difference on the financial performance when the companies' nature of operations is considered.

H03: There is no significant relationship between asset management efficiency and financial performance of the companies.

Method

Research Design

Zikmund et al. (2010) defined research design as a blue print that specifies the overall structure for the procedures to be followed, the data to be collected, and the data analysis to be conducted. It describes the mode of the research and lays down the specific research type (Cristobal & De La Cruz-Cristobal, 2017a). Research designs are often classified as either quantitative or qualitative. This study is quantitative as it requires numerical data to answer the research questions.

Quantitative research is the type of research that uses empirical methods and statements (Cohen, 1980, as cited in Sukamolson, 2007, p. 2). As opposed to qualitative research, its data are in the form of numbers. A more succinct definition was provided by Creswell (1994) who detailed that quantitative research explains the issue through gathering

numerical data and analyzing it through the use of mathematical models.

The study also used the deductive reasoning approach. It pertains to the process in which the researcher starts with a framework and attempts to test it through gathering evidence (Zalaghi & Khazaei, 2016). As described by Bryman (2012), it is an approach in which the research is performed on the subject of ideas derived from a framework. It is widely recognized as a quality standard for quantitative studies (Polit & Beck, 2010).

Participants and Sampling Procedures

The participants are the individuals that serve as the sources of information during data collection. In cases where the participants are not people (i.e., objects), these may be referred to as elements (Cristobal & De La Cruz-Cristobal, 2017b).

Two of the most relevant concepts are population and sample. The population is composed of persons (or objects) that possess some common characteristics that are of interest to the researcher (Best & Kahn, 1998). According to Asiamah et al. (2017), there are three groups of population: (1) general; (2) target; and (3) accessible. The general population is the biggest group of potential participants which share at least a single attribute of interest (Bartlett et al., 2001). The target population is described as the group with the specific attributes of interest and significance which includes the elements the researcher wishes to present in the study (Cooper, 1982). The accessible population is deemed as the final group of participants from which data is collected which includes the elements the researcher is able to have access (Bracht & Glass, 1968).

Once the population's characteristics have been defined, a sample is selected from the accessible population (Endacott & Botti, 2005). Hereon, it represents the sampling

frame, which is the list of the actual cases from which the sample will be drawn. The sampling frame is called the "working population" for it will render the final elements to be covered.

The population of the study, as illustrated in the table, is defined as follows:

Table 1. Population of the study

Category	*N*	Description
General		
ETF Sector	5	The general population is composed of 273 listed companies
Financials Sector	29	
Holding Firms Sector	41	
Industrial Sector	65	
Mining Sector	24	
Property Sector	40	
Services Sector	64	
Small, Medium, and Emerging Board Sector	5	
Target and Accessible		
Chemicals	6	The target and accessible population are composed of 65 listed companies (industrial sector)
Construction, Infrastructure, and Allied Services	10	
Electrical Components and Equipment	7	
Electricity, Energy, Power, and Water	14	
Food, Beverage, and Tobacco	25	
Other Industrials	3	

The sample is a subset of the accessible population that the researcher selects as the participants (Gray et al., 2007). A good sample must be adequate to allow confidence in the stability of its characteristics (Salaria, 2012). The sampling method will affect the representativeness of the population, thereby, influencing the generalizability of results.

Generally, a larger sample is better. Krejcie and Morgan (1970) indicated that the lesser the elements there are in the whole population, the greater the elements of the population should be present in the sample. Nonetheless, a sample size of thirty is accepted to be the minimum number of elements if the researcher aims to use statistical analysis (Shott, 1990). Further, Gall et al. (2002) suggested that correlational research requires a sample size of at least thirty.

The participants of the study were determined using sampling techniques. Barrot (2018) defined sampling as the process of systematically selecting individuals to be examined. The goal is to have a statistically representative sample of elements from the population (Kamangar & Islami, 2013). Sampling serves as an important tool since the population usually consists of too many elements (Majid, 2018).

