# An Analysis of Activity Based Costing Practices in Selected Manufacturing Units in India

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## Abstract

**This study was an attempt to analyze the motives for implementation and causes for non implementation of activity based costing (ABC) system and to establish the relationship between the company characteristics and use of the ABC system in selected manufacturing units in India. The study targeted medium and large scale companies having at least 100 employees and a minimum investment of ₹ 5 crores in plant and machinery. Logistic regression and descriptive statistics were performed to analyze the data through SPSS. The study found a number of employees and the percentage of overheads as significant company characteristic factors for the implementation of the ABC system. More adequate pricing decisions, better overhead cost allocation, and more accurate product cost were found as the motives for the implementation of the ABC system. The major challenges faced during the adoption process of the ABC system are selecting cost drivers, high cost of ABC, data collection difficulties, and uncertainty of ABC benefits. Costly to switch to ABC, easy to track cost, satisfied with current system, and uncertainty of ABC benefits were found as the main causes for non adoption of ABC. The study recommended the implementation of the ABC system to get the various benefits associated with it.**

***Keywords*** **: ABC system, activity based costing, product diversity, implementation of ABC**

**JEL Classification : L25, M10, M11, M40**

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Manufacturing organizations have undergone significant changes since the 1960s, that is, technological changes, increase in competition, product diversification, shift from labour intensive to capital intensive techniques, decrease in labour costs due to use of capital intensive techniques, and the increase in indirect costs. Today, in the era of cut throat competition, managements need to have more accurate cost information to take more appropriate decisions. Hence, in the present times, we can't use the traditional costing technique of apportionment of the overheads cost on the basis of volume, that is, sales volume, direct labour hour, or machine hour. The traditional costing method of apportionment of overheads is not logical as felt by managements and accountants. So, a need arose to have a new system for the apportionment of the overheads to take more appropriate decisions by the management. To overcome the limitations of the traditional costing system, the activity based costing system (ABC) came into the existence in 1980s.

As per the ABC system, the overhead costs are apportioned on the basis of the services utilized by the various production departments. In the ABC method, the department which has used most of the services has to bear the

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maximum burden of the overhead cost. The ABC method is a logical method to divide the cost on the basis of benefit received by the concerned department and not on the basis of volume like in the traditional costing method in which a department having the maximum sale has to bear the maximum expenses of service departments if the apportionment is based on the basis of sales volume. In the ABC system, the overhead cost is assigned to the activities on their uses of resources.

Previous studies revealed that most of the work on ABC has been done in developed countries such as: USA, Australia, Canada, Japan, etc. Implementation of ABC system is also more in developed countries as compared to the developing countries. Previous studies found the causes for the adoption of the ABC system, that is, to get more accurate product cost, elimination of wastage, to be able to make more accurate pricing decisions, etc. Researchers also analyzed the causes for non adoption of the ABC system, that is, resistance to change, costly to switch, lack of top management support, etc.

## Literature Review

The previous studies which comprise the motives for implementing the ABC system, difficulties faced in the process of implementing the ABC system, and the reasons for not adopting the ABC system are summarized below.

The previous studies explored the factors for adopting the activity based costing, that is, cost control, accurate cost estimations, determination of selling price, and exclusion of non value adding activities (Salem & Mazhar, 2014). With the above factors, the product profitability analysis also found an important reason for implementing the ABC system. Decrease in manufacturing cost, increase in product quality, and reduction in cycle time were also analyzed as the motives for the implementation of the ABC system (Ittner, Lanen, & Larcker, 2002). While studying the technological and organizational influences on the adoption of activity based costing in Australia, the support from top management and internal champion with the size of the firm were identified as the reasons behind the initial interest in ABC implementation (Brown, Booth, Giacobbe, 2004). Lack of support of top management, lack of knowledge, and resistance to change were found to be the major causes for non adoption of the ABC system in the study application of activity based costing in manufacturing companies in Bangladesh (Shil & Pramanik, 2013). The lack of management support, IT support, education and training were found as the main reasons for the non implementation of the ABC system (Duh, Lin, Wang, & Huang, 2009). Factors such as to ascertain the cost of the product more accurately, helps in cost control, helps in taking administrative decisions like selling price determination and exclusion of non value adding activities were found as the expected benefits behind the application of the ABC system (Shaban & Mazhar, 2014). Resistance and lack of interest & support from the management, high implementation costs, and complicated work processes were identified as the main challenges for non implementation of the ABC system (Jinga, Dumitru, Dumitrana, & Vulpoi, 2010).

