THE EFFECT OF EXTERNAL SOURCING ON THE FINANCIAL PERFORMANCE OF MANUFACTURING COMPANIES LISTED IN INDONESIA STOCK EXCHANGE (BEI)

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Abstract: There were differences in research results of several previous studies which examined the relationship between external sourcing and corporate financial performances. Those results indicated that external sourcing could have a positive, negative, or no effect on the financial performance of the company. There was numerous literature stated that external sourcing was a strategy to minimize costs which could reduce production and procurement costs, thus becoming a strategy considered by the top management to improve the company performance. This study analyzed the external sourcing effects on financial performance (ROA) of manufacturing company listed in Indonesia Stock Exchange (BEI). Total population of manufacturing companies listed in the Indonesia Stock Exchange from 2012-2016 was as many as 132 companies, but there were only 70 companies that met the criteria to be the object of the research. The manufacturing company used three industry sectors namely basic and chemical industry, consumer goods industry, and miscellaneous industry as the research objects. Using panel data regression, the research results indicated that external sourcing strategy had a significant and negative effect on ROA. Negative effects resulting from purchases on external parties (external sourcing) were caused by the high cost of sales exceeded the company revenue. Therefore, the company should pay attention to the level of purchases made, namely purchases to the third party on raw materials and goods in the process to have the level of purchases at an optimal point in order to generate profits for the company.

Keywords: external sourcing, financial performance, panel data, manufacturing company

Abstrak: Pada beberapa penelitian sebelumnya yang menguji hubungan antara eksternal sourcing dan kinerja keuangan perusahaan terdapat perbedaan hasil penelitian. Penelitian sebelumnya memberikan hasil bahwa sumber eksternal dapat berpengaruh positif, negatif, atau tidak berpengaruh terhadap kinerja keuangan perusahaan. Meskipun ada banyak literatur bahwa sumber eksternal adalah strategi untuk meminimalkan biaya dimana sumber eksternal dapat mengurangi biaya produksi dan biaya pengadaan sehingga menjadi strategi yang dipertimbangkan oleh manajemen puncak untuk memperbaiki kinerja perusahaan. Studi ini menganalisis pengaruh sumber eksternal terhadap kinerja keuangan (ROA) yang terdaftar di Bursa Efek Indonesia (BEI). Jumlah populasi perusahaan manufaktur yang terdaftar di Bursa Efek Indonesia dari tahun 2012-2016 sebanyak 132 perusahaan, namun hanya terdapat 70 perusahaan yang memenuhi kriteria untuk dijadikan objek penelitian. Perusahaan manufaktur yang dijadikan objek penelitian terdiri dari 3 sektor industri yaitu industri dasar dan kimia, industri barang konsumsi, dan aneka industri. Dengan menggunakan regresi data panel, hasil penelitian menunjukkan bahwa strategi sumber eksternal berpengaruh signifikan dan negatif terhadap ROA. Pengaruh negatif yang dihasilkan dari pembelian pada pihak eksternal (external sourcing) disebabkan dari tingginya beban pokok penjualan melebihi pendapatan perusahaan sehingga perusahaan harus memperhatikan tingkat pembelian yang dilakukan yaitu pembelian pada pihak ketiga atas bahan baku dan barang dalam proses sehingga berada pada titik optimal yang dapat menghasilkan keuntungan bagi perusahaan.

Kata kunci: external sourcing, kinerja keuangan, panel data, perusahaan manufaktur

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INTRODUCTION

Advanced technology and globalization intensify the company competition. All companies attempt to provide services and products with high quality to maintain the increasing number of consumers and obtain high profits. Therefore, the company important strategy is to gain profit, which will affect financial performance and to attract investors. Companies will also always think of strategies in order to gain profits in the present and the future. These strategies will affect the company financial performance, which will eventually attract the investors. The existence of an organization can be associated with the market failure, which drives transaction cost (Coase, 1937). Therefore, the company keeps considering the total cost, including transaction and production costs. One possibility to minimize production cost in enhancing the company profit is utilizing the external sourcing strategy. The external sourcing is the decision of the company to buy goods or raw materials for production from the third party. The external sourcing is some of production activities which are previously performed by the internal company and shifted to the external party, thus the company may choose a product or service supplier that is considered the best one (Lacity and Hirschheim, 1995). The consideration to choose external sourcing is related to the core competence owned by the company (Prahalaad and Hamel, 1990). Performing outsources (external sourcing) on non-core activities enables a company to improve its managerial interest and resource allocation to the activities, which is the core competence of the company.