Ideally, all units in the cluster are taken (Acharya et al., 2013). However, the study cannot do the same due to significant reasons. As presented in the table below, the researchers have performed process of elimination and arrived with three subsectors as preliminary qualified sample.

Table 2. Preliminary elimination of unqualified sample

Cluster	*N*
Industrial Sector	6
Less: Non-manufacturing Subsectors	(3)
Manufacturing Subsectors	3

The companies under the three non-manufacturing subsectors (i.e., Construction, Infrastructure, and Allied Services, Electricity, Energy, Power, and Water, and Other Industrials) were removed from the sampling frame. The study's subject matter is asset management efficiency; those

firms which are manufacturing are considered more relevant and significant. The three manufacturing subsectors are composed of thirty-eight companies.

Table 3. Qualified sample of the study

Manufacturing Companies	*N*
Preliminary Qualified Number of Companies	38
Less:	
(1) Companies not listed during 2015 through 2019	(3)
(2) Companies not able to publish complete financial reports during 2015 through 2019	(2)
(3) Companies' presentation currency in its financial statements during 2015 through 2019 was not Philippine peso	(6)
(4) Companies not operational during 2015 through 2019	(2)
Total Qualified Sample	**25**

The researchers set four criteria to select the final number of qualified samples. These conditions were as follows: (1) The companies were listed during 2015 through 2019; (2) The companies were able to publish complete financial reports during 2015 through 2019; (3) The companies' presentation currency in its financial statements during 2015 through 2019 was Philippine peso; and (4) The companies were operational during 2015 through 2019. After considering the requirements, the final samples, as shown in the table above, were determined.

Out of thirty-eight companies, only twenty-five were able to meet the criteria. The study intended to examine the companies' financial performance for five years. The inclusion of those firms who were not registered, not able to disclose financial reports, not able to prepare financial reports using Philippine peso, and not in operations during the period covered would violate the assumption, goal, and context of the study. Hence, those companies were deliberately excluded.

Research Instruments

Roberts and Stone (2003) described research instrument as the data gathering device. The validity of the results heavily relies on the quality of the instrument (Hulley et al., 2013). As the groundwork of any study, data needs to be updated, dependable, and theoretically right. Hox and Boeije (2005) classified data into two categories: (1) primary; and (2) secondary. It is considered as the former if the data was gathered by the researcher himself for a specific purpose, while it is regarded as the latter if the data was previously collected by other people for a different purpose.

The study utilized the secondary data which is the type of data that already exists. Secondary data is usually historical, amassed, and accessible. As stated by Sørensen et al. (1996), it is often collected for the following purposes: (1) control functions; (2) evaluation of activities; (3) management, claims, administration, and planning; and (4) research. The researchers made use of electronic secondary data geared towards commercial audience. These include company and government websites. Specifically, the study used the companies' audited financial statements as the primary instrument.

In the field of business research, the most apparent source of secondary data is the public report of firms (Calantone & Vickery, 2010). These show the results of the management's stewardship of the resources entrusted to it (W. Ballada & S. Ballada, 2018). When a person reads a company's financial statements, he gets an overall picture of the firm's profitability and financial conditions. However, merely reading such statements is insufficient when making informed judgments (Roque, 1990).

Table 4. Computation of research variables

Variable	Formula
I. Independent Variables	
Inventory Turnover	$\frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$
Fixed Asset Turnover	$\frac{\text{Net Sales}}{\text{Average Fixed Assests}}$
Total Assets Turnover	$\frac{\text{Net Sales}}{\text{Average Total Assests}}$
II. Dependent Variable	
Return on Assets	$\frac{\text{Net Income (After Tax)}}{\text{Average Total Assets}}$

The researchers used the companies' financial statements to compute for the necessary ratios using the formulas (Weygandt et al., 2015) summarized in the table above. The basic inputs of these calculations are the firms' statement of financial position and statement of comprehensive income.

