

# ANALYSIS OF THE COST STRUCTURE: PERSPECTIVES FROM THE MANUFACTURING COMPANIES IN SRI LANKA

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## ABSTRACT

The purpose of this paper is to analyse the cost structure of manufacturing companies in an emerging economy. The data was collected from 41 listed manufacturing companies in Sri Lanka mainly through a structured questionnaire and an analysis of company records. In addition, to analysing the data descriptively, we used correlation and regression models. The findings suggest that despite the majority of costs being variable, there are great differences among the companies in the composition of costs. There is no relationship between the cost structure and the level of advanced manufacturing technology used, which suggests a low level of technology-related costs in the cost structure. Budgeting and cost control are the main reasons for classifying costs while there is inadequate use of information for strategizing pricing decisions. Differences were also observed in the classification of the manufacturing cost items in the respondent companies. Finally, all the findings confirm that accounting practices in emerging economies are shaped by their environment as well. The study also reveals certain managerial and policy level implications.

**Keywords:** advanced manufacturing technology, cost behaviour, cost structure, emerging economies, manufacturing companies

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## **INTRODUCTION**

In response to globalization and advanced technology, corporations now undergo fundamental changes in their structures, operations and cultures (Palmisano, 2006, Novák & Popesko, 2014). Globalization has led to international competition and efforts to stay competitive (Junarsin, 2009). Owing to trade liberalization organizations are now derived of trade protection of various types they once enjoyed (Flammer, 2015). In particular, they have to face not only growing competitive pressure from their foreign rivals but also falling product prices and margins (Edwards & Sundaram, 2017; Flammer, 2015; Khandelwal, et al., 2013). This compels organizations to be extremely competitive on many fronts. However, these changes offer numerous new opportunities for firms operating in today's business environment such as access to worldwide markets, exposure to modern technology, and fewer barriers to trade and capital flows (Awuah & Amal, 2011).

Changes in the business environment have made significant impacts on the structure of company costs (Novák & Popesko, 2014; Drury, 2009). For instance, the proportion of direct costs has decreased due to advanced manufacturing technologies such as additive manufacturing and automation (Baumers, et al., 2016; Weller, et al., 2015). This requires that companies possess accurate information about their operations, products, customers and markets to maintain a competitive position in the industry (Novák & Popesko, 2014, Barfield et al., 2001). Although this is important for companies in both developed and devolving countries, the extent of these impacts is more severe on companies in emerging economies owing to their inability to react fast in the face of capital constraints, social and cultural barriers and lack of infrastructure (Avgerou & Walsham, 2018). Thus, understanding cost structures and related issues is important for these countries from both an academic and managerial point of view. Yet, the majority of studies so far on management accounting have concentrated on developed countries (Alawattage et al., 2007, Albu & Albu, 2012; de Soyza et al., 2014; Hopper & Bui, 2016; López & Hiebl, 2014). This has created a knowledge gap in respect of the composition of the cost structures of companies in emerging economies and how the use of advanced technology impacts on management accounting practices.

Filling this knowledge gap on the cost structure on emerging (or developing) is particularly important since most of the world's population live in emerging economies with their own economic, social and environmental challenges, which could, in turn, create differences in cost structures and management accounting practices. It is also important when considering certain economic and geographical regions such as Asia which plays an important role in the global economy. In order to fill this knowledge gap, this study analyses the cost structure of manufacturing companies in an emerging Asian economy and sets out the specific objectives of this study as follows:

1. Objective 1: Analyze the cost structure of the manufacturing companies,
2. Objective 2: Examine the relationship between cost structure and use of advanced manufacturing technology,
3. Objective 3: Examine the reasons for the classification of costs of manufacturing companies, and
4. Objective 4: Identify the behaviour-based classification of manufacturing cost items.

### **Sri Lanka Manufacturing Sector and Management Accounting Practices**

The emerging economy selected for this study is Sri Lanka, an island nation in the South Asian region. After a long-drawn-out civil war, the Sri Lankan economy grew at an average of 6.4 percent from 2010 to 2016. It is now considered a lower middle-income country with a total population of 21 million people (World Bank, 2017). The major contribution to the country's gross domestic product (GDP) in 2017 came from the service sector which accounted for 62 percent, followed by manufacturing 31 percent and agriculture 7 percent. The manufacturing sector was selected for this study for several reasons. First, the manufacturing (industry) sector has been growing steadily over the years while providing employment opportunities for 26 percent of the total labour force (Central Bank of Sri Lanka, 2017). Although Sri Lanka is a small economy, it has earned a global reputation for several manufacturing industries such as apparel, tea-based products, and leather products. Further, the Board of Investment (BOI) of Sri Lanka has strategically identified a wide range of manufacturing industries

to drive the economic development process of the country (BOI, 2016). Finally, increased domestic and international competition, growing costs of inputs and declining profit margins make cost and management accounting imperative for Sri Lanka's manufacturing firms (Kariyawasam, 2018).

