

Cost Structure Shifting in Dealing with a Dynamic Business Environment: Manufacturing Companies in Indonesia

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— *Review of* —
**Integrative
Business &
Economics**
— *Research* —

ABSTRACT

The main objective of this research is to identify whether there is cost shifting or changing in the cost structure in the last ten years, i.e. from 2009-2018. There are two cost structures observed in this research, the first is the proportion of overhead costs compared with the production costs, and the second is the ratio of production costs to non-production costs in the total costs. This research focused on manufacturing companies listing their stocks at Indonesia Stock Exchange (IDX). The sample were selected using purposive random sampling from six (6) industrial sub-sectors: Pulp and Paper, Chemicals, Textile and Garment, Automotive, Food and Beverage, and pharmaceuticals. There were a sample of 30 companies in total, distributed equally to six (6) sub-sectors. The result showed that no cost shifting occurs in both production costs and total costs in the last ten years. The proportion of factory overhead costs is relatively unchanged at the time of observation. The percentage of factory overhead costs for the sample observed is around 24-26% of the production costs. This number is relatively lower compared to the result suggested by Novack and Popesko (2014, p.96), which was 39.5%. The ratio between production costs to non-production cost also remains unchanged for the last ten years. The production costs are approximately 79% of the total costs.

Keywords: cost shifting, factory overhead, indirect costs, production costs, non-production costs.

1. INTRODUCTION

Industrial revolution has impacts on all aspects of human life. Many people say that the world is entering the fourth stage of industrial revolution called industrial revolution 4.0. Industrial revolution 4.0 occurs along with the connection of all machines in the internet system or cyber system. The first, second, and third stages of the industrial revolution show the impacts of each stage of the industrial revolution on business activities, especially production activities. This change will certainly have impacts on all aspects of human life, including its impacts on business activities. When automation replaces the role of humans in all economic activities, the reduction in

human labor that is replaced by machines will increase social inequality in the economic sector. Such a condition will happen especially in developing countries. In terms of the internal side of the company, that kind of model will reduce labor at a certain level and can reduce production costs. It is estimated that 40-60 percent of jobs will be lost in Southeast Asia, a region that still has a comparative advantage in terms of demographics and labor costs.

Changes in the business environment of the past decade give significant impacts on the cost structure of manufacturing companies. Companies' cost structure indicates the relative comparison between one type of cost and other costs, for example between production costs and non-production costs or raw materials costs, direct labor costs, and factory overhead costs. In the middle of the 20th century, production costs consisting of raw materials, direct labor, and factory overhead accounted for around 90% of the total costs (Novack and Popesko, 2014, p.90). During this period, the total overhead costs would not exceed 20% of the company's total costs because the production process was dominated by human labor. In developing countries, including Indonesia, where the population is large with abundant productive labor and a low level of labor wages, it is assumed that the proportion of overhead costs is smaller than that of companies in developed countries. This can be seen in the construction of large world manufacturing companies in developing countries, including Indonesia. Nike, Adidas, and Reebok have factories in Indonesia, Thailand, and Vietnam.

In the middle of the 20th century, the cost structure started to experience a shift. Glad and Baker (1996) in the research of Novack and Popesko (2014, p.90) suggest that the shift in the cost structure in the second stage of the 20th century was caused by some factors, i.e. the use of cheap raw materials, increasing marketing costs due to an increasing competition, increasing distribution and communication costs, new costs arising from the increase of research activities, increasing training costs, increasing automation, the use of high-tech machinery, and increasing use of information systems. Chan and Yee Lee (2003, p.82) stated that with the movement towards modern manufacturing (e.g. automation, computer assisted manufacturing), the mix of production costs is changing. Direct labor is shrinking and overhead (indirect costs) is increasing. Cokins (2001, p.4) stated that overhead expenses are displacing direct costs. In a manufacturing company, direct costs that are comprised of raw materials and direct labor have been shifted by indirect costs, i.e. factory overhead costs. The allocation of overhead costs in the 1950s and 1990s shifted from 25% to 60%. Technology, equipment, automation, and the use of computers were the main reasons for such a shift in the cost structure of manufacturing companies. Those factors made the 1990s a period where direct production costs were only 40% of the company's total costs. Changes in production due to technology will cause changes in the composition

of production costs. Direct costs will depreciate, while overhead costs will increase (Chan and Yee-Lee, 2003, p.82). Similar conditions have also been examined by Patrik (2005) in Noval and Popesko (2014, p.90) who found dramatic differences in the cost structure during the 1970s and 2000s. What about Indonesia especially in manufacturing companies responding to the demands of technological developments in the third and fourth industrial revolutions?

