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Supply Chain Management, Firm Size and Intellectual Capital Models to Predict Capital Structure and Profitability in the Manufacturing Industry

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Abstract- **The implementation of supply chain management is necessary to support a company's operational activities especially in the manufacturing industry. Capital structure is part of the supply chain strategy that plays an important role in funding decision making in effort to boost company profitability. This study aims to analyze the effect that supply chain management, firm size and intellectual capital have on the capital structure and profitability in the manufacturing industry. The population in this study was all manufacturing industries registered in the Indonesia Stock Exchange (BEI) of 145 companies. 96 companies from the period 2010-2018 were taken as the sample using the purposive sampling technique. Data in this study were analyzed using path analysis with AMOS software. The results showed that supply chain management dan firm size had no significant effect on capital structure and profitability, while intellectual capital negatively affected capital structure but had a significant positive effect on profitability, and capital structure had a significant negative effect on profitability. The results are in agreement with the pecking order theory stating that a company capable of gaining high profits tends to have low corporate debt.**

Keywords: supply chain management, Firm Size, Intellectual Capital, Profitability, Manufacturing Industry

1. Introduction

Supply chains are principally concerned with the flow of products and information between supply chain member organizations—procurement of materials, transformation of materials into finished products, and distribution of those products to end customers. Today's information-driven, integrated supply chains are enabling organizations to reduce inventory and costs, add product value, extend resources, accelerate time to market, and retain customers. Company capital structure is one of fundamental factors in company operations. Capital structure is determined by the spending policies put forward by financial managers that constantly wrestle with various deliberations both qualitative or quantitative ones. Every company needs funds to keep their operational activities running which can be acquired from the owner's capital or from other parties in the form of debts. Debts are often treated as one of the more appealing funding sources for a company compared to other external funding sources such as stocks, bonds and other securities.

Indonesia has been known as a country with stable economic growth and great investment climate. This condition fosters enough trust in business actors to make investments. One form of expansions by business actors are the increasing value of debt, especially foreign debt. Since 2012, private company foreign debts tend to be higher than the government foreign debts. Private debts saw a significant increase of 127.48% since 2010, while the government debts saw 56.97% increase since the same year. The optimism of business actors towards Indonesia's strong economic fundamental condition has pushed them to expand their businesses by increasing debt as a source of corporate financing.

Out of the 3 sectors in the Indonesia Stock Exchange, namely primary sector, manufacturing sector and service sector, the manufacturing sector emerges as a key sector in spurring national economy. The manufacturing sector can boost domestic raw material value-added, absorb labor, generate foreign exchange from exports and become the biggest contributor to taxes and excise. The manufacturing value-added (MVA) value of Indonesia in 2018 reached 4.84%. Globally, Indonesia's manufacturing sector is ranked 9th among countries in the world. This condition is possible due to the fact that Indonesia has been inducted into one trillion-dollar club, the only country so far in ASEAN to manage that feat [1-9].

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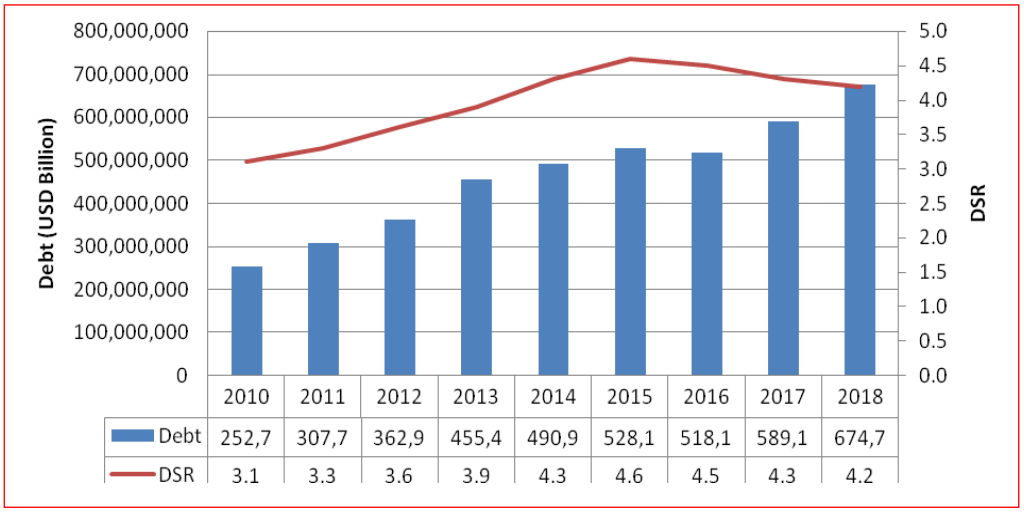