A number of studies have also been conducted to know the relationship between the use of the ABC system and company's characteristics such as size of the firm, product diversity, and level of overhead. Mixed results were observed as some studies found a significant relationship between the use of the ABC system and some company characteristics, while some studies found no relation or negative relation between the use of the ABC system and some company characteristics. Size of the firm was found to be a significant factor for the use of the ABC system (Arora & Raju, 2017 ; Brierley, 2008 ; Elhamma, 2012 ; John, 2014), while some studies found no significant relationship between the size of the firm and the use of the ABC system (Ahmadzadeh, Etemadi, & Pifeh, 2011 ; Rababah, 2013).

Factors such as product diversity (increase in the number of products), increase in competition, and increase in overheads were also found to be very important to implement the ABC system (Ahmadzadeh et al., 2011 ; Salawu

& Ayoola, 2012). On the other hand, few studies found no significant relation between the above said variables and adoption of the ABC system (Brierley, 2008 ; Rababah, 2013).

## Objectives of the Study

This study is an attempt to analyze the causes that act as motivation for implementation of ABC and also to find out the causes for non adoption of ABC in selected manufacturing units in India. The study is also an attempt to establish the relationship between the company characteristics and use of the ABC system. The objectives of the study address the following questions :

**(1)** To study the overview of the practices of the ABC system in selected manufacturing units.

**(2)** To examine the relationship between company characteristics factors, that is, size of the firm, product diversity and level of overhead, and use of the ABC system in selected manufacturing units.

**(3)** What are the motives for an organization behind the adoption of the ABC system in selected manufacturing units ?

**(4)** What are the important areas for the implementation of the ABC system ?

**(5)** What are the major difficulties faced by the selected manufacturing units while implementing the ABC system ?

**(6)** To investigate the possible reasons for non adoption of the ABC system in selected manufacturing units.

## Research Methodology

**(1) Data Collection Procedure :** The study is based on primary data. For collection of data, a three part questionnaire was developed. Part one consisted of basic information regarding the company characteristics like, number of employees, average annual turnover, number of products, investment in plant and machinery, percentage of overheads in total cost. The second part of the questionnaire was for those organizations who implemented the ABC system which consisted of the questions regarding motives for the adoption of the ABC system, specified areas where ABC system has been implemented, and what are the major challenges they have to face during the implementation process of the ABC system. The third part of the questionnaire was for those organizations who had not implemented the ABC system to know the various reasons for the non adoption of the ABC system.

**(2) Sample :** The study targeted the medium and large scale manufacturing companies which had at least 100 employees and had a minimum investment of ₹ 5 crores in plant and machinery. The reason for restricting our study to companies having at least 100 employees is because smaller firms have fewer chances to have separate costing department, and hence, the ABC system implementation possibility is reduced. The reason for targeting firms which had a minimum investment of ₹ 5 crores in plant and machinery is because in India, a firm having ₹ 5 crores investment in plant and machinery is considered as a medium scale company. The data were collected by sending emails and conducting direct interviews & using the telephonic interview method. Out of 150 firms targeted on the basis of the convenience sampling method, only 79 responses were received (approx. 53%). Out of 79 responses, we considered only 72 respondents as seven responses were not appropriate. The present study is a cross sectional study which was conducted during January - June 2018.

**(3) Method :** The data were analyzed through SPSS version 22. Logistic regression was used to know the relationship between the company characteristics and the use of the ABC system. To examine the motives for the implementation of the ABC system, specified area for the use of the ABC system, problems faced during the implementation process, and the reason for non - adoption of the ABC system were considered. The descriptive statistics were used which consist of average, minimum and maximum value, standard deviation, and variance.

## Data Analysis and Findings

**(1) Implementation Rate:** Out of the 72 sample units considered in the study, only 26 units (approx 36%) had implemented the ABC system ; whereas, 46 sample units (approx 64%) had not implemented the ABC system.