For effective planning and control, cost information plays a crucial role in setting realistic cost budgets, comparing actual cost information with expected results, and taking remedial action for variances. In Sri Lankan small and medium-sized enterprises (SMEs) in the manufacturing industries, Wijewardena et al. (2004) consider planning and control sophistication to be an important driver of sales growth. Despite the usefulness of cost and management accounting for Sri Lankan manufacturing companies, the adoption of management accounting practices is inadequate in Sri Lankan industries (Fonseka et al., 2005; Subasinghe & Fonseka, 2009) or disappointingly low (Fonseka et al., 2005). Management accounting is mainly confined to planning and internal control purposes (Fonseka et al., 2005). Among many other reasons this is mainly attributable to the lack of top management awareness of the usefulness of cost and management accounting practices including cost analysis (Subasinghe & Fonseka, 2009). Further over emphasis on financial accounting-based reports for decision-making have resulted in downplaying cost and management accounting practices in Sri Lanka (De Soyza et al., 2014; Fonseka et al., 2005). In a recent study Nagirikandalage and Binsardi (2017) observe that inadequate access to cost information, lack of awareness of the importance of cost accounting and a primitive approach to costing are prominent barriers to implementing an effective cost accounting system. Similarly, de Soyza et al. (2014) opine that the majority of Sri Lankan companies still prefer conventional cost and management accounting techniques such as budgeting and standard costing over modern cost management tools such as activity-based costing and lifecycle costing. Thus, management accounting is needed in such areas as strategy formulation, decision making, resource use and performance measurement (Fonseka et al., 2005; Subasinghe & Fonseka, 2009). Fonseka et al. (2005) emphasize the need to establish a central management and cost information system to cater to the information needs of the different departments in an organization. Similarly, in the public sector the need for better costing and management accounting has been emphasized as a measure to reduce losses, minimize waste and close loopholes for possible frauds and malpractices and improve transparency (Committee on Public Enterprises, COPE, 2013).

As Sri Lanka is endeavouring to become a commercial and knowledge hub it is imperative for investors to access comparable information across countries based on internationally accepted costing and management and financial accounting practices. This will enable informed decision making as foreign and private sector investments are necessary to reach the targeted GDP growth rate and development in Sri Lanka (World Bank, 2015). Having understood the importance of management accounting, the Parliament of Sri Lanka unanimously passed a bill in 2009 to establish a separate national body for management accounting called the Institute of Certified Management Accountants of Sri Lanka (ICMASL). Further, over the last few years various initiatives have been taken at national and policy levels to adopt cost and management accounting practices in the country. For instance, ICMASL is now in the process of introducing cost and management accounting standards for the country. Thus, Sri Lankan manufacturing industries provide an interesting case to study.

The paper is organized as follows: Section Two is a literature review on cost structures, importance of cost classifications and adoption of advanced manufacturing technology and its impact on cost structure. Section Three describes the research method followed in this study. The next section presents the analysis and results. The last section presents the conclusions of the study, its contributions and limitations and directions for future studies.

## **LITERATURE REVIEW**

### **Cost Structure and Importance of Cost Classification**

Cost and management accounting systems generate information to meet different requirements such as profit measurement and inventory valuation, decision making, performance measurement and controlling the behaviour of people (Drury, 2009). Among the various cost classification methods, behaviour-based cost classification is essential for decision making and it describes how costs and revenues vary with different levels of activity (Horngren et.al, 2016). In the management accounting literature, the terms ‘variable’, ‘fixed’ and ‘semi-fixed’ are used to describe how cost reacts to changes in activity (Drury, 2009; Horngren et.al, 2016; Langfield-Smith et al., 2012). Activity or volume may be measured in terms of units of