Ratio analysis has been commonly used in the financial data valuation for as long as financial statements have been prepared. Thus, using ratio analysis to examine a company's financial condition is highly defendable and justifiable (Laurent, 1979). As expressed by James (2013), it helps highlighting both the areas of poor and satisfactory performance through assisting the management to find where their strengths and weaknesses are and where supplementary efforts should be directed.

Data Gathering Procedures

One of the most important phases in completing any research is data gathering. It is the point at which researchers collect sufficient evidence to answer research questions (Serrant-Green, 2008). The selected data gathering method will affect the way the activities will be performed (Polonsky & Waller, 2019).

The researchers used the secondary type of data gathering which offers massive advantages in terms of cost and effort. The nature and context of the study do not require the use of usual research instruments like survey questionnaire. Only secondary data collection was performed.

The accumulated data was completely composed of secondary data. The links of the companies' verified websites are documented in the Philippine Stock Exchange. It should be noted that the new design of the PSE website only allows the researchers to view the annual reports during the past two years. Consequently, the firms' previous financial statements were downloaded directly from the companies' respective websites.

The data gathering procedures were done diligently in order to obtain well-grounded and established research data. Aside from the PSE's website, the firms' financial statements are required to be submitted to the Securities and Exchange Commission (SEC). As an agency of the government that is responsible for securities industry regulation, the SEC requires broker-dealers certain company insiders, and public companies to file periodic financial statements. The researchers were certain that the amassed secondary data possessed authenticity and legitimacy.

The study was conducted with integrity, translucency, and thoroughness. The researchers ensured and maintained a satisfactory level of confidentiality and objectivity throughout the research conduct. The names of the selected participants were not revealed to certify anonymity.

Data Analysis and Statistical Treatment

Data analysis is an iterative procedure of manipulating and interpreting numbers in order to extract meaning. The collected data is evaluated to explicate research questions, disprove theories, or test hypotheses (Pal, 2017).

In a quantitative research, data analysis typically involves statistical generalization. It refers to the extent to which conclusions developed from the collected evidence from a sample can be extended to the larger population (Gray et al., 2007).

Statistical treatment is the peak of the long process of hypotheses formulation, instrument construction, and data collection. The numerical data collected in quantitative research is validated through the use of statistics. Statistics is a branch of mathematics used to summarize, analyze, and interpret a group of observations. The two major divisions are descriptive statistics and inferential statistics. The former involves description, depiction, and tabulation of data, whereas the latter provides procedures to draw inferences regarding a population based on the observations acquired from the sample (Franzese & Iuliano, 2018).

A series of statistical test were conducted to appropriately analyze the data gathered. To acquire full knowledge of the phenomenon being studied, it is first necessary to arrange, describe, summarize, and visualize the collected data (Spriestersbach et al., 2009). Accordingly, descriptive statistics will be used in the determination of the minimum, maximum, measures of central tendency, and measures of dispersion. These will be calculated to present a larger overview of trends in manufacturing companies' asset management efficiency and financial performance.

A number of inferential statistical tests were applied in the study. Specifically, the researchers performed the analysis of variance (ANOVA), Pearson's correlation analysis, and panel data regression. Zhang et al. (2018) specifically categorized ANOVA as parametric inferential statistical method, Pearson's correlation as predictive statistical correlation method, and panel data regression as predictive statistical regression method.

As a means to determine the significant difference of asset management efficiency ratios and financial performance of the industrial manufacturing companies, Analysis of Variance (ANOVA) was used. This test is used to spot differences in group means provided that there is one or more independent variables and one parametric dependent variable (Sawyer, 2013). ANOVA tests the null hypothesis that the means for all groups are equal (Herzog et al., 2019). Rejecting this hypothesis means that the researchers believe that at least one difference of two means is not zero. ANOVA lets the researchers estimate all of the mean differences in a single hypothesis test using a single alpha level (Liu, 2017). In this study, the researchers set the significance level (α-level) to 0.05.