Manufacturing industry has an important role in implementing external sourcing strategy. Manufacturing companies make purchases from supplier (third party) in their business process. Raw materials purchasing is a crucial process. However, based on the external sourcing data from the company financial report (2012–2016), the trend of raw material and goods purchasing ratio of the third party and revenue cost (external sourcing) was decreasing. Moreover, manufacturing industry also plays an important role in national economy, and it has the highest added value compared to the other nine economic sectors. Based on the figures of Gross Domestic Product (GDP) at 2010’s constant market price, in 2014, the contribution of manufacturing industry was increasing after falling in the previous years (2011–2013). At a constant market price, manufacturing industry was ranked first for its highest contribution to the GDP, amounting to Rp1,856,310 billion (21.02%), followed by wholesale and retail trade sector; car and motorcycle repairs sector of Rp1,172,362 billion (13.38%), agriculture, forestry, and fishery of Rp1,128,448 billion (13.38%).

Several previous studies showed differences resulting in the relationship between external sourcing and corporate financial performance. The study conducted by Kotabe and Mol (2009) at a manufacturing company in The Netherlands found that external sourcing had a negative curvilinear effect on the company performance which was reflected by the value of return on value added (ROVA). There was an optimum level of external sourcing. The occurring deviation of external sourcing due to its distance from the optimal level caused a more expensive cost. However, Mol et al. (2005) which also at a manufacturing company in The Netherlands, stated that external sourcing had no effect on the company financial performance (ROS and ROI). The external sourcing performed was a balancing between a lower production cost and the transaction cost incurred by the company. Meanwhile, a study conducted by Murray et al. (1995) at a manufacturing company in the US found out that external sourcing had a positive relationship with the company financial performance (ROS, ROI, and ROE). Those differences of study results became the background of a further study in Indonesia to determine the effect of external sourcing on the financial performance of manufacturing companies listed in Indonesia Stock Exchange (BEI). This research was expected to give information to investor, investor candidate, creditor, shareholder, and public on the external sourcing strategy influence to manufacturing companies listed on BEI on company financial performance and to manufacturing company to minimize risks due to its external sourcing strategy.

The external sourcing is a strategy to minimize costs by reducing production and procurement costs. Therefore, it is utilized by the top management to improve the company performance. External sourcing is the transfer of some production activities previously done internally to be conducted by suppliers with certain contractual agreements. The company pursues this strategy to minimize costs and to produce high quality products that ultimately have a positive effect on the company financial performance. Most of public manufacturing companies in Indonesia measured their financial performance through financial ratios by analyzing the balance sheets (profit and loss statements). Data
contained in the company balance sheets and profit and loss statements were analyzed by comparing the accounts in the balance sheets and profit and loss statements both vertically and horizontally. Investors and capital market participants often measure the company financial performance by looking at financial ratios. The weakness of this method is that this does not take into account the risks faced by the company and the amount of capital costs but only pays attention at the results (company profits). It is difficult to know whether the company has succeeded in creating the company value or not so that the investors and capital owners do not have any illustration of the capital cost and risks they put in the company. The value of a company itself is a reference for investors to invest in the company. It is important for investors to see how much the company value, which will be a consideration for investors in making decisions to make investments. In addition, the weakness of performance measurement through financial ratios is less accountable because the resulting financial ratios depend on the method or treatment of the financial ratios used. Given these weaknesses and limitations, the financial performance indicators need to be complemented by other indicators.

Currently, a performance measurement analysis tool has been developed which considers the capital cost and risk factor an Economic Value Added (EVA). According to Kiryanto (1997), EVA calculations expel capital costs of after tax operating profit in calculating the company performance. It is measuring the value creation generated by the company by subtracting the Net Operating Income after Tax (NOPAT) against capital costs (cost of capital expenses) multiplied by capital invested. By using this method, the company will try to put more emphasis on creating more value than the assets and investments. Capital cost used as a measuring tool caused a higher return demanded by shareholders and investors than the capital cost incurred. In order to get a positive EVA, an efficient and effective working capital management is required. This research was equipped with an economic value added (EVA) indicator which included the company earned profit by subtracting the capital costs used. In other words, EVA is a measuring tool which calculates the return after all costs deducted, including the financing costs. The objectives of this research were analyzing the performance of manufacturing companies in Indonesia during the observation period of 2012–2016 and analyzing the influence of external sourcing strategy on the company financial performance with Return on Asset (ROA) indicators at manufacturing companies listed on Indonesia Stock Exchange.