This research aim is to examine the reaction or response of manufacturing companies in Indonesia to the developments of the existing industrial revolution. If these companies respond to the existing development, they will use high-tech machines or production equipment. However, if they have difficulties following the existing developments, they will continue to gradually use human labor or labor intensity. It is expected that this research can prove whether a shift in the cost structure existed in the past decade or not, and if it existed, it can determine when the shift happened.

Based on the foregoing, this research will examine the pattern of the shift in factory overhead costs into production costs (cost shifting) occurring in manufacturing companies in Indonesia over the past decade and the pattern of the shift of non-production costs into total company costs (cost shifting) occurring in manufacturing companies in Indonesia for the past decade.

2. COST STRUCTURE CHANGES IN MANUFACTURING COMPANIES

In manufacturing companies, costs are classified into two based on the correlation between costs and products, i.e. (1) production costs and (2) non-production costs. The first refer to the costs incurred to process raw materials into finished products that are ready for sale. According to the object of expenditure, production costs are broadly divided into raw material costs, direct labor costs, and factory overhead costs. The latter consist of two types of costs, i.e. marketing costs and general administrative costs.

Drury (2007), and Johnson and Kaplan (1987) in Novak and Popesko (2014, p.91) state that the classification of costs based on the above classification is more oriented to financial report to the external parties rather than on the interests of managers. Drury (2007) in Novak and Popesko (2014, p.91) argues that the classification of costs that are more oriented to the interests of managers is the classification of costs into direct costs and indirect costs. According to Hilton and Platt (2011, p.86), the classification of costs into direct and indirect costs relates to the imposition of costs on a cost object. Costs that can be traced and charged to a cost object is called direct costs, while costs that cannot be traced and charged to a cost object is called indirect costs. The same definition is also stated by Drury (2007), i.e. that indirect costs are costs that can be specifically and exclusively identified and

charged to a particular cost object, while indirect costs cannot be charged to an object's costs.

Changes in a business environment triggered by the development of technology have significant impacts on the cost structure of companies, including trading companies, services companies, or manufacturing companies. Novak and Popesko (2014, p.90) state that in the beginning of the 20th century, production or manufacturing costs are costs that control companies' total costs. In that period, production costs could reach around 90% of the companies' total costs, so non-production costs, including marketing costs, research costs, and distribution costs, are only around 10%. Moreover, it is also mentioned that in production costs, the component of indirect costs, which are factory overhead costs, are only a maximum of 20% of the company's total costs. Research conducted by Sunarni (2012, p.314) that concerns medium and large scale manufacturing companies in the Special Region of Yogyakarta concludes that almost all research samples have a proportion of factory overhead costs ranging from 10% - 25% of production costs. The research also reveals that none of the sample companies has a proportion of factory overhead costs below 10%.

Changes in the cost structure occurred at the end of the 20th century. In this period, the proportion of indirect costs increased to approximately 40% of the company's total costs. The change in the cost structure was triggered or caused by the following factors (Glad and Becker, 1996): (a) use of fewer amounts of materials with lower prices; (b) improvements in the business environment; (c) the emergence of new types of costs related to marketing, research and development, and training activities; (d) increasing automation and use of high-tech machines; and (e) increasing use of information technology.

Another opinion is expressed by Cokins (2001, p.4) who states that in the period of 1950s to 1990s, the proportion of direct costs of both raw materials and labor was immediately replaced by factory overhead costs. It was stated that the proportion of factory overhead changed from around 25% to 60%. Cokins (2001, p.5) also states that these changes resulted primarily from technology, equipment, and automation. However, these things are actually only secondary causes. This change is mainly caused by two things: (1) a gradual increase in the number of products or services offered by companies to consumers and (2) increasing use of various types of distribution and sales channels.