Table 5. Interpretation of Probability Value

P-value	Interpretation	Reject or Accept Null Hypothesis
Less than 0.05	There is a significant difference	Reject
Greater than 0.05	There is no significant difference	Accept

With the intention of determining the relationship between asset management efficiency and financial performance, Pearson's correlation analysis was performed. Schober et al. (2018) defined correlation as a measure of a monotonic association between two continuous variables. It is a relationship in which either (1) as the value of one variable increases, the other variable's value also increases; or (2) as the value of one variable increases, the other variable's value decreases. Specifically, it measures the strength of the association between two variables (Sabilla et al., 2019).

The interpretation of Pearson correlation coefficient (denoted by R) is shown in the table below. Larger Pearson values indicate a potentially high degree of relationship, whereas smaller Pearson values indicate a potentially low

degree of relationship. The values are only indicative of the potential strength of relationship between the variables and are not suggestive of any form of causation (Cooper & Schindler, 2003).

The change in the magnitude of one variable is associated with the change in the magnitude of another, either in the same (positive) or in the opposite (negative) direction. As the coefficient gets closer to an absolute value of 1, the relationship becomes stronger and eventually approaches a straight line.

Table 6. Interpretation of correlation coefficient

R value	Verbal Interpretation
-1.00	Perfect negative relationship
-0.75 to -0.99	Very strong negative relationship
-0.50 to -0.74	Strong negative relationship
-0.25 to -0.49	Weak negative relationship
-0.01 to -0.24	Very weak negative relationship
0.00	No relationship
to 0.24	Very weak positive relationship
0.25 to 0.49	Weak positive relationship
0.50 to 0.74	Strong positive relationship
0.75 to 0.99	Very strong positive relationship
1.00	Perfect positive relationship

The coefficient of determination (denoted by R^2), sometimes called as multiple correlation coefficient, is widely used in classic regression analysis. It measures the proportion of variation in the dependent variable explained by the predictors in a regression model (Zhang, 2017). Frequently, more than one variable is presented to explain an outcome; within this frame of reference, the R^2 will increase

even if the variable is trivial. The adjusted R^2 attempts to correct for this (Saunders et al., 2012).

To ascertain if there is a significant relationship between asset management efficiency and financial performance of the companies, panel data regression was employed. Torres-Reyna (2007) defined a panel data (also called as cross-sectional time-series or longitudinal data) as a set of data in which the entities are observed across time. These entities could be companies, countries, individuals, or states. In other words, panel data is data derived from the same entities observed in a definite time period (Zulfikar, 2018). A panel is described as balanced if there is an observation for every unit of observation for each period or as unbalanced if some observations are missing (Ahmad, 1994).

The combination of time series with cross-sections can improve both the quality and quantity of data that is considered unmanageable if only one of these two dimensions is used (Mule et al., 2013). With panel data, the researchers can control for factors that: (1) differ across entities but do not differ over time, (2) could cause omitted variable bias if excluded, and (3) are unnoticed or incalculable (Sakali, 2013). Hence, panel data regression enhances the usual regression analysis with both a spatial and temporal facet (Yaffee, 2003).

There are several types of panel data analytic models. These include pooled Ordinary Least Squares (OLS) model (assumes constant coefficients), fixed effects model (assumes that the individual specific effects are correlated with the regressors), and random effects model (assumes that the individual specific effects are not correlated with the regressors). Among these three, Williams (2018) stated that the most commonly used are the fixed effects and random effects models.

Unlike the usual regression, panel data regression must undergo thorough estimation modeling step. To select an appropriate model, the researchers followed the procedures proposed by Dougherty (2011). The figure above outlines and summarizes the decision criteria for selecting a model to analyze the panel data. Premised on the diagram, the researchers were required to perform Durbin–Wu–Hausman (DWH) and Lagrange Multiplier (LM) tests.