This research was conducted on manufacturing companies listed on the Indonesia Stock Exchange (IDX) focusing on analyzing the influence of external sourcing strategy conducted by the company, especially external sourcing on raw materials and components or intermediate inputs to the company financial performance with finance performance indicators (ROA). This research also provided an overview of the performance development of manufacturing companies during the observation period of 2012-2016.

METHODS

The data used in this research were secondary data in the form of annual financial report published by the go public manufacturing companies listed in BEI. All the data were obtained from BEI. Total population of manufacturing companies listed on the Indonesia Stock Exchange from 2012–2016 were 132 companies, but there were only 70 companies that met the criteria to be the research object. The sample selection in this study was using purposive sampling method. A non-random sampling type whose information were obtained used a certain considerations. The sample selection criteria were as follows:

1. The company was listed as a manufacturing company on BEI in the period of 2012–2016;
2. The company did not experience a delisting during the observation period (2012–2016);
3. The company had completed its obligation in submitting an annual report in the period of 2012–2016 which had been audited and annually ended on December 31 during the observation period;
4. The company had a complete data related to the variables used in this study.

Descriptive and quantitative analysis were used in this study. Descriptive analysis was utilized to describe the development of manufacturing companies in Indonesia during the observation period (2012–2016). Quantitative analysis was utilized to analyze the effect of the external sourcing on the companies’ financial performance, which was observed based on ROA indicator. This method utilized a panel data regression. The data were processed using Eviews 9 program. One stage in this study was formulating the general models which would be used and analyzed with regression
function. Using regression function was intended to observe the external sourcing effect on the financial performance of manufacturing companies listed in BEI. Therefore, variables which could explain the factors affecting the companies' financial performance were chosen. Variables in this research model were chosen based on the literature study of Kotabe and Mol (2009). The general models used in this study were as follows (Kotabe and Mol, 2009):

$$\text{ROA}_t = \beta_0 + \beta_1 \ln \text{FS}_t + \beta_2 \ln \text{PROD}_t + \beta_3 \text{SGR}_t + \beta_4 \text{ROS}_t + \beta_5 \text{EXTERNAL}_t + \epsilon_t$$

in which: ROA$_t$ (Return on Asset); FS$_t$ (Firm size); PROD$_t$ (Productivity); SGR$_t$ (Sales Growth Rate); ROS$_t$ (Return on Sales); EXTERNAL$_t$ (Ratio of Industrial Purchasing to COGS (external sourcing)).

Several previous literatures stated that external sourcing and company performance had a positive relationship. External sourcing caused the company to be more responsive and allowed the company to focus on core competencies (Domberger, 1998). External sourcing also reduced production costs because it used a specialized supplier (Kotabe, 1998) and increased the company flexibility in handling technological changes or demand fluctuations (Balakrishnan and Wernerfelt, 1986). External sourcing helped to avoid the costs associated with the bureaucracy in order to produce (D'Aveni and Ravenscraft, 1994; Jensen and Meckling, 1976).

According to Hendry (1995), companies could reduce costs by contracting the third party related to the procurement of goods and services previously produced internally. This strategy for cost efficiency and effectiveness was by focusing on company core competencies. External sourcing could also make the company more flexible and adaptable for competitive environment.

External sourcing improved the company financial performance and impacted on various nonfinancial performance, such as increasing focus on core competencies. Through external sourcing, production costs might decrease and plant and equipment investment could be reduced (Bettis et al. 1992). Reducing the investment in production capacity could reduce the fixed costs that ultimately lead to a lower break-even points. Thus, external sourcing could be a method to improve the company financial performance, especially in the short term. External sourcing strategy could reduce the costs and risks. In addition, external sourcing enabled companies to get higher value, more flexibility, and more integrated services and increased the company's capacity to innovate (Quinn, 1999).