production or sales, hours worked, miles travelled or any other appropriate measure. In the short run these costs are variable, fixed or semi-fixed (Drury, 2009; Kinney & Raiborn, 2012). Over a longer time period, costs tend to change in response to large changes in activity. Hansen et al. (2009) states that according to economics, in the short run, some costs may be fixed but in the long run, all costs are variable. Novák and Popesko (2014) state that the length of the short-run period depends to some extent on management judgement. However, there are alternative perspectives on the nature of long- and short-run cost behaviour patterns. These perspectives mostly relate to activities and resources needed to enable an activity to be performed (Hansen et al., 2009). Despite this general understanding, the same cost item is categorized differently by different companies (Oberholzer & Ziemerink, 2004; Langfield-Smith et al., 2012). In practice, there are several factors that determine the cost classification method chosen by a company such as the accounting and managerial policy adopted, cost driver selected, time period, cost object and the range of activity selected (Oberholzer & Ziemerink, 2004; Horngren et al., 2016). For example, a particular cost item could be variable with respect to one cost object and fixed with respect to another cost object. Similarly, variable and fixed cost-behaviour patterns are valid for linear cost functions only within a given relevant range. Outside the relevant range, variable and fixed cost-behaviour patterns change, causing costs to become nonlinear.

Traditionally, in management accounting cost behaviour classification was done by identifying a single activity level. In contrast to this traditional costing, activity-based costing generally analyzes costs in great detail by identifying a range of cost drivers that cause cost to vary (Langfield-Smith et al., 2012). In activity-based costing, costs depend on whether an activity is unit level, batch level, product level or facility sustaining (Horngren et al., 2016). The activity-based view of cost categorization, which is supported by the activity hierarchy, improves understanding of cost behaviour and the accuracy of cost prediction in any industry (Langfield-Smith et al., 2012). Irrespective of traditional costing or activity-based costing, cost behaviour is assumed to be symmetrical. However, recent studies reveal that costs may behave asymmetrically, that is, costs may respond differently to upward or downward changes in activity (Ibrahim & Ezat, 2017). Such costs are called sticky costs –the costs increase more with a rise in the activity than with a decrease in the activity by an equivalent amount (Anderson et al.,

2003). With the emergence of arguments on sticky costs, asymmetric costs behaviour has become debatable (Ibrahim & Ezat, 2017).

Regardless of the method, these classifications are important for determining the operating leverage and break-even point, profit planning and control, and decision making (Horngren et al., 2016). For instance, operating leverage attempts to highlight a risk-return trade-off associated with the cost structure of a firm (Dagogo, 2014; Pandey, 2002; Van Horne, 2005; Weston & Brigham, 2008). Operating leverage is the extent to which fixed costs are used in business operations to generate more than proportionate increases in operating profit (Weston & Brigham, 2008). This could be achieved by employing fixed costs in the expectation that sufficient revenue will be generated to cover all fixed and variable costs (Van Horne, 2005). Hence, the cost structure of a firm has many implications and uses for managerial decision making.

### **Adoption of Advanced Manufacturing Technology and its Impact on Cost Structure**

Over the last few decades manufacturing companies have adopted advanced technology for a variety of purposes including automation, enterprise resource planning, supply chain management, and efficiency improvements in manufacturing industries (Heim and Peng, 2010). Today, the use of technology in manufacturing companies is at various levels. This results in various degrees of use of technology (or capital-intensity) in a firm. The assessment of the use of technology in a firm can be done by analyzing its use of new technologies such as computer-aided manufacturing (CAM), computer-aided designing (CAD), electronic data interchange (EDI), automated production processes, materials/manufacturing resource planning including enterprise-wide resource planning systems, e-commerce and automated inventory and warehouse management systems (Higgins et al., 1996; Horngren et al., 2016; Langfield-Smith et al., 2012; Laudon & Laudon, 2015; Milgrom & Roberts, 1990; Oberholzer & Ziemerink, 2004). The purpose of advanced manufacturing technology is to improve competitiveness (Moyano-Fuentes et al., 2016). However, the use of advanced manufacturing technology does not necessarily lead to improved performance (Heim & Peng, 2010; Moyano-Fuentes et al., 2010) as technology can have a significant impact on the cost structure. In this regard,

a relationship has been suggested between the cost structure and the use of advanced manufacturing technology of a firm. The difference between a labour-intensive and a capital-intensive firm (an entity that uses a high level of manufacturing technology) can be determined by referring to their cost behaviour structures (Oberholzer & Ziemerink, 2004). Explaining this further, Garrison and Noreen (2003) opine that a company that uses a high level of technology is expected to have a higher operating risk than a labour-intensive company because of the use of fixed costs. In similar vein, La Roy (as cited in Oberholzer & Ziemerink, 2004) argues that costs tend to become fixed if more technology is introduced into the business operations. Despite this popular belief, Oberholzer and Ziemerink (2004) observed a significant negative relationship between fixed costs and the level of use of advanced manufacturing technology in manufacturing companies in South Africa. They argue that labor-intensive companies incur more fixed costs in their cost structures leading to higher operating risk than companies that use a high level of manufacturing technology.

