

Advanced Management Accounting Techniques in Manufacturing Firms in Ethiopia

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Abstract

In order to survive in the increasing global economic pressure and remain competitive, manufacturing firms are to become more efficient in managing and controlling their costs. This paper examines the level of advanced management accounting practices in manufacturing firms of Ethiopia, and it examines the relationship between some theoretical factors that influence the usage of Advanced Management Accounting Techniques (AMATs). The usage or its advancement level of management accounting techniques increased in the last five years. This implies that the manufacturing firms have awareness about these techniques. To examine the relationship of theoretical factors that affect the usage of AMATs, the paper used Pearson correlation and cross tabulation. As the result from Pearson correlation coefficient indicates, the usage of AMATs and advanced manufacturing technology has strong relationship. With regard to the Traditional Management Accounting Techniques firms widely use and this increased in the last five years. To keep pace with the world's changing management accounting environment, Ethiopian manufacturing firms should use the newly developed techniques.

Keywords: Advanced Management Accounting Practices in Manufacturing Firms of Ethiopia

1.Introduction

Advanced Management Accounting Techniques (AMATs) are generally defined as multidimensional composite of planning and controlling subsystems that aim to provide information for managerial decision-making and enhance an organizational performance (Birnberg and Snodgrass, 1988). Modern management accounting has a rich history dates almost 200 years back. The need for cost accounting and tools for planning, coordinating and controlling first arose during the industrial revolution (Johnson, 1987). Since the early 1980s, a number of innovative management accounting techniques have been developed such as activity based management, strategic management accounting, balanced scorecard and others. These new techniques are designed to support modern technologies and new management processes, such as total quality management and just-in-time production systems, and the search for competitive advantage to meet the challenge of global competition has been, as a result, realized.

Advanced management accounting techniques in developing countries including Ethiopia and developed countries have recently received more publicity than what is usual. Outdated management accounting systems were found to produce misleading cost numbers and performance measures. Radical changes in manufacturing technology and philosophy combined with intensified global competition, had made many traditional systems obsolete. In response, significant efforts have been made in both industry and academies to conceive and apply new costing systems that meet the requirements of changing environments (Holzer and Norreklit 1991). Therefore, in the context of Ethiopia, to what extents do the manufacturing firms are practicing advanced management accounting techniques in producing relevant information to the management and creating a competitive advantage for the firms. This study is subject to the usual limitations associated with survey research but there are at least some limitations to the study that need to be addressed. Firstly, this study covers only manufacturing firms. Second, the scope was limited to Addis Ababa and neighborhood towns or industry zones because most of the manufacturing firms are around this area. Finally, there may be other important predicting variables that could be added to theoretical framework to improve its explanatory power.

2.Objective of the Study

The main objective of the study is to investigate and analyze whether manufacturing business firms in Ethiopia are using Advanced Management Accounting techniques and the extent of such use. The specific objectives are to;

- Assess the level of advanced management accounting practices in manufacturing companies operating in Ethiopia.
- Examine the relationships between product varieties, complexity of production process, overhead expenses and usage of advanced management accounting practices.
- Analyze the relationship between level of competition and usage of advanced management accounting practices.

- Investigate the relationship between company size and usage of advanced management accounting practices.

3.Methodology

Three approaches of research design used these are Qualitative, Quantitative and mixed. The Qualitative approach does not attempt to quantify results through statistical summary or analysis. Quantitative research approach is the systematic and scientific investigation of quantitative properties and phenomena and their relationships. Finally, a mixed methods approach is one which the researcher tends to base knowledge claims on pragmatic grounds (e.g., consequence-oriented, problem-centered, and pluralistic) (Creswell, 2002). In an attempt to meet the research purposes, quantitative research was used for this study. The reasons for selecting this method was that the study used the structured predetermined questionnaires for collecting data on and statistical tools like descriptive and correlation coefficient also used for analyzing the data. The survey is preferred type of data collection for this study because in terms of economy and rapid turnaround in data collection. To collect empirical data, self-administered questionnaire was used. These facilitate access to large number of respondents and provide sufficient data for statistical analysis. In this study, the population is stratified and from each strata the chance being selected is equal because the manufacturing firms are different in size, capital and sales volume this helps me to meet the objective of the study.