Figure 1. Comparison of Foreign Debt and Debt to Service Ratio in Indonesian Manufacturing Sector

Figure 1 presents foreign debt and debt to service ratio (DSR) of the manufacturing sector, it can be seen that the value of foreign debt of the manufacturing sector keeps rising every year. It rose by 85.34% from 2010. Meanwhile, the manufacturing DSR value saw a trend of increase in 2010-2018. DSR represents the ratio of principal and interest payments on foreign debt to receipt of the current account. Increase in debt must be counterbalanced with increase in earnings, which will lead to decrease in DSR value. This condition indicates that the performance of manufacturing debt has not been productive in an effort to encourage the reception of current account, especially exports.

This study aims to (1) analyze supply chain management, firm size and intellectual capital on capital structure and profitability in the manufacturing industry and (2) analyze the effect capital structure has on the profitability of the manufacturing industry.

2. Literature Review

The correlation between supply chain management and capital structure are described by the study from [10], finding that there was a negative correlation between supply chain management factor and capital structure. The more unique the product offered by a company is, the more unique the labor and supplier it is going to need. This condition will stimulate increased company risks and cause investors to think twice to approve loan (debt) requests from the company. Another study, by [11], found that supply chain management did not significantly affect capital structure. While the study by [12] stated that supply chain management had a significant negative effect on profitability. This explains why a company that offers unique products will need massive fund for research & development purpose which in turn will decrease its profits. In other words, although a company manages to gain bigger markets with its unique products, it will still be at loss when compared to the costs incurred to produce said unique products.

H1: Supply chain management significantly affects capital structure in the manufacturing industry

H2: Supply chain management significantly affects profitability in the manufacturing industry

The size of a company describes how big a company is that is reflected through total assets and total sales. Big companies will have easier access to external funding sources and better opportunity to emerge victorious in the competition as well as survive in the industry. This condition is line with the theory proposed by [13]. This statement is in line with the study by [14] finding that the size of the company positively affects the leverage in food sector companies in Muscat Securities Market. This study result is in line with the study by [15-18]. However, they are in contrast with the study by [19-29]. [30], in their study, found that company size positively affects profitability. Therefore, it can be concluded that big companies tend to have high profitability compared to smaller companies. Big companies favor the use of debt to finance their operations. The use of debt is intended to take advantage of tax deductive interest costs so that it will stimulate increased profitability. This result is in line with the study by [30-33]. However, it is in contrast with the study by [5].

H3: Company size significantly affects capital structure in the manufacturing industry

H4: Company size significantly affects profitability in the manufacturing industry

[31] stated that intellectual capital includes all processes and assets which do not normally appear on the balance sheet and all intangible assets (trademarks, patents and brands). So far, companies have concentrated its management activities on tangible and financial assets [18]. However, recently companies have started to extend attention to the matter of intangible assets such as human capital and innovation capital. Effective and efficient intellectual capital management can improve company performance which is evidenced by an increase in the knowledge and ability of human resources in managing the company. To achieve this, companies need huge capital that can only be met through debt. Therefore, the better the management of company's intellectual capital is, the higher its debt will be. This statement is in line with the study by [25]. However, it is contrast with the study by [4]. The resource-based theory expresses that superior intellectual capital commanded by a company is an organizational resource as capital to better manage the organization. The better the management of intellectual capital is, the better the company's performance will be. This statement is in line with the study by [12],[19],[21],[23]. However, it is contrast with the study by [3],[16],[26].

H5: Intellectual capital significantly affects capital structure in the manufacturing industry

H6: Intellectual capital significantly affects profitability in the manufacturing industry

[28] in the pecking order theory stated that a company favors internal funding more than external ones. This could explain why a big profitable company tends to be conservative in their way of exploiting debt. On the other hand, a small, less profitable company tends to prioritize the use of internal funding then get a loan in the form of debt to cover the deficit of operational funds. Small companies are largely uninterested with issuing new stocks to cover existing funding deficits. This is done to limit the disclosure of company's internal information to the public. A study by [30] on companies in Vietnam showed that capital structure negative impact company profitability. It is in line with the study by [1],[5],[7],[11], while contrasting the study by [14],[17].