The extant literature highlights the need for a sharper analysis and understanding of the use of cost and management accounting information in manufacturing companies. This is particularly important in emerging economies because of the paucity of studies on these fundamental yet critical aspects of cost and management accounting in these countries that heavily rely on the manufacturing sector to earn foreign exchange and generate employment. Further, the few available studies show inconclusive evidence of how cost structures are affected by the use of advanced manufacturing technologies. Hence this study aims to address these aspects of Lankan manufacturing companies.

The next section presents the method followed in this study.

## **METHOD**

Since the purpose of this study was to analyse the cost structure of manufacturing companies, the researchers had to rely on companies that are accessible and whose cost information is available with some degree of accuracy. Hence, they selected the listed companies in the country's only stock exchange, the Colombo Stock exchange (CSE). Since it is mandatory



for these companies to publish their audited annual reports, some cost information is readily available to the public. Further, the researchers can double check the accuracy of the information provided by the individual companies against their published annual reports. The listed companies are grouped under twenty business sectors. Though there is a separate category for manufacturing, there are manufacturing companies listed under other categories as well. The authors therefore selected manufacturing companies from the following business sectors:

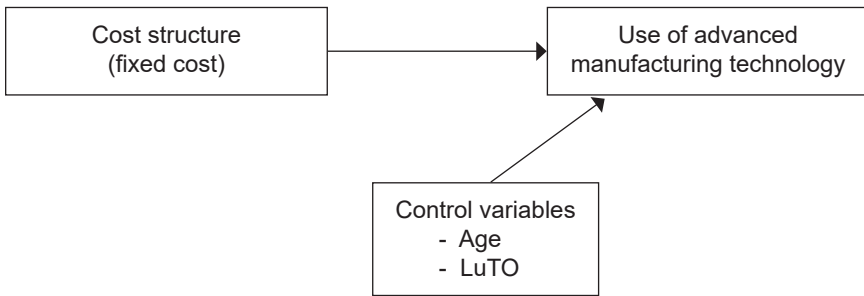
1. Manufacturing
2. Beverage, food and tobacco
3. Chemicals and pharmaceuticals
4. Footwear and textile
5. Construction and engineering
6. Diversified

This resulted in identifying eighty-two companies as manufacturing companies for this study. Their annual reports for the year 2014/15 were first accessed to get some understanding of the company's operations and cost structure. Thereafter, all these companies were informed by mail about the purpose of the study. The questionnaire was also sent out with the mail. The main person to contact was the Management Accountant. In the absence of a Management Accountant, the Accountant, Finance Manager or Finance Controller was contacted. The data was collected from February 2015 to June 2015. In order to improve the response rate, whenever possible, the researchers or the research assistants personally visited these companies by prior appointment to solicit responses to the questionnaire. Two weeks after sending the questionnaire, reminders were sent by mail or telephone. Thereafter, having checked the response list, the researchers gave several subsequent reminders to the relevant contact persons of the companies that had not responded. After taking all these measures, a total of 43 completed responses were received, representing a 51% response rate from the total sample. The two researchers checked the questionnaires for any missing information. The relevant persons were again contacted by post or telephone when information was missing. Two incomplete questionnaires were excluded from the analysis. This finally resulted in 41 responses for the analysis.

The questionnaire was developed by modifying the instrument used Oberholzer and Ziemerink (2004) for several reasons. First their instrument was based on international literature on cost structure and other related aspects. Second, it gave little emphasis to the specific South African context but was more general in nature. Third, the use of this instrument enabled the researchers to make a comparison with the findings from Sri Lanka. However, the researchers made the necessary adjustments to the instrument without simply adopting it as it was. The researchers therefore sent the questionnaire to two Management Accountants and one Production Manager in the manufacturing firms for feedback on its overall quality, understandability and user-friendliness. These respondents with more than five to ten years of industry experience in the manufacturing sector and professional qualifications made valuable suggestions for improving the questionnaire. With their feedback some improvements were made to the questionnaire. It consisted of two main sections. Section one dealt with information about the company's turnover, number of years since incorporation and details of the respondent. The second covered information on four main areas related to the objectives of the study. First, the cost structure of the organization was analysed to identify the composition of variable and fixed costs. Next, the extent of the use of advanced manufacturing technology used (measured in terms of CAD, CAM, automatic/computerized production process, e-commerce, resource planning and automated inventory management systems, real time reporting, automated supply chain management systems and warehouse management systems) was identified on a five-point Likert scale. Third, the reasons for the classification of costs as fixed and variable components were also identified on a five-point Likert scale. Finally, the behaviour-based cost categorisation method used by these companies for some selected manufacturing cost items such as manufacturing labour, material handling, energy, building occupancy, quality control, depreciation, and materials was identified. In order to ensure the reliability of information, the researchers used the annual reports of the companies, web sites and, when accessible, other sources such as cost records, budgetary reports and cost manuals.