For achieving the objective of the study Descriptive analysis, cross tabulation and the Pearson correlation was used to examine frequencies and the relationships between dependent variables and independent variable. A cross-tabulation gives the picture of how two variables inter-relate or interdependent with each other. To compute Pearson r and cross tabulation SPSS software was used.

4.Data Analysis and Interpretation

Questionnaires were filled out by 71 manufacturing firms from this 43 usable responses were received, that represents a response rate of 57% of the total sample size. The usable response is firms that use the advanced management accounting techniques. The respondents comprised the Accountants, Administrative, cost and budget division heads and finance heads.

Profile of Firms

Table 1: Profile of Companies

	Frequency	Percentage
Classification of the firms		
Food Products and Beverages	19	27
Manufacture of Tobacco Products	1	1
Textile products	2	3
Leather and footwear	5	7
Wood, paper products and printing	4	6
Chemicals and chemical products	17	24
Non-metallic mineral products	15	21
Metal and electrical	6	8
Manufacture of machinery and equipment	1	1
Assembly of motor vehicles and trailers	1	1
Owner of the firms		
Local	66	93
Foreign company	3	4
Share of foreigners and local	2	3
Firms product marketed in		
Local market	59	83
International market	8	11
Both local and international	4	6

Table 2: Past and Present Usage of Management Accounting Techniques

Management Accounting Techniques	Past usage		Present usage		Difference
	Frequency	Percent	Frequency	Percent	
Traditional M. Accounting					
Full costing	23	30	28	37	7
Standard costing	26	34	23	31	3
Job order costing	16	21	18	24	3
Process costing	11	14	5	6	8
Advanced M. Accounting					
Activity Based Costing	12	43	20	29	14
Activity Based Management	0	0	0	0	0
Target Costing	9	32	24	35	3
Kaizen Costing	0	0	0	0	0
Life Cycle Costing	6	21	17	25	4
Throughput Accounting	0	0	0	0	0
Balanced Scorecard	0	0	0	0	0
Just In Time	1	4	8	12	8
Back flush Costing	0	0	0	0	0

To investigate all the relationships between usage of advanced management accounting techniques and factors that influence the usage AMATs, a cross tabulation and the Pearson correlation were used. The result of the Pearson Correlation is summarized in table 3 below and each relationship is discussed under the table.

Table 3: Pearson correlation

Factors influence AMATs	Advanced management accounting techniques
Perceived competition	Pearson correlation
Product price	0.094
Product quality	0.456
New product introduction	0.366
Technological change	0.479
Advertising and promotion	-0.078
After sales service	0.208
Perceived competition	0.425
Complexity of production process	
Batch	0.064
Continuous	0.122
Line	0.144
Overhead cost with the cost structure	0.389
Total sale	0.038
Current capital	0.042
Product variety	0.275
Technological advancement	0.600

Perceived Competition and AMATs

The instrument used in perceived market competition consisted of six items that is competition in product price, product quality, new product introduction, advertising and promotion, technological change and after sales service. Table 3 displays the Pearson correlation between perceived market competitions with usage of AMATs is 0.425, this result is the overall usage of the perceived competition and usage of AMATs their relationship is some moderate. From the above table, the perceived competition product quality, technological change and new product introduction has 0.456, 0.479 and 0.366 significant level which indicate they have moderate relationship. But the Pearson correlation between advertising and promotion and usage of AMATs is -0.078 almost they have no relationship because the Pearson correlation is approaches to zero.

Complexity of Production Process and AMATs

From factors that might affect management accounting practices is complexity of manufacturing of production process. Complexity of production process was defined on a scale from the least complex production system, continuous production process, followed by line, batch and to the most complex job shop production process. With regard to job shop production system, there is no firm which used this type of system from the sample. It is argued that as when the complexity of production processes increases, the more usage of advanced the

management accounting techniques. However, in the above table the relationship between complexity of the production process and usage of AMATs is not as such statistically significant. In other words, the relationship between Batch and usage of AMATs, is almost no because the Pearson relationship between them is 0.064 that is approach to zero. The others like continuous and AMATS and Line and usage of AMATs are 0.122 and 0.144, respectively; this result shows that their relationship is weak. As indicated above the interpretation of the Pearson correlation coefficient when the result approaches to zero implies that there is no relationship between the variables. If the result approaches to one there is strong relationship or when one variable increases the other also increases.