Table 7. Hausman (1978) specification test

Value	Coef.
Chi-square test value	4.455
P-value	.216

To choose between fixed or random effects model, the researchers run a Hausman specification test where the null hypothesis is that the preferred model is random effects. It basically tests whether the unique errors (μi) are correlated with the regressors. The results above have shown that the random effects model is more appropriate than the fixed effects model. The P-value is .216 which is not significant; hence, the researchers failed to reject the null hypothesis where random effects model is preferred.

Table 8. Breusch and Pagan Lagrangian multiplier test for random effects

Value	Coef.
Chi-square test value	90.24
P-value	.0000

To choose between random effects or pooled OLS model, the researchers run a Breusch-Pagan Lagrange multiplier test where the null hypothesis is that the preferred model is the pooled OLS. It basically tests whether the variances across entities is zero. This means that there is no

significant difference across units (i.e., no panel effect). The results above have shown that the random effects model is more appropriate than the pooled OLS model. The P-value is .0000 which is significant; hence, the researchers reject the null hypothesis where the pooled OLS model is preferred.

Both the Hausman specification and Breusch-Pagan Lagrange multiplier tests provided similar result. It was determined that the random effects model is the most appropriate to be used in the study. The tests imply that the individual specific effects are not correlated with the explanatory variables and can very well be taken as random. Accordingly, the researchers cannot run the fixed effects and pooled OLS model.

Table 9. Interpretation of probability value

P-value	Interpretation	Reject or Accept Null Hypothesis
Less than 0.05	There is a significant relationship	Reject
Greater than 0.05	There is no significant relationship	Accept

To determine if asset management efficiency have an effect on the financial performance of the industrial manufacturing companies, the p-values were considered. If the p-value is less than or equal to 0.05 limit, it means that the given measures have an effect towards the financial performance. The degree of its effect was reflected by the correlation coefficient (R). The proportion of variation in return on assets explained by these three measures was demonstrated by the coefficient of determination (R^2).

Results and Discussion

Table 10. Distribution of the companies across the six descriptors

Profile	Frequency (n)	Percentage (%)
1. Nature of Operation		
Chemicals	4	16%
Electrical Components and Equipment	2	8%
Food, Beverage, and Tobacco	19	76%
Total	25	100%
2. Number of Years of Operation to Date		
Less than 25	4	16%
25 to 50	8	32%
51 to 75	7	28%
76 to 100	4	16%
Greater than 100	2	8%
Total	25	100%
3. Number of Years Publicly Listed		
Less than 15	5	20%
15 to 30	12	48%
31 to 45	5	20%
46 to 60	2	8%
Greater than 60	1	4%
Total	25	100%

Continued.

Table 10. Continuation

4. Average Total Assets		
Less than P1 billion	1	4%
P1 billion but less than P10 billion	13	52%
P10 billion but less than P20 billion	5	20%
P20 billion but less than P30 billion	2	8%
Greater than P30 billion	4	16%
Total	25	100%
5. Average Net Sales		
Less than P1 billion	5	20%
P1 billion but less than P10 billion	10	40%
P10 billion but less than P20 billion	3	12%
P20 billion but less than P30 billion	2	8%
Greater than P30 billion	5	20%
Total	25	100%
6. Average Net Income		
Less than P100 million	6	24%
P100 million but less than P800 million	9	36%
P800 million but less than P1.5 billion	4	16%
P1.5 billion but less than P2.2 billion	0	0%
Greater than P2.2 billion	6	24%
Total	25	100%

Six descriptors were used in the study to determine the profile of the companies. These include: (1) nature of operation, (2) number of years of operation to date, (3) number of years publicly listed, (4) average total assets, (5) average net sales, and (6) average net income. Table 10 displays the result of the distribution of the participants among these enumerated descriptors.