**(2) Sample Unit Characteristics :** The Table 1 presents the descriptive statistics of the 72 sample units. To examine the company characteristics factors, size of the firm, product diversity, and level of overhead are considered for the selected manufacturing units. The size is measured in terms of number of employees, average annual turnover, as well as in terms of investment in plant and machinery. Generally, studies have considered the number of employees or annual turnover as the size of the organization, but in our study, we have considered the investment in plant and machinery also, as in India, companies having investment of ₹ 5 crores or more are considered as medium scale companies. The study has considered only those firms which had 100 or more employees. The range of number of employees is from 100 to 7000, with an average number of the employees in the sample companies selected for the study being approx 837. The range of average annual turnover is from ₹ 7 crores to ₹ 5000 crores, with an average of approx ₹ 469 crores. The range of investment in plant and machinery is from ₹ 5 crores to ₹ 900 crores, with an average of approx ₹ 94 crores. To measure the product diversity, we have considered the number of

**Table 1. Descriptive Statistics of the Sample Units**

| | No. of Employees | Av. Annual Turnover (Cr.) | No. of Products | Plant & Machinery (Cr.) |
|---|---|---|---|---|
| *N* Valid | 72 | 72 | 72 | 72 |
| Missing | 0 | 0 | 0 | 0 |
| Mean | 837.47 | 468.67 | 11.31 | 94.39 |
| Std. Deviation | 1518.75 | 1019.80 | 11.61 | 205.29 |
| Minimum | 100 | 7.00 | 2.00 | 5.00 |
| Maximum | 7000 | 5000.00 | 52.00 | 900.00 |

**Table 2. Omnibus Tests of Model Coefficients**

| | | Chi-square | *df* | Sig. |
|---|---|---|---|---|
| Step 1 | Step | 65.530 | 5 | .000 |
| | Block | 65.530 | 5 | .000 |
| | Model | 65.530 | 5 | .000 |

**Table 3. Model Summary**

| Step | -2 Log likelihood | Cox & Snell *R* Square | Nagelkerke *R* Square |
|---|---|---|---|
| 1 | 32.274[a] | .598 | .804 |

*Note.* [a] Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

the products produced by the sample units. The range of number of products is from 2 to 52, with an average of approx 11.

**(3) Relationship Between Company Characteristics Factors and Use of the ABC System :** To study the relationship between company characteristics factors, that is, size of the firm, product diversity, level of overhead, and use of the ABC system, the logistic regression method (enter method) is used through SPSS statistic-22. Logistic regression is used as the dependent variable is a dichotomous variable (use of ABC – Yes/No). From the Table 2, we can interpret that the model is significant as the significant value is less than 0.05.

Nagelkerke *R* square explains to what extent the variance in the dependent variable is explained by the predictive variables. This is similar to the *R* square used in the ordinary least square. Thus, from the above, we can say that approx 80% of the variance has been explained by the model as shown in the Table 3.

From the Table 4, we can interpret that only the number of employees and the percentage of overheads are the statistical significant factors for the implementation of the ABC system as the significant values are below 0.05. It implies that number of employees (size of the organization) and the percentage of overheads are directly related with the adoption of the ABC system ; whereas, other factors like average annual turnover, number of products (product diversification), and investment in plant and machinery are not statistically significant for the implementation of the ABC system. The values of standard errors are also very low, which indicates that the estimates are fair. The above finding regarding the size of the organization as the significant factor for the adoption of the ABC system coincides with the prior studies conducted by Arora and Raju, (2017), John, (2014), Elhamma, (2012), and Brierley, (2008). Further, for the product diversification, the study conducted by Salawu and Ayoola (2012) and Ahmadzadeh et al. (2011) found the same results.

**Table 4. Relationship Between Company Characteristics Factors, that is, Size of the Firm, Product Diversity, and Level of Overhead and Use of the ABC System (Variables in the Equation)**

| | | *B* | *S.E.* | Wald | *df* | Sig. | Exp(B) |
|---|---|---|---|---|---|---|---|
| Step 1[a] | No_Employees | .009 | .003 | 7.063 | 1 | .008 | 1.009 |
| | AAT | .001 | .002 | .289 | 1 | .591 | 1.001 |
| | No_Products | -.017 | .089 | .038 | 1 | .845 | .983 |
| | PM_Crores | .001 | .006 | .010 | 1 | .922 | 1.001 |
| | Percentage_Overhead | 2.149 | .748 | 8.255 | 1 | .004 | 8.580 |
| | Constant | -8.679 | 2.491 | 12.135 | 1 | .000 | .000 |

*Note.* [a] Variable(s) entered on step 1: No_Employees, AAT, No_Products, PM_Crores, Percentage_Overhead

**(4) Motives for the Implementation of Activity Based Costing System :** Out of 72 firms, 26 firms either fully implemented or partly implemented the ABC system. The results reveal that more adequate pricing decisions ($\bar{x}$ = 4.69), better overhead cost allocation ($\bar{x}$ = 4.69), and more accurate product cost ($\bar{x}$ = 4.58) are the most important benefits which companies were expecting to gain through the implementation of the ABC system. Decision making improvement ($\bar{x}$ = 4.38), increase in profitability ($\bar{x}$ = 4.27), increase in competitive capability ($\bar{x}$ = 4.19), and cost control improvement ($\bar{x}$ = 4.19) are also found to be the other important motives for the implementation of the ABC system as shown in the Table 5. The above findings are similar to the studies conducted by Lu, Wang, Wu, and Cheng, (2017) ; Almedia and Cunha (2017) ; Nassar, Al-Khadash, Sangster, and Mah'd, (2013).