Both researchers independently scrutinized the collected information for accuracy and consistency before the analysis. After tabulating the data, SPSS was used to analyse the data. In order to achieve the second objective, we first tested the relationship between fixed cost and the extent of use

of advanced manufacturing technology using correlation analysis (and independent sample *t*-test). Secondly, we used a multivariate regression model with two control variables, i.e., turnover and age of the companies to test the same relationship. In order to address the homoscedasticity issue, the total turnover was transformed by calculating the natural logarithm of the total turnover (Jamshidian & Jalal, 2010; Salkind, 2010). The related conceptual framework for testing the relationship under regression analysis is indicated below (Figure 1).



**Figure 1: Conceptual Model of the Study**

The next section presents the analysis and results of the study.

## ANALYSIS AND RESULTS

Some characteristics of the 41 companies included in this study are presented in Table 1.

**Table 1: Description of Data (n=41)**

	Frequency	Percentage (%)	
<b>Turnover (Rs. Mn)</b>	> 1,000	13	31.7
	1,000-5,000	14	34.1
	5,000-10,000	6	14.6
	10,000-20,000	2	4.9
	>20,000	6	14.6
	<b>Total</b>	<b>41</b>	<b>100.0</b>

<b>Years since incorporation</b>	<10	1	2.4
	10-20	5	12.2
	20-30	25	61.0
	>30	10	24.4
	Total	41	100.0

### Cost Structure of the Manufacturing Companies

As the first objective of this study, it was necessary to determine the cost structure of the respondent companies. This necessitated identifying the variable cost and fixed cost separately. Table 2 presents some of the average, distribution and dispersion values of the distribution of fixed and variable cost of these companies.

**Table 2: Cost Structure of the Manufacturing Companies**

	<b>Fixed cost</b>	<b>Variable cost</b>
Mean	29.24%	70.75%
Median	22.00%	78.00%
Std. Deviation	22.82%	22.82%
Skewness	.988	-.988
Kurtosis	-.029	-.029
Minimum	5.00	13.00
Maximum	87.00	95.00

According to Table 2, the sample companies have a large proportion of variable costs (i.e., 70.75%) in their cost structures. However, among these companies there is a large deviation as indicated by the standard deviation. For example, in one company the fixed cost proportion was only 5% representing the minimum in the sample, while the maximum was a high proportion of 87%. These results are similar to the situation in South Africa where the cost structure is mainly comprised of variable cost, which stands at 60% (Oberholzer & Ziemerink, 2004). Those companies too exhibit a large deviation in the sample, which could be due to the great diversity of their operations.

## Extent of Use of Advanced Manufacturing Technology

In order to assess the level of use of advanced manufacturing technology, the data was analysed on a five point Likert scale where 1 represents a very low level of use while 5 represents a very high level of use of advanced manufacturing technology. As Table 3 shows, the use of resource planning systems, real time reporting and continuous assessment and upgrading of production process have received the highest score. A possible reason could be the use of ERP systems that enable the companies to generate real time reports and upgrade their processes continuously (Hunton et al., 2003; Laudon & Laudon, 2015). The use of e-commerce and automated supply chain management have received the lowest score. Despite the high use of ERP systems, they have not incorporated up-stream activities in the value chain.

**Table 3: Extent of Use of Advanced Technology**

Aspect of advanced manufacturing technology	Mean value of the use of technology
Use of CAD	3.13
Use of CAM	3.05
Use of automatic/computerized production process	3.43
Continuous assessment and upgrading of production process	3.51
Use of e-commerce	2.80
Use of resource planning systems (such as MRP/ ERP)	3.80
Use of real time reporting	3.63
Use of automated inventory management systems	3.39
Use of automated supply chain management/procurement/EDI	2.44
Use of automated warehouse management systems	3.02

There was no evidence of the use of other technologies apart from these technologies. (It was a column we left open in the questionnaire for the respondents to enter their responses). This indicates that the latest advanced manufacturing technologies such as additive manufacturing (Baumers et al., 2016; Weller, et al., 2015) are not used by the manufacturing companies in Sri Lanka.