H7: Capital structure significantly affects profitability in the manufacturing industry

3. Methodology

Population and Sample

The population in this study was all manufacturing industry companies listed in the Indonesia Stock Exchange (BEI) for the period 2010-2018. Study samples of 96 companies were selected using purposive sampling technique. The sampling criteria were (1) companies that went for IPO before 2010, (2) companies that were not suspended by the BEI during the observation period, (3) companies that were not delisted by the BEI during the observation period, and (4) companies that were conducting research & development.

Variable Operationalization

This study consisted of exogenous variables namely supply chain management (X1), company size (X2) and intellectual capital (X3) while the endogen variables were capital structure (Y1) and profitability (Y2). Further details are shown in Table 1.

Table 1. Variable Operationalization

	Variable	Ratio	Source
Y1	Capital Structure	Endogenous Variable	
		Total Debt/Total Equity	[1],[6],[15],[22],[27],[30]
Y2	Profitability	Endogenous Variable	
		Net Income/Total Asset	[1],[2],[5],[30],[32]
X1	*Firm Size*	Exogenous Variable	
		LN Total Asset	[2],[30]
X2	*Supply chain management*	Exogenous Variable	
	Research & Development	Research & Development/ Total Sales	[15]
X3	*Intellectual Capital*	Exogenous Variable CEE + HCE + SCE	[21],[23],[26]
	VAIC ™		

Data Collection Method

The study utilized secondary data related to literatures, company annual reports, or supporting research journals. The data collection was performed for 6 months (January-June 2020).

Analysis Technique

Analysis technique used in this study was path analysis with the help of statistical software AMOS.

4. Findings

Hypothesis Testing

Hypothesis testing served to determine the correlation between endogen variables and exogenous variables partially. The result of hypothesis Testing is shown below in Figure 2 and Table 2.

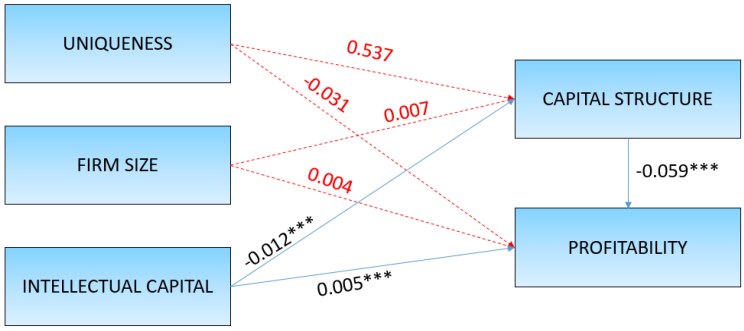

Figure 2. Path Diagram of Structural Madel

Table 2. Result of Hypothesis Testing

Endogenous Variable	Exogenous Variable	Estimates Parameters	T Value	P Value
Capital Structure	Supply chain management	0.537	1.621	0.105
	Firm Size	0.007	0.636	0.525
	Intellectual Capital	-0.012	-4.701	***
Profitability	Supply chain management	-0.031	-0.466	0.641
	Firm Size	0.004	1.660	0.097
	Intellectual Capital	0.005	9.787	***
	Capital Structure	-0.059	-8,579	***

The results of the hypothesis testing of exogenous and endogen variables are as follows:

a. The result of path analysis showed a correlation beta coefficient value between supply chain management and capital structure of 0.537. The t-value test result obtained was 1.621. This shows that supply chain management did not significantly affect capital structure in the manufacturing industry.

b. The result of path analysis showed a correlation beta coefficient value between firm size and capital structure of 0.007. The t-value test result obtained was 0.636. This shows that firm size did not significantly affect capital structure in the manufacturing industry.

c. The result of path analysis showed a correlation beta coefficient value between intellectual capital and capital structure of -0.012. The t-value test result obtained was -4.701. This shows that intellectual capital significantly affects capital structure in the manufacturing industry.

d. The result of path analysis showed a correlation beta coefficient value between supply chain management and profitability of -0.031. The t-value test result obtained was 0.466. This shows that supply chain management did not significantly affect profitability in the manufacturing industry.