Overhead Portion AMATs

In this case, when overhead portion increased in proportion to the cost structure of the product produce the firms' usage of AMATs will increase. In other words, when firms' overhead cost increases as proportion to total cost firms will use different types AMATs. As indicated in table 3 the Pearson correlations between overhead cost portion with the cost structure and usage of AMATs has 0.389. This implies that their relationship is positive and moderate.

Total sale and usage of AMATs

In table 3 above, Pearson r shows the relationship between annual sales of firms and usage of AMATs is 0.038; this result implies that there is almost no relationship between the annual sales and usage of AMATs.

Size and AMATs

Another research objective seeks to explore whether firm size is related to the use of AMATs. Larger firms with bigger capital and other resources are more likely to use AMATs. As these advanced techniques are usually expensive and require large capital outlay. The Pearson correlations result shows their relationship is 0.042. The result of these two variables shows that there is insignificant relation, which suggests that size and AMATs' usage were not statistically related.

Product Variety and AMATs

The other factor that might affect the usage of AMATs is product variety. It is defined as by the number of products produced by the firm. In other words, if the firms produce more than one product type, it will use variety of AMATs. In table 3, the Pearson correlation coefficient shows the relationship between product variety and usage of AMATs is 0.27 that implies their relationship is statistically insignificant.

Usage of technological Advancement and AMATs

Factors that might affect the usage of AMATs are the usage of advanced technologies of the firms. Technological usage means that if the firms use this type of technologies such as Robotics, Computer aided manufacturing, Computer aided design, Computer aided engineering, Computer aided process planning, Testing machines and Computer integrated manufacturing. In this regard the Pearson r 0.600 implies that the relationship between usage of AMATs and usage of technological advancement is strong as compared to others factors. In other words, this the implication is when the firms uses advanced technology also use more AMATs.

Cross tabulation of perceived market competition and usage of AMATs

Perceived competition is among the factors that influence the usage of AMATs. There are product price, product quality, new product introduction, technological change, advertising and promotion and after sales service in this factor. AMATs' Activity Based Costing, Target Costing, Life Cycle Costing and just in time are used among the samples of manufacturing firms.

From the table 4 below, firms that use product price for competition and use activity based costing are 16 from 43 firms or 37% of them use simultaneously ABC and product price. In other words 37% of firms that use the product price for competition use directly ABC costing method. From the table also 4 firms that do not use product price for competition do not also use ABC costing method that is 9% of them. Firms that use product price for competition and not use ABC for their costing is 19 or 44%. As shown under table 5, the Pearson correlation result between product price and usage of ABC is -0.33. This implies that the relationship is negative. Firm that use product price for competition and target costing for controlling their cost is about 44% (19 firms) use simultaneously product price as well as target costing. The Pearson correlation of these two variables, as shown in table 5, is around -0.064. This means product price and target costing are negatively related.

Life cycle costing and product quality have 0.326 correlation as shown below in table 5 which is positively and moderate. About 40% of the firms use product quality and life cycle costing shown 17 firms use product quality for their competition and life cycle costing for controlling their cost.

With regards to just in time, 65% (28 firms) that use product price and not just in time. On the other hand, correlation coefficient, in table 5 is 0.075 this shows the existence of insignificant relation with each other.