3. RESEARCH METHODOLOGY

The research population consisted of manufacturing companies registered at IDX. Manufacturing companies are industrial companies that process raw materials into semi-finished products or finished products. Manufacturing companies have a

complete cost structure in production activities. The manufacturing industry sector is one of the pillars of the national economy since this sector contributes significantly to Indonesia's economic growth.

The population of this research consisted of three (3) industrial sectors, and two (2) sub-sectors were taken from each sector with the following details:

1. Basic and chemical industry: pulp and paper, and chemical manufacturing
2. Various industry: textile and garment, and vehicles and their components
3. Consumer goods industry: food and beverage, and pharmaceuticals

The sampling method used was purposive sampling. Sekaran and Bougie (2016, p.247) said that purposive sampling is conducted by collecting samples from a specific type of people who will provide desired information because they are the only ones who can give the information needed. Purposive sampling is used to make the data obtained to be more representative and reflect the population. The criteria used in this research were determined based on the following consideration:

- The companies are included in the five sub-sectors mentioned previously.
- The companies have sold their shares actively to the public for the past ten years
- The companies published financial statements and notes to financial statements from 2009 to 2018
- The companies report factory overhead costs separately from direct labor costs

4. RESEARCH FINDINGS

Proportion of Factory Overhead Costs of the Total Production Costs

Factory overhead costs are an indirect component of production costs. These costs only exist in manufacturing companies, i.e. companies that convert raw materials into finished products that are ready to sell. Carter (2006, pp.2-10) writes that factory overhead costs can be interpreted as production costs in addition to the cost of raw materials and direct labor costs that cannot be traced directly to each type of product accurately. One of the dominant components of factory overhead is the costs related to machine, both the depreciation cost of the engine and the cost for maintaining the machine. Manufacturing companies, which are capital intensive or machine intensive, will have a relatively high component of depreciation and maintenance costs.

Machines with advanced technology, especially those imported from abroad, will certainly have a high acquisition price so that the depreciation expense will also be high. In addition to a high acquisition price, advanced technology in the manufacturing sector will make machines quickly outdated, meaning that their economic lives tend to be shorter. Therefore, if a manufacturing company uses high-tech machinery that has a

high acquisition price but low economic life, the depreciation expense per year tends to increase. This causes the amount of factory overhead cost tend to increase.

The observation on 30 samples in 6 industrial sub-sectors has obtained data on factory overhead costs, direct labor costs, and total production costs over the past 10 years. Additionally, the proportion of factory overhead costs of total production costs in each sub-sector was calculated by dividing overhead costs by total production costs and are provided in Table 1.

Table 1
Factory Overhead Costs to Production Costs from 2009 to 2018 (in %)

SUB-SECTORS	2009	2011	2012	2013	2014	2015	2016	2017	2018
Automotive	20	20.6	25.6	21.2	22.6	25.8	25	25	25.8
Pulp and paper	27.6	29	29	29.4	29.6	31.8	32.2	31	32.8
Chemicals	17.4	17.8	18	15.4	17.2	26.4	17.6	22.2	17.6
Textile & Garment	30	26.6	28	26.8	30.2	32.4	35.4	35.4	33.6
Food & Beverage	9	13.6	12.4	14.4	15.8	18.2	17.6	17.2	18.4
Pharmaceuticals	27.6	29.6	26	24.6	25.2	26	28.6	26.6	24.2

Table 1 reveals that the highest percentage of factory overhead costs was found in the textile and garment sub-sector, which was around 30%, while the smallest percentage was found in the food and beverage sub-sector, which ranged from 9% to 18.4%. This average remains low compared to the results of Novak and Popesko's research (2014, p.96), which suggest that indirect costs or factory overhead costs in 2009 were around 39.5%. Further analysis was also carried out for all sample companies of the six manufacturing sub-sectors. The average percentage of factory overhead costs from the total production costs over the past decade can be seen in 2009, the proportion of factory overhead costs was 23.3% and relatively stable in the next five years, i.e. at 23.43%, then increased to 25.04% in the following five years. The results of Novak and Popesko's research (2014, p.96) discover that the proportion of indirect costs of production in was 34.5%, 40.7%, and 39.5% in 2004, 2007, and 2009 respectively. However, findings of the present research suggest a tendency of an increasing proportion of indirect production costs among manufacturing companies in Indonesia.