**Table 5. Motives for the Implementation of Activity Based Costing System**

| Response Options: | *N* | | Mean | Std. Deviation | Variance | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| | Valid | Missing | | | | | |
| More Accurate Product Cost | 26 | 0 | 4.58 | .58 | .33 | 3 | 5 |
| Better Overhead Cost Allocation | 26 | 0 | 4.69 | .55 | .30 | 3 | 5 |
| Increase in Product Quality | 26 | 0 | 3.27 | .96 | .92 | 1 | 5 |
| Increase in Profitability | 26 | 0 | 4.27 | .72 | .52 | 2 | 5 |
| Cost Control Improvement | 26 | 0 | 4.19 | .63 | .40 | 3 | 5 |
| Better Performance Measurement | 26 | 0 | 3.38 | .70 | .49 | 2 | 5 |
| Elimination of Waste | 26 | 0 | 3.96 | .45 | .20 | 3 | 5 |
| Encouragement to Commitment to Quality | 26 | 0 | 3.15 | .67 | .46 | 2 | 5 |
| Increased Customer Satisfaction | 26 | 0 | 3.15 | .67 | .46 | 2 | 5 |
| Decrease in Manufacturing Cycle Time | 26 | 0 | 3.77 | .76 | .58 | 2 | 5 |
| Increase in Employee Productivity | 26 | 0 | 3.65 | .85 | .72 | 2 | 5 |
| Increase in the Effectiveness of Budgeting | 26 | 0 | 3.88 | .71 | .51 | 2 | 5 |
| Decision Making Improvement | 26 | 0 | 4.38 | .80 | .65 | 2 | 5 |
| Increase in Competitive Capability | 26 | 0 | 4.19 | .80 | .64 | 3 | 5 |
| Improvement in Shareholder Value | 26 | 0 | 3.31 | .62 | .38 | 2 | 5 |
| More Adequate Pricing Decisions | 26 | 0 | 4.69 | .47 | .22 | 4 | 5 |

**Table 6. Important Areas for the Implementation of Activity Based Costing System**

| Response Options: | *N* | | Mean | Std. Deviation | Variance | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| | Valid | Missing | | | | | |
| Stock Valuation | 26 | 0 | 3.38 | 1.13 | 1.29 | 2 | 5 |
| Product Costing | 26 | 0 | 4.58 | 0.50 | 0.25 | 4 | 5 |
| Product Mix Decision | 26 | 0 | 4.15 | 0.73 | 0.54 | 3 | 5 |
| Cost Reduction | 26 | 0 | 3.96 | 0.82 | 0.68 | 2 | 5 |
| Budgeting and Planning | 26 | 0 | 3.62 | 0.75 | 0.57 | 2 | 5 |
| Pricing Decision | 26 | 0 | 4.38 | 0.64 | 0.41 | 3 | 5 |
| Process Improvement | 26 | 0 | 3.35 | 0.89 | 0.80 | 2 | 5 |
| Forecasting | 26 | 0 | 3.12 | 0.95 | 0.91 | 1 | 4 |
| Capital Investment Decisions | 26 | 0 | 3.19 | 1.33 | 1.76 | 1 | 5 |
| Performance Measurement | 26 | 0 | 3.00 | 1.39 | 1.92 | 1 | 5 |
| Quality Control | 26 | 0 | 2.81 | 1.36 | 1.84 | 1 | 5 |
| Compensation System | 26 | 0 | 2.27 | 1.12 | 1.24 | 1 | 4 |

**(5) Important Areas for the Implementation of Activity Based Costing System :** Product costing ( $\bar{x}$ = 4.58), pricing decision ( $\bar{x}$ = 4.38), and product mix decision ( $\bar{x}$ = 4.15) are found to be the most important areas for the implementation of the ABC system ; whereas, compensation system ( $\bar{x}$ = 2.27), quality control ( $\bar{x}$ = 2.81), and performance measurement ( $\bar{x}$ = 3.00) are found to be the least important areas for the implementation of the ABC system as shown in the Table 6.