Table 4: Cross tabulation of perceived market competition and usage of AMATs

Factors Influence AMATs		Activity Based Costing		Target Costing		Life Cycle Costing		Just In Time	
Perceived competition		Not use	Use	Not use	Use	Not use	Use	Not use	Use
Product Price	Not use	4	4	3	5	6	2	7	1
	Use	19	16	16	19	20	15	28	7
Product Quality	Not use	3	3	3	3	6	0	6	0
	Use	20	17	16	21	20	17	29	8
New product introduction	Not use	6	7	5	8	11	2	13	0
	Use	17	13	14	16	15	15	22	8
Technological change	Not use	17	10	11	16	20	7	22	5
	Use	6	10	8	8	6	10	13	3
Advertising and promotion	Not use	14	11	12	13	14	11	19	6
	Use	9	9	7	11	12	6	16	2
After sale service	Not use	20	16	17	17	22	14	29	7
	Use	3	4	1	2	4	3	6	1

Table 5 shows that the correlation of each perceived competition for each AMATs that are used in (activity based costing, target costing, life cycle costing and just in time) the sample. As shown below in the table, the relationship between target costing and product price, product quality, new product introduction, technological change, advertising and promotion and after sale service is -0.064, 0.047, -0.076, -0.09, 0.091 and 0.139 respectively. This result shows that there is almost no significant relationship between them.

As the table below shows, the relationship between activity based costing and technological change is 0.247 which has some moderate relationship. As compared with other Life cycle costing and technological change has significant relationship from the factors of perceived competition that influence AMATs has value of 0.362.

Table 5: Pearson correlation of perceived competition and AMATs

	Activity based costing	Target costing	Life cycle costing	Just in time
Perceived completion				
Product price	-0.33	-0.064	0.142	0.075
Product quality	-0.028	0.047	0.326	0.193
New product Introduction	-0.097	-0.076	0.325	0.315
Technological change	0.247	-0.090	0.362	0.003
Advertising and promotion	0.059	0.091	-0.108	-0.163
After sales service	0.094	0.139	0.030	-0.049

Cross tabulation of AMATs and complexity of production process

From the table 6 below, 40% (6 firms) use target costing and simultaneously continuous production system. However, 34 firms (79%) do not use line production system and just in time techniques. The Pearson *r* value of the two variables is -0.074 (almost has no statistically relationship between them).

The Pearson correlation of batch production system and life cycle costing is strong and negative (-0.70). This result implies that when one usage of batch production system increase the usage of life cycle costing increase and vice-versa. The other moderate relation recognized is between batch and activity based costing with 0.295 level of significance.

Table 6: Cross tabulation of AMATs and complexity of production process

Factors Influence AMATs		Activity Based Costing		Target Costing		Life Cycle Costing		Just In Time	
Complexity of production process		Not use	Use	Not use	Use	Not use	Use	Not use	Use
Batch	Not use	17	9	10	16	15	11	21	5
	Use	6	11	9	8	11	6	14	3
Continuous	Not use	6	6	5	7	9	3	10	2
	Use	17	14	14	17	17	14	25	6
Line	Not use	23	19	19	23	25	17	34	8
	Use	0	1	0	1	1	0	1	0

Table7: Correlation complexity of production process and usage of AMATs

	ABC	TC	LCC	JIT
Complexity of production process				
Batch	0.295	-0.143	-0.70	-0.20
Continuous	-0.044	-0.032	0.185	0.031
Line	0.165	0.137	-0.125	-0.074

The table above shows the Pearson correlation result of from complexity of production process Batch, continuous and line and form AMATs ABC, TC, LCC and JIT. From those of all relationship strong correlation is occurred between life cycle costing and usage of batch production system.

5. Conclusions

The objectives of the study are to investigate the usage of AMATs in Ethiopia and to explore whether AMATs usage is related to product variety, complexity in production processes, overhead portion, perceived competition, usage of technological advancement and firm size.

The findings of this study indicate that the present usage rates of the AMATs among Ethiopian manufacturers were higher as compared to what was in the past five years. However, the changes are relatively small despite the increasingly competitive business environment. The result shows the usage of AMATs is low because the firms that the study took as a sample use only four types (activity based costing, target costing, life cycle costing and Just in time).

From the result, Activity-Based Costing and target costing had the highest rate of changes, followed by life cycle costing and just in time. These results suggest that there have been an increasing level of awareness among the manufacturing firms about these AMATs. It is interesting to note that the rate of TMATs usage has also increased during the present period compared to those in the past. The results also indicate that while there has been an increasing application of certain AMATs, the emphasis on the TMATs remains equally important.