In the context of nature of operation, most of the companies are associated in the production of food, beverage, and tobacco, while only a few are involved in the manufacturing of electrical components and equipment. With regard to the number of years of operation, majority of the companies have already been operating for 25-50 years, while quite a few have been operative for greater than 100 years. On the basis of number of years being publicly-listed, almost half of the companies have already been registered in the Philippine Stock Exchange for 15-30 years, while only some have been listed for greater than 60 years.

In terms of the average total assets, half of the companies have assets worth P1 billion but less than P10 billion, while only some carries assets amounting to less than P1 billion. With reference to the average net sales, roughly half of the companies have reported net sales aggregating P1 billion but less than P10 billion, while only a few have documented net sales averaging P20 billion but less than P30 billion. As to the average net income, a great number of the companies have earned net income of P100 million but less than P800 million, while no one has established a profit of P1.5 billion but less than P2.2 billion.

Table 11. Distribution of the companies across the asset management efficiency ratios

Ratio	Frequency (n)	Percentage (%)
1. Inventory Turnover		
Less than 3	5	21%
3 but less than 6	7	29%
6 but less than 9	7	29%
9 but less than 12	2	8%
Greater than or equal to 12	3	13%
Total	24	100%
2. Fixed Asset Turnover		
Less than 1	3	13%
1 but less than 4	10	42%
4 but less than 7	4	17%
7 but less than 10	4	17%
Greater than or equal to 10	3	13%
Total	24	100%
3. Total Asset Turnover		
Less than 0.5	7	28%
0.5 but less than 1	8	32%
1 but less than 1.5	7	28%
1.5 but less than 2	3	12%
Total	25	100%

Three financial ratios were used in the study to determine how do the companies measure their asset management efficiency. These include: (1) inventory turnover, (2) fixed asset turnover, and (3) total asset turnover. Table 11 shows the result of the distribution of the participants among these particularized ratios.

In relation to the inventory turnover, most of the companies have an inventory turnover of 3 but less than 6 times and 6 but less than 9 times, while only some have an inventory turnover of 9 but less than 12 times. As a general rule, a higher ratio indicates faster turnover. All of the

companies have shown a ratio that is greater than 1. It signifies that each company has sold and replaced its inventories at least once every year during the five-year period.

In connection with the fixed asset turnover, virtually half of the companies have a fixed asset turnover of 1 but less than 4 times, while only a few have a fixed asset turnover of less than 1 and greater than or equal to 10 times. Generally, a higher ratio is an indication of greater use of fixed assets to generate sales. A total of 21 companies have shown a ratio that is greater than 1. It implies that these companies have used their fixed assets at least once every year during the five -year period. The remaining firms were inefficient in terms of fixed asset utilization.

In the matter of the total asset turnover, majority of the companies have a total asset turnover of 0.5-1, while quite a few have a total asset turnover of 1.5 but less than 2 times. In general, a higher ratio is a manifestation of greater usage of entire assets in producing sales revenue. Only 10 companies have shown a ratio of greater than 1. It insinuates that these companies have used their full assets at least once every year during the five-year period. The remaining firms were inefficient in terms of total asset utilization.

Table 12. Distribution of the companies in terms of return on assets

Ratio	Frequency (n)	Percentage (%)
Return on Assets		
Less than 0.03	5	20%
0.03 but less than 0.07	10	40%
0.07 but less than 0.11	4	16%
0.11 but less than 0.15	4	16%
Greater than or equal to 0.15	2	8%
Total	**25**	**100%**

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In relation to the inventory turnover, most of the companies have an inventory turnover of 3 but less than 6 times and 6 but less than 9 times, while only some have an inventory turnover of 9 but less than 12 times. As a general rule, a higher ratio indicates faster turnover. All of the companies have shown a ratio that is greater than 1. It signifies that each company has sold and replaced its inventories at least once every year during the five-year period.