The hypothesis of this study was that external sourcing had a significant and positive effect on the financial performance of the company (ROA).

In the panel data method, there were several econometrics models such as Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). Several tests were required to determine the most appropriate econometrics model. The Chow test was used to determine whether the FEM or PLS was used in the research. Meanwhile, the Hausman test was used to determine whether the REM or FEM was used.

Table 1 showed that the probability value of the Hausman test (0.0000) was smaller than the real level of 5%, which meant the FEM model was better than the REM model to be used in this study whereas, based on Chow Test, the probability value of 0.0000 is smaller than the real level of 5% which meant the FEM model was better than the PLS model. Thus, further estimation used the Fixed Effect model for the relationship model on ROA.

Table 1. Best model selection results

| Test the best model | Probability Chi-Square | Decision |
|---------------------|------------------------|----------|
| Hausman Test        | 0.0000                 | FEM      |
| Chow Test           | 0.0000                 | FEM      |

Classical Assumption Test

Classical assumption test was necessary to be conducted so that the model could produce an estimator which met the Best Linear Unbiased Estimator (BLUE) criteria. Classical assumption tests included normality test, multicollinearity test, heteroscedasticity test and autocorrelation test.

In the model of relationship to ROA (Table 2), Jarque-Bera probability value amounted to 0.018003 indicates that the probability value is greater compared to the real level of $\alpha$ of 1%. Probability value which is greater than the real level ($\alpha$ of 1 percent) indicates that H0 is received and the residual is normally distributed.
Testing whether the multicollinearity exist or not was conducted by looking at the value of correlation among independent variables. The correlation value among the independent variables is not high (not more than 0.8). Therefore, it can be said there is no multicollinearity problem in the model.

In Table 2, the sum square resid weighted value (0.989860) is smaller than the sum square resid unweighted (1.057847). Therefore, it can be concluded that there is a heteroscedasticity in the model, but since the model estimation has used GLS cross-section weighting, the heteroscedasticity problem can be ignored.

Table 2. The results of the classical assumption test on the relationship model to ROA

| Information                      | Value    |
|----------------------------------|----------|
| Durbin Watson                    | 2.115110 |
| Sum Square Resid Weighted        | 0.989860 |
| Sum Square Resid Unweighted      | 1.057847 |
| Prob (Jarque Berra)              | 0.018003 |

It can be seen that the Durbin Watson value obtained in the model is 2.115110. Then, there is no problem of autocorrelation. Furthermore, the model in the research used GLS Cross section weighting method, so that the problem of autocorrelation can be corrected and the model has been free from autocorrelation problem.

RESULTS

The Performance of Manufacturing Companies by Industrial Sector

The performance assessed based on ROA analysis and calculation performed on the three industrial sectors became the objects of the study, namely, basic and chemical industry sectors, consumer good industry sector, and miscellaneous industry sector. Basic and chemical industry in 2012 recorded an ROA amounted to 4.68% and 4.83% respectively in 2016 which were below the average of manufacturing industries. Miscellaneous industry recorded an ROA amounted to 5.81% in 2012 and 5.04% in 2016. The ROA achievement of miscellaneous industries was far below the average of manufacturing industry. If compared to the other three industrial sectors included as the objects of this study, consumer goods industry had the best performance in terms of ROA achievement (Figure 1).

The low ROA achievement in basic and chemical industry sectors and miscellaneous industry sector occurred because the companies experienced a decline in net profit and even a loss due to the high cost of goods sold and operating cost. The cost of goods sold and operating cost that far exceeded the operating income caused the companies not be able to record a profit. The company that performs based on ROA is in line with the results of this study that companies in Indonesia tend to experience losses during the period of observation because of the large cost of revenue that exceeds the company's revenue. In 2013, the average ROA fell appreciably as the companies experienced a loss due to the exchange rate gap. A declining demand for automotive and components, textile and garment, electronics in the market caused those subsectors to have a low ROA which was below the industrial average for five years consecutively. This was due to the high cost of goods sold dominated by the purchase of raw materials and manufacturing cost which was not balanced with the net sales. A decline took place in companies operating in cement industry, ceramics, glass, and porcelain industry, metals and allied products industry, plastics and packaging industry, and wood and wood products industry subsectors. Overall, the subsectors within the miscellaneous industry recorded an unfavorable ROA. However there was an increase in the companies operating in footwear subsectors and cable subsectors. If observed from the achievement of ROA from 2012 to 2016, consumer goods industry had the best performance compared to basic and chemical industry and miscellaneous industry.