To test the hypothesis of the study Pearson correlation was used. The first hypothesis said usage of AMATs has no relationship to perceived competition. The result indicates that a positive relationship is there between perceived competition and usage of AMATs. As indicated in the interpretation part this result is interpreted as when one variable increases the other also increases or when the firms uses different techniques of AMATs it uses simultaneously different techniques of perceived competition like product price, product quality and others. From the relationship between usage of AMATs and each of the items in the perceived competition, only the advertising and promotion has negative relationship but the rest items has positive relationship between with usage of AMATs.

The usage of technological advancement and usage of AMATs has strong relationship. This result implies that when firms use more advanced technology, they use also different techniques of advanced management accounting techniques.

The second hypothesis was a positive relationship between the firm size and usage of AMATs. The firm size was measured in terms of current capital and the annual sale. The result indicates there is almost no relationship. The third hypothesis is a firm with higher overhead in related to total cost uses AMATs than those with small overhead portion. The result indicates a positive relationship between them. In other words, when the firms overhead portion was higher the firm uses AMATs that those of small portion of overhead.

The fourth hypothesis is the complexity of production process of the firms and usage of AMATs. With regards to complexity of production process batch with the usage AMATs is almost has no relationship between them. But line and continuous has some moderate positive relationships were found between them. On job shop order production (more complex) process no firm was found in the sample that uses this type. These results however contradict the prediction that usage of AMATs has related to the more complex production processes.

The fifth hypothesis is the level of product variety and usage of AMATs has positively related. The result indicates that the relationship between these two variables was positively related but the significance level is not as such strong.

Finally, the relationship between perceived market competition and AMATs change, however, is consistent with the findings of previous studies. For example Williams and Seaman (2002) and Isa and Foong (2005), whose studies were conducted in Singapore and Malaysia, respectively, found negative relationships between perceived market competition and usage in management accounting systems. An earlier study in Canada by Libby and Waterhouse (1996) found both variables were positively related. These mix findings suggest that the exact nature of market competition and management accounting practices might not be as direct as expected. In addition, the results might be affected by differences in time frame as well as economic or cultural factors. Ethiopia belong to the developing and emerging economies with its own cultural values, while Libby and Waterhouse's study was based on a sample of Canadian manufacturing firms which were of Anglo-American cultural value and in an advanced economy. Williams and Seaman (2002) had in fact argued that the inconsistent effects of competition on management accounting controlling systems change found in theirs and Libby and Waterhouse's studies could be due to the differences in the economic condition in Canada (severe recession) and Singapore (booming economy) that existed during the survey periods. The inconsistent and inconclusive results suggest that more studies may need to be carried out to investigate the role of market competition in predicting management accounting change.

Based on the hypothesis of the literature served and the findings of this research, the researcher recommended the following:

- To keep pace with the world changing management accounting environment, I recommend Ethiopian manufacturing firms use the newly developed techniques. A well-balanced practice of those techniques irrespective of the sectors may be enhanced through compulsory enactment of cost and management accounting audit in Ethiopia.
- The researcher recommends that before choice, the manufacturing firms' first improve factors that influence choice of advanced management accounting practices such as timeliness, technology and effectiveness.
- After that, it is useful, for manufacturing firms to select the best-advanced management accounting techniques that fit and meet the objective of the firms. These techniques reduce cost and increase the efficiency of the company.
- In order to support the manufacturing firms, the researcher suggests higher institutions of the country give some cost controlling designs techniques that much with the capabilities of manufacturing industry in the country. In other words, give some orientations that reduce cost, time and increase the efficiency for firms.
- From the result indicate usage of advanced technology and usage of AMATs has a strong relationship, so the researcher recommend that when manufacturing firms uses modern technology they will also tend to use modern management accounting techniques that goes with this technology. This gives for manufacturing firms in Ethiopia to compete globally.
- Finally, the researcher invites other interested researcher to proceed the detail study of each AMATs in the manufacturing industry how they implement and use.

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