e. The result of path analysis showed a correlation beta coefficient value between firm size and profitability of 0.004. The t-value test result obtained was 1.660. This shows that firm size did not significantly affect profitability in the manufacturing industry.

f. The result of path analysis showed a correlation beta coefficient value between intellectual capital and profitability of 0.005. The t-value test result obtained was 9.787. This shows that intellectual capital had a significant positive effect on profitability in the manufacturing industry.

g. The result of path analysis showed a correlation beta coefficient value between capital structure and profitability of -0.059. The t-value test result obtained was -8.579. This shows that capital structure had a significant negative effect on profitability in the manufacturing industry.

5. CONCLUSIONS

Based on the hypothesis testing results, it was known that supply chain management did not significantly affect capital structure in the manufacturing industry. This is in line with the study by [7],[8],[33]. However, this is in contrast with the study by [15]. The insignificant correlation between supply chain management and capital structure indicates that the supply chain management of a product/policy produced by a company does not directly result in an increase or decrease of debt value. Companies lean more toward utilizing internal funds derived from assets or sales to finance research & development activities than external funds derived from debt. The hypothesis testing found that supply chain management did not significantly affect profitability in the manufacturing industry. This is not in line with the study by [9]. It goes to show that research & development costs incurred by the company do not affect its profitability. This might be due to the long time before the results of research & development activities bring in the expected outcome. Thus, it does not directly result in increased company's profits.

Based on the hypothesis testing results, it was known that firm size did not significantly affect capital structure in the manufacturing industry. This is in line with the study by [7],[22]. However, this is in contrast with the study by [10],[13],[24]. The insignificant effect firm size has on

capital structure indicates that the size of a company does not directly result in an increase or decrease of debt value. The size of a company is not a guarantee for investors or creditors to invest funds into the company. The hypothesis testing found that firm size did not significantly affect profitability in the manufacturing industry. This is in line with the study by [29]. However, this is in contrast with the study by [5],[27],[30]. The insignificant effect firm size has on profitability indicates that the size of a company does not affect its profitability. Big companies are not guaranteed to have high profits. This is due to the fact that manufacturing companies can also be defined as processing industries in which business success depends on the company's ability and capability to meet the demands and desires of consumers.

Based on the hypothesis testing results, it was known that intellectual capital had a significant negative effect on capital structure in the manufacturing industry. This is in line with the study by [25]. However, this is in contrast with the study by [4]. Intellectual capital becomes the new resource for an organization in their effort to gain competitive edges. Proper management of intellectual capital is achieved through enhancement in knowledge and ability of human resources in managing the company. This condition prompts the company to pump out bigger capital that can be fulfilled by internal funds such as retained earnings or owner's capital. The company does not rely on debt in financing intellectual capital because the management of intellectual capital cannot yet be included in the company's financial statement.

Based on the hypothesis testing results, it was known that intellectual capital had a significant positive effect on profitability in the manufacturing industry. This is in line with the study by [12],[19],[21],[23]. However, this is in contrast with the study by [3],[16],[26]. Better management of company's intellectual capital will directly result in increased company's profitability. It is in line with the statement expressed under the resource-based theory. Better management of company's intellectual capital will directly result in increased company's profitability. It is in line with the statement contained in the resource-based theory. In the era of information and knowledge, the key to a company's success is not only determined by its tangible assets but also determined by intangible assets to gain competitive edge.

Based on the hypothesis testing results, it was known that capital structure had a significant negative effect on profitability in the manufacturing industry. This is in line with the study by [1],[5],[7],[11],[30],[32]. However, this is in contrast with the study by [2]. Low corporate debt will boost company profitability. It is in line with the statement expressed under the pecking order theory. The manufacturing sector is one of sectors that has huge impact on national economy. With such condition, manufacturing companies can leverage internal funds derived from assets or sales to keep operational activities running while external funds serve as supplement.

The real measure of supply chain success is how well activities coordinate across the supply chain to create value for consumers, while increasing the profitability of every link in the supply chain. In other words, supply chain management is the integrated process of producing value for the end user or ultimate consumer. The present study is limited to tangible and intangible variables, hence, the flawed results. Future research is expected to involve other financial variables to detect factors that may affect company's capital structure and profitability.

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