## Relationship between Cost Structure and Use of Advanced Manufacturing Technology

The next step was to find out whether any relationship existed between the cost structure and level of use of advanced manufacturing technology.

Pearson's Correlation indicated that there was no systematic real relationship between these two factors as the  $\rho$ -value was over 0.05, which confirms that there is no statistically significant relationship between fixed cost (i.e., cost structure) and extended use of advanced manufacturing technology among the listed manufacturing companies in Sri Lanka. Furthermore, in order to examine whether there is a difference between the high fixed cost and low fixed cost firms in terms of their use of advanced technology, the firms were categorized into four quartiles based on their fixed cost. The independent sample t-test was used to examine whether there is a statistically significant difference between the 1<sup>st</sup> fixed cost quartiles and 4<sup>th</sup> fixed cost quartiles in the use of advanced manufacturing technology. The results indicated that there is no statistically significant ( $\rho$ -value>.05) difference between the highest and the lowest quartiles in terms of the use of advanced manufacturing technology, which confirms again that the level of fixed cost (i.e., cost structure) does not affect the use of advanced technology. Finally, a multivariate regression analysis was done of fixed cost and use of advanced manufacturing technology with two control variables, viz., turnover and age of the companies, to test the same relationship. Table 4 below shows that even after introducing control variables, there no statistically significant relationship ( $\rho$ -value>.05) between fixed cost (i.e., cost structure) and level of use of advanced manufacturing technology.

**Table 4: Multivariate Regression Results**

Dependent variable: Tech	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
Intercept	1.679	.636		2.640	.012
FC	.006	.006	.155	.991	.328
Age	.004	.005	.138	.883	.383
LnTO	.159	.074	.350	2.150	.038

Overall, all the tests indicate that there is no statistically significant relationship ( $p$ -value $>.05$ ) between FC (i.e., cost structure) and the extent of use of advanced manufacturing technology. Since these companies are manufacturing companies, there can be a significant proportion of non-technology related costs such as of raw materials in the cost structure. Hence, this can be a possible reason for the low-level contribution of technology-related costs in the cost structure of these companies. This finding is however inconsistent with that of Oberholzer and Ziemerink (2004), who found a negative relationship between fixed cost and use of advanced manufacturing technology.

### Reasons for Classifying Costs as Fixed and Variable Costs

As the third objective of this study, the respondents were asked to identify the reasons for classifying costs as fixed and variable. Their responses were recorded on a five-point Likert scale with 1 representing a very low level of usage while 5 a very high level of usage. The averages were obtained for each reason based on which the following rankings were arrived at. Table 5 also shows the results of similar studies carried out elsewhere both in developed and developing countries (emerging economies).

**Table 5: Reasons for the Classification of Costs**

Reasons for the classification of costs	Sri Lanka	Vaal Triangle	South Africa	Australia	Japan	U.K.
Price determination	7	4	1	1	5	1
Decreasing/controlling costs	2	6	2	6	3	5
Profit planning	3	2	3	3	1	2
Cost-benefit analysis	6	5	4	4	6	5
Cost-volume-profit analysis	4	1	5	4	4	4
Budgeting	1	3	6	2	2	3
Stock valuation	5					
External reporting	8					

Source: Developed based on Oberholzer and Ziemerink (2004)

According to Table 5, budgeting is the predominant reason for the selected Sri Lankan companies classifying costs and the next is cost control. Price determination and external reporting have been ranked as the least important reasons for the classification of costs. This suggests that

companies use cost classification primarily for internal purposes such as budgeting and controlling cost, but not for price setting. These findings are consistent with those of Fonseka et al. (2005) and De Soyza et al. (2014) who suggest that the use of management accounting is mainly confined to planning and internal control purposes. Also, these findings suggest that even after over a decade (the study of Fonseka et al was conducted in 2005), the use of cost and management accounting has not extended beyond planning and control to other areas such as strategy formulation, resource utilization and performance measurement (Fonseka et al., 2005; Subasinghe & Fonseka, 2009). The low use of cost information in pricing suggests that there are many more other dominant factors in determining the price such as government regulations, competition and trade agreements (Drury, 2009, Hansen et al., 2009). The rankings arrived at in this study are quite different to those in other countries such as South Africa, Australia and UK, which have ranked price determination as the most important reason. A comparison of these results further indicates many differences between these countries in the use of cost information.