In connection with the fixed asset turnover, virtually half of the companies have a fixed asset turnover of 1 but less than 4 times, while only a few have a fixed asset turnover of less than 1 and greater than or equal to 10 times. Generally, a higher ratio is an indication of greater use of fixed assets to generate sales. A total of 21 companies have shown a ratio that is greater than 1. It implies that these companies have used their fixed assets at least once every year during the five -year period. The remaining firms were inefficient in terms of fixed asset utilization.

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0.11 but less than 0.15	4	16%
Greater than or equal to 0.15	2	8%
Total	**25**	**100%**

With respect to the return on assets, substantially half of the companies have a return on assets of 3% but less than 7%, while only a few have a return on assets of greater than or equal to 15%. As a general proposition, a higher ratio is a demonstration of greater profitability and efficient utilization of assets. All of the companies have shown a return on assets of greater than 1%. It suggests that each firm earns adequate amount of money per peso of assets possessed.

Table 13. Significant differences on the asset management efficiency ratios

Management Efficiency Ratios	F	p	Conclusion
Inventory Turnover	0.180385509	0.83622835	Accept $H_0$1
Fixed Asset Turnover	1.085348587	0.35599347	Accept $H_0$1
Total Asset Turnover	0.067262565	0.93514119	Accept $H_0$1

A series of one-way ANOVA was conducted to determine whether there is a significant difference on the asset management efficiency ratios when the companies' nature of operation is considered. Results shown in Table 13

exhibited that there is no significant difference on the inventory turnover [F (2,21) = 0.18, p = 0.836], fixed asset turnover [F (2,21) = 1.09, p = 0.356], and total asset turnover [F (2,22) = 0.07, p = 0.935] among the three groups. The means of the three subsectors for the three efficiency ratios were found to be statistically equal.

Hence, the researchers have failed to reject **$H_0$1**. It was established that there is no significant difference on the asset management efficiency ratios when the companies' nature of operation is considered.

Table 14. Significant difference on the financial performance

Financial Performance Ratio	F	p	Conclusion
Return on Assets	0.872432069	0.43189971	Accept $H_0$2

A one-way ANOVA was conducted to determine whether there is a significant difference on the financial performance when the companies' nature of operation is considered. Results shown in Table 14 revealed that there is no significant difference on the financial performance among the three groups [F (2,22) = 0.87, p = 0.432]. The means of the three subsectors were found to be statistically equal.

Hence, the researchers have failed to reject **$H_0$2**. It was established that there is no significant difference on the financial performance when the companies' nature of operation is considered.

Table 15. Significant relationship between asset management efficiency and financial performance

ROA	Coef.	St. Err.	R	t	p
ITO	-.007	.001	.065	-4.62	**0***
FATO	-.002	.003	.081	-0.81	.417
TATO	.099	.015	.193	6.39	**0***
Constant	.027	.018		1.50	.134

Mean dependent var	0.068	SD dependent var	0.067
Overall r-squared	**0.323**	Number of obs.	113
Chi-square	94.639	Prob > chi2	**0.000**
R-squared within	0.515	R-squared between	0.276

** p<.05*

Panel data regression analysis using random effects model was conducted to determine whether there is a significant relationship between asset management efficiency and financial performance of the companies. Table 15 above displays the summarized results.

The inventory turnover is found to be significantly (t = -4.62, p = 0) correlated to financial performance. The result is consistent with the findings provided by Nicholas (2020) and Patjoshi (2016). It is, however, inconsistent with the conclusions offered by Halim (2020) and Nasution (2020). It was further revealed that inventory turnover has a negative relationship with financial performance. It implies that increasing the number of times a company replaces its inventories would decrease its financial performance. The result is in agreement with Dashi (2018) and Garba et al. (2020), whose studies have proven that there is a significant negative relationship between inventory turnover and financial performance. Nonetheless, the relationship is described as very weak (R = .065).