**Table 7. Challenges Faced for the Adoption of the ABC System**

| Response Options: | *F* | % |
|---|---|---|
| Identifying and Aggregating Activities | 11 | 42.31 |
| High Cost of ABC | 13 | 50.00 |
| Selecting Cost Drivers | 20 | 76.92 |
| Assigning Activity Cost of Cost Objects | 11 | 42.31 |
| Data Collection Difficulties | 13 | 50.00 |
| Resistance to Change | 11 | 42.31 |
| Lack of Top Management Support | 2 | 7.69 |
| Uncertainty of ABC Benefits | 13 | 50.00 |
| Inadequate Computer Software | 1 | 3.85 |
| Lack of Knowledge/Experience | 4 | 15.38 |
| Satisfied with Current System | 2 | 7.69 |

**Table 8. Reasons for Non - Adoption of the ABC System**

| Response Options: | *F* | % |
|---|---|---|
| Satisfied with current system. | 28 | 60.87 |
| Resistance to change. | 20 | 43.48 |
| Lack of awareness of ABC development. | 6 | 13.04 |
| ABC is not relevant to our business. | 4 | 8.7 |
| Small percentage of overhead costs. | 22 | 47.83 |
| Manufacturing process is simple/easy to track costs. | 31 | 67.39 |
| The number of products is less. | 8 | 17.39 |
| Costly to switch to ABC. | 33 | 71.74 |
| Lack of top management support. | 22 | 47.83 |
| Uncertainty of ABC benefits. | 28 | 60.87 |
| Lack of qualified accounting and administrative system to adopt ABC. | 11 | 23.91 |
| Lack of appropriate technology to apply ABC (like computer software etc.). | 4 | 8.7 |
| Difficulty in identifying cost drivers. | 10 | 21.74 |

**(6) Challenges Faced During the Adoption of the ABC System :** It is not easy to accept change ; there are so many challenges to be faced before adopting a new method or procedure. The study attempts to know the major challenges faced during the adoption process of the ABC system from the 26 respondent companies who implemented the ABC system. Selecting cost drivers (76.92%), high cost of ABC (50%), data collection difficulties (50%), and uncertainty of ABC benefits (50%) are found as the major challenges before the implementation of the ABC system as shown in the Table 7. These findings are similar to the findings obtained by Shil and Pramanik (2013) and Salawu and Ayoola (2012).

**(7) Reasons for Non - Adoption of the ABC System :** Out of the 46 respondents who had not adopted the ABC system, the most important reasons for non - adoption of the ABC system are : costly to switch to ABC (71.74%), manufacturing process is simple/easy to track costs (67.29%), satisfied with current system (60.87%), and uncertainty of ABC benefits (60.87%) as shown in the Table 8. The above findings coincide with the findings

obtained by Rundora and Selesho (2014) ; Ríos - Manríquez, Colomina, and Pastor (2014) ; and Nassar et al. (2013).

## Conclusion and Implications

The study observes that approximately 36% of the Indian manufacturing firms are successfully using the ABC system. This implies that in India, manufacturing firms are moving towards the ABC system in place of the traditional costing system. The reason behind this is to know the correct cost data that can help to take more appropriate decisions to increase the profitability by reducing the cost and increase the competitive capability. Though ABC is a better technique as compared to traditional costing method, but still, a large number of firms in India are not using the ABC system due to various perceived difficulties such as: high cost of ABC, data collection difficulties, and uncertainty of ABC benefits, etc. One of the other reasons we found during the study which is a main cause for non adoption of the ABC system is that companies are interested in overall results of the organization and they are least bothered with the individual products. We are of the opinion that companies who have not implemented the ABC system should try to implement it at least in some selected areas. Initially, they have to face difficulties, but they will get the benefits in the long run by implementing the ABC system.

## Limitations of the Study and Scope for Further Research

The outcome of the present study may not be applicable to other companies. The results are confined to sample units only. The interpretations are based on the basis of information received ; so, the study may be affected due to the respondents' bias. As the study is related to the costing system, many companies were not ready to share their information, and hence, we had to restrict the analysis to a sample unit of 72 companies only ; otherwise, the sample should be large enough to get more concise results. The study included only medium and large scale manufacturing units.

The present study does not include the services sector. It has considered only the manufacturing sector. In the present scenario of high competition, the services sector is also using the ABC system to get an edge over its competitors ; so, further study can be conducted for the services sector to know the motives for the implementation of the ABC system and the major challenges for this. The study has covered only medium and large scale organizations, while further studies can be done for micro and small level firms. Further studies can also be conducted to know whether there is any difference in the perceived and actual benefits of implementing the ABC system or not.

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