### **Classification of the Behaviour of Manufacturing Cost Items**

In respect of the fourth objective, the respondents were asked to select their behaviour-based cost classification method for a given list of manufacturing cost items. That is, they selected how the given cost items are treated -as fixed, variable or semi-variable- in their organizations. Their responses are presented in Table 6 along with the findings of similar studies carried out elsewhere.

Table 6 shows that among the listed manufacturing companies in Sri Lanka direct manufacturing labour is considered as either variable (42%) or semi-variable (34%) costs. Unlike in Australia and USA, direct labour cost is not variable in Sri Lanka. This indicates that they can be more flexible than Sri Lanka in adjusting their labour force to fluctuations in production volume. However, in Sri Lanka indirect manufacturing labour is considered as either semi-variable or fixed costs. Many companies classify these two cost items as semi-variable indicating that labour cost has a fixed monthly fee accompanied by a variable component that changes with the volume of production.



A majority of Sri Lankan companies among the countries in the list classify material handling cost as variable (i.e., 61%). On the other hand, many companies classify energy cost as semi-variable. This is mainly because in Sri Lanka, industrial sector consumers (i.e., businesses such as mining and quarrying and manufacturing) have to pay a variable fee for electricity based on the kilowatt hour consumption (kWh) and a fixed fee as fixed monthly fixed cost and a fixed maximum demand charge when the demand for electricity exceeds a given level (Ceylon Electricity Board, 2016). Other manufacturing cost items such as building occupancy and manufacturing depreciation cost are classified mainly as fixed by the listed Sri Lankan manufacturing companies reflecting a situation similar to other countries. Material cost is classified mainly as a variable cost by these companies, reflecting a similar situation in the Vaal Triangle in South Africa. A notable feature of the above manufacturing cost items is that 12% of the respondent companies do not separately identify quality control cost as a manufacturing cost item. A possible reason could be the pooling of quality control cost with other cost items or non-incurrence. If the latter is more prevalent, it indicates a lack of focus on quality-related expenditure by Sri Lankan manufacturing companies.

**Table 6: International Comparison of Classification of Manufacturing Costs**

Cost item	Sri Lanka			Vaal Triangle			South Africa			USA			Japan			Australia		
	Var. %	Semi Var. %	Fixed %	Var. %	Semi Var. %	Fixed %	Var. %	Semi Var. %	Fixed %	Var. %	Semi Var. %	Fixed %	Var. %	Semi Var. %	Fixed %	Var. %	Semi Var. %	Fixed %
Direct manufacturing labour	42	34	22	29	14	57	51	14	35	86	6	8	52	5	43	70	20	10
Indirect manufacturing labour	7	42	46	43	14	43	49	16	35	60	25	15	44	6	50	45	33	22
Material handling cost	61	15	17	36	21	43	30	10	60	48	34	18	23	16	61	40	30	30
Energy(power)	27	56	17	71	14	14	46	25	29	26	45	29	42	31	27	-	-	-
Building occupancy	0	3	91	7	0	93	5	15	80	1	6	93	0	0	100	-	-	-
Quality control	10	22	56	21	7	71	21	8	71	34	36	30	13	12	75	21	27	52
Manufacturing depreciation	7	10	83	14	7	79	6	13	81	1	7	92	0	0	100	-	-	-
Direct material	98	0	2	64	0	36												
Indirect material	56	17	22	71	7	21												

Source: Oberholzer and Ziemerink (2004)

## **CONCLUSIONS**

The purpose of this study was to identify cost structure- related issues in manufacturing companies in an emerging economy. Firstly, the analysis revealed that although the majority of costs are variable there is great diversity among the companies in their composition of costs. In terms of advanced manufacturing technology, respondent companies mostly use resource planning systems, real time reporting and continuous upgrading of the production system. This can be attributed largely to the use of ERP systems. Despite the high use of ERPs, the companies have not incorporated up-stream activities in the value chain into their systems. The analysis of cost structure and level of the use of advanced manufacturing technology revealed that there is no relationship. This suggests that the level of use of advanced manufacturing technology does not result in any changes in the cost structure of the respondent companies. This can be due to the low contribution of technology-related costs in the cost structure of these companies. This finding therefore should encourage manufacturing companies to invest more in advanced manufacturing technologies to improve quality, meet global competition, streamline business processes, and increase efficiency without overly worrying about the increase in cost.