Comparison between Factory Overhead Costs and Direct Labor Costs

In management accounting, total direct labor costs and factory overhead costs are referred to as conversion costs (Carter, 2006, pp.2-10). According to Hanson and Mowen (2007, p.43), conversion costs represent costs to convert raw materials into finished products that are ready for sale. The ratio of factory overhead costs to direct

labor costs for the six sub-sectors ranges from 2 to 23 times. The data analysis reveals that all sub-sectors have a greater amount of factory overhead costs compared to direct labor costs. The highest is in the chemical sub-sector, which is 23 times, while the lowest is in the automotive sub-sector, which is 2 times. It can be seen that the ratio of factory overhead costs to direct labor costs is relatively stable, except for the chemical sub-sector which is experiencing fluctuations. In general, the comparison between factory overhead costs and direct labor costs can be said to be relatively stable in the last decade. The growth of the factory overhead cost-direct labor cost ratio in the past decade is 7.12 times of direct labor costs in the beginning of the observation period, then increased slightly to 9.15 in the next five years but decreased to 7.9 in the last five years of observation.

Proportion of Production Costs of the Total Costs

Novak and Popesko (2014, p.90) state that in the mid-first era of the 20th century, total production costs amounted to around 90% of a company's total costs. At that time, the majority of production cost components were dominated by direct costs, especially raw materials and direct labor costs. Total indirect production costs, i.e. factory overhead costs, were barely higher than 20%. The research finding explains that the proportion of production costs ranged from 45-95% of the total costs. Based on the data, it can be stated that the highest proportion of production costs over the past decade is in the textile and garment sub-sector, which ranges from 90-95%. However, only one sub-sector, which is pharmaceuticals, that has a relatively equal ratio of production to non-production costs. In this sub-sector, the proportion of production costs only ranges from 40-50%, meaning that non-production costs also have the same proportion.

According to Kaplan and Atkinson (1998, p.371), activities run by a manufacturing company can be divided into three stages, they are Innovation Cycle, Operation Cycle, and Post-sales Service Cycle. Production costs are costs that occur during the operating cycle or production cycle. Costs in the innovation cycle consist of two, i.e. costs to determine the characteristics of the market and consumers, and costs to realize products or services that are market-compatible. The third cycle is after-sales service. Costs in this last cycle represent costs incurred after the sale transaction, including warranty costs and consumer compensation costs, repair costs, and so on. It can be stated that organization activities is concentrated in the second cycle, which is the operation cycle, except for the pharmaceutical sub-sector. However, findings of this research reveal that manufacturing companies have not fully paid attention to the innovation cycle or after-sales service cycle because the proportion of non-production costs is only around 20%.

5. CONCLUSION

It can be concluded that in terms of the proportion of factory overhead costs, the highest production cost is in the textile and garment sub-sector, which is around 33%. The lowest proportion of factory overhead costs is in the chemical sub-sector, which is around 17%. This percentage is still lower compared to the results of Novak and Popesko's research (2014, p.96) which reveal that indirect costs or factory overhead costs in 2009 were around 39.5%. In general, in the observation of the last ten years, it can be stated that the proportion of overhead costs to direct labor costs can be said to be relatively stable, which was 7.12 in 2009, 8.15 in 2014, and 7.9 in 2018. This indicates that during the observation, there were no significant changes in the way or method of production. Only the chemical sub-sector experienced a significant change during the observation period. It can also be said that for the past ten years, there has been no shift or change in the ratio of factory overhead costs to production costs.

On average, production costs range from 45 % to 95% of the total costs. There is only one sub-sector, which is pharmaceuticals, with production costs of 50%, while the other five sub-sectors are above 75%. This condition shows that manufacturing companies still focus on operations or production. All samples have not provided the same attention to activities before production or after production. During the last ten years, the proportion of overall production costs can be said to remain unchanged, which was 77.8% in 2009, 78.7% in 2014, and 77.5% in 2018. The results show no change or shift in the proportion of production costs and non-production costs from the total costs of the organization or company. It can be affirmed that there has been no change in the focus of activities carried out during the last ten years, especially activities in the innovation cycle and after sales service.

6. LIMITATION AND SUGGESTIONS

The observation period that was only 10 years, i.e. from 2009 to 2018, may cause invisible changes or shifts in costs. Due to this limitation, it is recommended that future researchers extend the period or time of observation.

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