The fixed asset turnover is not significantly (t = -0.81, p = .417) correlated to financial performance. It means that there is no statistically significant relationship between the two variables. This finding is in contrary with the undertaking of Rely and Arsjah (2018). It was further revealed that fixed asset turnover has a negative relationship with financial performance. It implies that increasing the number of times a company utilizes its fixed assets would decrease its financial performance. This is opposing the results rendered by Endri et al. (2020), who found out that a positive relationship exists between the two variables. In fact, the result is the exact opposite of those presented in Anuar et al.'s (2021) study, which discovered a significant positive relationship between fixed asset turnover and financial performance.

The total asset turnover is found to be significantly (t = 6.39, p = 0) correlated to financial performance. This is supported by several studies including those by Nofiana and Sunarsi (2020), Paramita and Pakpahan (2020), and Qamara et al. (2020). However, it clashes with the findings specified by Simatupang and Sari (2021). It was further disclosed that total asset turnover has a positive relationship with financial performance. It implies that increasing the number of times a company utilizes its entire assets would also increase its financial performance. The result is agreed by Shahnia et al. (2020). In fact, the result is remarkably similar with those presented in Harahap et al. (2020) and Tania et al.'s (2020) studies, which found a significant positive relationship between total asset turnover and financial performance. Nevertheless, the relationship is described as very weak (R = .193).

The three variables taken altogether significantly (p = 0.000) affect the financial performance of the companies. The regression model summary above specified an overall R2 value of 0.323. This infers that the three asset management efficiency ratios account for 32.3% of the variations in the

financial performance of the companies. The remaining 67.7% would be explained by other variables.

Hence, the researchers reject the **$H_0$3**. It was established that there is a significant relationship between asset management efficiency and financial performance of the companies.

Conclusions

Asset management efficiency is an important area of concern for any company. If assets are managed efficiently, it can enhance the conduct of business operations and augment profitability. As a significant contributor to the country's economy, the manufacturing sector of the Philippines is uninterruptedly growing and advancing towards innovation and progress. With this, it has become imperative that companies utilize all their resources optimally. Efficient management of assets provide cost savings and amplified profits for these firms. Based on the results of the analysis carried out, the following conclusions were drawn:

Taking into account the companies' nature of operation, no significant differences were found both on the asset management efficiency ratios and financial performance. This suggests that the means of the three subsectors for these matters were statistically equal.

Inventory turnover has a very weak significant negative relationship with financial performance. Meanwhile, fixed asset turnover has a very weak insignificant relationship with financial performance. Total asset turnover, on the other hand, has a very weak significant positive relationship with financial performance. Nevertheless, there is an overall significant relationship between asset management efficiency and financial performance.

Among the three financial ratios used to characterize asset management efficiency, only inventory turnover and total asset turnover have a significant effect on the financial performance. It can be deduced that the way a company manages its inventories and entire assets will give an impact on its financial performance. Nonetheless, its effects were found to be inverse. In line with the outcomes, if a company desires to increase its financial performance, it shall focus on increasing its total asset turnover and decreasing its inventory turnover.

Recommendations

The results of this study raised several matters that warrant future research. Based on the conclusions and limitations of the study, the researchers put forward the following suggestions:

For the companies, they should report their financial statements regularly and consistently to facilitate anyone, whether researchers or not, who desires to see their annual financial reports. It is suggested to include these reports, covering at least the past 10 years, on their official websites. In relation to the results of the study, the management of the industrial manufacturing companies should continue to implement modern techniques of asset management by concentrating on the size and value of their total assets to raise the level of financial performance.

For the future researchers, you may incorporate other indicators of financial performance in order to provide a more complete picture of financial profitability or add other explanatory variables and not only focus on the asset management efficiency aspect. It is also recommended to increase the number of samples and the time period to minimize outlier data and reach more accurate results. Make efforts to collect the most reliable and valuable data, not based solely on the financial statements of the entities.

Others, such as surveys, may be utilized to gain personal engagement and experience in the economic field. In addition, try to consider conducting a comparative study involving other industrial manufacturing companies listed in other stock exchanges of other developing countries to discover differences.

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