Secondly, it was found that budget setting and cost control are the main reasons for classifying cost as variable or fixed. But the use of the same information for pricing and external reporting is less evident. This situation is quite different from other countries though similar to the other findings in Sri Lanka. Since these are listed companies run by professional managers, they may use the information for internal legitimacy by preparing budgets and controlling costs. However, the use of information for strategizing pricing decisions is lacking as cost information can only be one determinant of pricing in these companies. This situation therefore highlights the need for the use of cost and management accounting in other areas such as strategy formulation, performance measurement and value creation (Fonseka et al., 2005; Subasinghe & Fonseka, 2009). However, without sufficient management awareness of the usefulness of management accounting a change is unlikely to happen. This therefore requires improving management awareness of cost and management accounting practices and their usefulness through education and professional development. The recently established national management accounting body in Sri Lanka,

ICMASL, has a crucial and active role to play in improving the use of management accounting in Sri Lanka.

Thirdly, the study observed differences in the classification of manufacturing cost items in respondent companies. Although the classification of certain cost items such as building occupancy, manufacturing depreciation and material cost are similar to the classification methods used elsewhere in the world, other cost items such as direct labour and electricity are different. The treatment of labour cost in various countries differs because of legal, political and social factors. Similarly, the treatment of cost items such as electricity depends on the tariff system in a country. Hence, the findings of the study point to international differences in cost structure-related issues. Finally, overall the findings of this study confirm that accounting is shaped by its environment, as highlighted by Sulaiman et al. (2004). For Sri Lanka, this can be an opportunity to expedite the introduction of cost accounting standards which are already in the pipeline to streamline the various cost and management accounting practices. It will enable international and local investors to make informed decisions if internationally accepted costing and management accounting practices are followed. This will facilitate the achievement of the targeted GDP growth rate and development in Sri Lanka (World Bank, 2015).

The contributions of this study are as follows: Firstly, it provides insights into cost structure from the perspective of an emerging economy through greater understanding of the use of cost and management accounting information in less researched geographical regions. Since the majority of studies on mainstream management accounting have sidelined the less developed countries (LDCs), there is a need to give a “voice” to management accounting research in LDCs (Alawattage et al., 2007). Secondly, this study reveals some country-specific reasons for classifying costs and using cost information for managerial planning, controlling and decision making. As Sulaiman et al. (2004) put it, “If, indeed, accounting is shaped by the environment, then one would expect there to be differences emerging in the adoption of the various management accounting tools by companies in these countries” (p. 494). Ignorance of these factors may impede the development aims of these countries (Hopper et al., 2009). Thirdly, from a practical perspective manager need to accurately understand their cost-related information for a variety of reasons ranging from planning

and decision making to cost control (Drury, 2009). As Alawattage et al. (2007) state, “managers in LDCs seek accurate costing and improved controls, need accounting systems, and must act as commercially as their Western counterparts”. Hence this study would enable the managers of these emerging economies to analyse their cost structures and make better planning and control decisions. This is particularly important as the use of cost and management accounting information is significantly low in the manufacturing companies in Sri Lanka (De Soyza et al., 2014; Fonseka et al., 2005; Subasinghe & Fonseka, 2009).

The findings of the study are not without limitations. One limitation is that the consideration of cost information is only for the year 2014/5. This was a time when the Sri Lankan economy showed a slowdown in GDP growth compared to previous years (Central Bank of Sri Lanka, 2015). This slowdown was particularly visible in the manufacturing sector too. Hence, this may have an impact on the sample companies as well which will, in turn, impact on their cost structure due to changes in production volume. Therefore, in future studies it will be desirable to consider a longer time period when examining the cost structure of the companies. Capturing a longer time period would enable future researchers to even out the fluctuations in the cost structure caused by various economic conditions. Similar to the limited time period is the limited number of firms used in the analysis of the study. Future studies with a larger sample will undoubtedly produce findings that can be better validated. Another limitation of this study stems from the researchers’ attempt to compare the results of this study with the findings of other studies carried out elsewhere. The differences in the sample, time periods, and perhaps analytical methods could render the international comparisons less meaningful. A possible strategy that future researchers can employ is to use the same research design across different geographical regions within a given time period. Despite the practical difficulties associated with such a massive project, the benefits in terms of the accuracy of the comparison will be valuable. Finally, in this study we used a questionnaire to collect data which inherently limits the amount of information we could collect through the research instrument. A mixed method approach together with qualitative insights (Cresswell, 2014) can offer a better understanding of the use of cost and management accounting information in specific contextual settings.

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