The Effect of External Sourcing on the Financial Performance of Manufacturing Companies

In several previous studies that examined the relationship between external sourcing and corporate financial performance, there were differences in the research results. The previous studies generated results that external sourcing could have a positive, negative or no effect on the corporate financial performance. Many previous studies stated that external sourcing is a strategic approach to minimize production cost and procurement cost, making it a strategy that is considered by the top management to improve the company performance.

Based on Table 3, the external sourcing variable in the estimation results had a significant effect on (probability amounted to 0.0430 which was less than
the significance level of 5%) and negative value in influencing the companies’ financial performance which was measured from the ROA. The interpretation of the coefficient value of external sourcing is that 1 percent increase in external sourcing will lower the ROA of manufacturing companies by 0.021466 percent, with the ceteris paribus assumption. This result is in accordance with the study conducted by Kotabe and Mol (2009). The study conducted by Kotabe and Mol (2009) analyzed the relationship between external sourcing and corporate financial performance using various levels of market uncertainty which was measured from the variance of return on sales (ROS). The result of Kotabe and Mol (2009) study was that external sourcing can have a negative effect at a certain point which exceeds its optimum point and when the market uncertainty is high. As a result, it can be said that under the high market uncertainty, the company must reduce external sourcing, so it is at its optimum level and profitable for the company.

Public manufacturing companies in Indonesia during the observation period had a fluctuating ROA. The negative effect of external sourcing was caused by the high cost of goods sold, dominated by the purchase of raw materials and goods in process, that exceeded the company income. For three years (2014–2016), manufacturing companies tended to experience loss, and one of the causes was the declining price of goods sold by the companies in international market. International market price is an important part in company income, where the selling price and purchasing price of a product will directly adjust to the international price fluctuation of the traded commodity. In addition, the rising price of raw materials and crude oils which were not followed by the rising selling price of the product proportionally caused the corporate financial performance to decline. Other losses were due to the high wage factor of labor intensive industrial sectors, exchange rate gap of rupiah against US dollar and low export due to the unstable commodity prices so that export demand to decline while domestic market was highly prone to the invasion of similar imported products.

![Figure 1. ROA Value of manufacturing industry (2012–2016)](image)

**Table 3. The estimation results using fixed effect model (FEM) of the effect on ROA model**

| Independent Variables          | Coefficient | P-value       |
|-------------------------------|-------------|---------------|
| C                             | -0.471743   | (0.0037)****  |
| LN_FIRM SIZE                  | 0.012347    | (0.1262)      |
| LN_PRODUCTIVITY               | 0.027054    | (0.0002)****  |
| SALES GROWTH RATE             | 0.020941    | (0.0003)****  |
| RETURN ON SALES               | 0.077580    | (0.0430)****  |
| EXTERNAL SOURCING             | -0.021466   |               |
| Adjusted R-Squared (R²)       | 0.932020    |               |
| Probability (F-statistic)     | 0.000000    |               |

Note: *** and ** mean that the figure is significant at the significance level of 1% and 5%
Public manufacturing companies in Indonesia during observation period (2012–2016) experienced a pressure on economic stability. The three main variables, consisting of economic growth, commodity prices, and capital flows to the developing countries also had an impact. Countries that highly rely on natural resources commodity and commodity-based export were affected. Global financial market condition also led to the decline in foreign capital flows to the developing countries including Indonesia and significantly decreased the supply of foreign exchange. The foreign capital outflow suppressed nearly all currencies including rupiah. The weakening exchange rate of rupiah, as well as high operational cost due to the rising wage and fuel price had a significant effect on the company performance.

Other factors that had a positive and significant effects on ROA were productivity, sales growth rate, and return on sales (ROS). Based on Table 1, productivity variables had a positive and significant impact (probability amounted to 0.0002 is smaller compared to 1% of real level) on the company financial performance which measured by return on assets (ROA). Interpretation on the value of productivity coefficient is 1% increase in productivity will increase ROA at manufacturing companies of 0.027054%, with the assumption of ceteris paribus. Productivity is calculated from net sales per number of employees, meaning that the higher the sales, the higher the productivity and the better the company performance in the use of assets to generate profits. This is in line with the research conducted by Shubita (2013) on the case of companies in Jordan.

The sales growth rate variables in the estimation result had significant and positive impacts (the probability of 0.0037 is smaller than the real level of 1%) in affecting the company financial performance as measured by return on assets (ROA). Interpretation of coefficient values of sales growth rate that is 1 percent increase in sales growth will increase ROA at manufacturing company by 0.020941%, with the assumption of ceteris paribus. This result is in accordance with the research by Shubita (2013). The results showed that there is a positive influence between sales growth and profitability measured by ROA. The positive relationship between sales growth and profitability (ROA) shows that the higher the sales, the higher the profits. Manufacturing companies are effective in using their assets to generate total net sales, with higher sales showing the better performance achieved by the company.

The variable return on sales (ROS) to the company financial performance as measured by the ROA in the estimation results had a positive and significant effect (the probability value of 0.0003 is smaller than the real level of 1%). This means that the increase in return on sales (ROS) is the increase ratio of earnings before interest and taxes on net sales can improve the financial performance of manufacturing companies as measured by ROA. Interpretation of return on sales coefficient (ROS) to ROA is if the return on sales (ROS) is increased by 1% then ROA will increase by 0.077580%, by assumption of ceteris paribus. This is in line with research conducted by Berman et al. (1999). Return on sales measures efficiency by taking into account any revenue from sales earned after the company incurs operating costs in order to generate such sales so that higher return on sales will improve financial performance (ROA).

**Managerial Implications**

Based on the results of the analysis conducted on the influence of external sourcing on the financial performance of the company, managerial implications can be formulated such as companies should pay attention to the level of purchases made, namely purchases to third parties of raw materials and goods in the process so that it is at an optimal point that can generate profits for the company. The company can minimize risks arising from foreign currency fluctuations in commercial hedging strategies by obtaining export sales in foreign currency equivalent to the needs of imports of companies as well as by trying to reduce the share of import purchases and replace them with local raw materials. Companies can run cost efficiency programs such as fuel costs as much as possible and adjust the sale price of the company products following the movement of raw material purchased prices so that the decrease of profit margin due to the increase in raw material price can be minimized.

To face the increasing fierce business competition, the company must maintain the quality of its products in order to obtain consumer confidence so that they will not to switch to competitor products, expansion of production capacity, and product innovation. Investors may choose investments in industrial sectors that have high profitability and have a positive EVA like companies that are included in the consumer goods industry sector. Regulators can create a good business climate on business actors such as maintaining the
stability of the rupiah exchange rate so that it will not continue to weaken.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the results of calculation and analysis conducted, it can be concluded that the financial performance of public manufacturing companies, consisting of basic and chemical industry sectors, consumer goods industry sector, and miscellaneous industry sector from 2012 to 2016 based on the ROA showed a declining level of profitability (ROA). The decline in level of profitability (ROA) occurred because several industrial sectors were not successful to record a profit. Those industrial sectors were metals and allied products industry, plastics and packaging industry, wood and wood products industry, pulp and paper industry, textile and garment industry, and home appliances industry. This low-level of profitability was the result of the lowering demand for wood products and textile products from the developed countries for wood and textile industry and the falling price of the traded goods in international market. In addition, wood and wood product industry experienced capital deficiency for five years consecutively. If seen from the achievement of ROA value from 2012 to 2016, consumer goods industry had the best performance compared to basic and chemical industry and miscellaneous industry.

On the effect on ROA model, external sourcing variable had a significant and negative effect on the corporate financial performance which was measured from the return on asset (ROA). This result is in accordance with the study conducted by Kotabe and Mol (2009). The result of Kotabe and Mol (2009) study was that external sourcing can have a negative effect at a certain point which exceeds its optimum point and when the market uncertainty is high. As a result, it can be said that under the high market uncertainty, the company must cut external sourcing so that it is at its optimum level and profitable for the company.

Recommendations

Based on the results and the limitations in this study, it is necessary to conduct further research related to external sourcing, and this should be conducted in a broader scope, complete the lack of data in this study and assess the performance of companies with non-financial scope so that the role of external resources to the company performance can be clearer and more comprehensive.

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