2.4. Proposal for Integration of Existing Systems Information to the Activity-Based Costing Model

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1. INTRODUCTION

The globalization of the economy has made companies try to be competitive in quality, time to market, flexibility and costs. The on-going product diversification, the allocation of employees to managing activities, among others, make up a set of changes which has led to a significant raise on indirect costs. This demands the companies to adopt a new attitude as far as the cost management systems are concerned.

Considering this situation, several proposals have been presented as competitiveness makers, among them the Activity-Based Costing.

The attention the Activity-Based Costing system has been receiving, is due to the recognition of its qualities in offering the companies a more accurate product costing, the potential identification of possible economic improvements in the production and the economic performance evaluation of its activities.

However, the efficiency and the effectiveness of taking a new system depends on how the change process is managed, that is, how its implementation is conducted. The purpose of this paper is to propose a data base sample which will link the Activity Based Costing model to the corporate data systems.

2. ACTIVITY-BASED COSTING

The Activity-Based Costing - ABC is a method of calculating the cost of activities, products and customers. With ABC it is possible to track the expenditures of a business or department in order to allocate them to the activities accomplished and to check how they relate to the revenue generated and the resources used [Ching, 1993].

The ABC process attends to the knowledge of the activities consumed and the resources required in order to deliver products or service to the customer. It gathers activities in centers and determines the allocation rate by dividing the activity cost by some output, which can also be the driver [Gonsalves & Eiler, 1996].

3. ACTIVITY-BASED MANAGEMENT

The Activity-Based Management - ABM is a process which uses data generated by ABC to manage a business. We can state that an activity data base is the basis or the foundation to ABM. Its basic principles are [Ching, 1995]:

- Costs are not merely incurred, they are caused;
- Activities and drivers are managed, not resources;
- Focus on the cost generating factors, that is, whatever originates the resource consumption demand.

The key to extend the ABC to the ABM is the vast appreciation of the concept of cost drivers, in order to analyze the resources being consumed and identify the areas by the quality, time and innovation drivers [Smith, 1995].

ABM is an activity analysis process which results in changes in these activities towards a performance improvement. Analysis should be made on financial and non-financial data in order to direct the organization into eliminating waste, focusing on more profitable processes, satisfying the customer and maximizing the return on investment [Sharman, 1993]. ABM consists in the items listed on table 1.

Product Costing	• Profitability analysis of product/line of products; • Rationalization of the product line; • Pricing.
Customer Costing	• Customer profitability analysis • Establishing customer service levels.
Capital Expenditures	• Decide whether to make/buy; • Investment justification
Process Management	• Process value analysis; • Operational cycle time improvement; • Reduction of waste and duplicity.
Cost Reduction	• Minimize or eliminate activities which do not add value; • Focus on cost generating factors.
Performance Measure	• Balance and rationalization of Efficiency; Productivity; Effectiveness.
Budget	• Planning of required resources based on activities; • Budget forecast

Table 1. ABM utilization [Ching, 1995]

ABM is the ideal tool for cost reduction and continuous improvement. With ABM it is possible to reduce the effort time, share activities, relocate resources and analyze the activities. ABC is more useful to product costing and profitability measurement.

4. NEED TO INTEGRATE THE DATA SYSTEM WITH THE ABC MODEL

It is extremely important that the data which feed the ABC cost model reflect the reality so that the company management will trust the data supplied by the model. For the data supplied by the ABC model to be reliable, it is important that this model be fed by the existing company systems. Thus, it is necessary to have an automatic integration of these data through a computer system, and it is vital to consolidate the ABC data with the data from the General Ledger, the production planning, etc., as shown on figure 1.

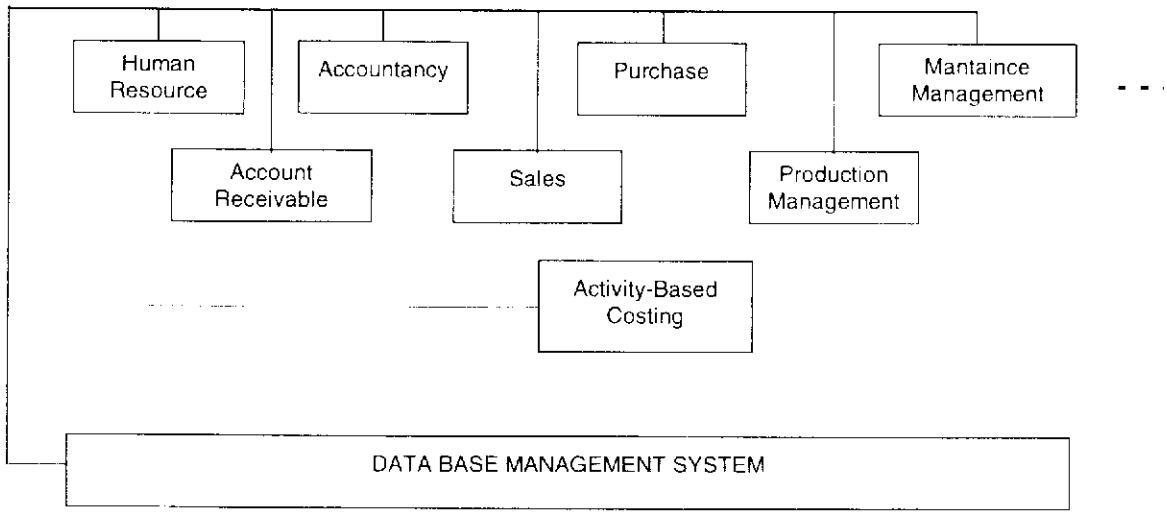

Figure 1. Information system structure

The update frequency of data originating from the ABC model depends directly on the company's change rate, as well as the cost and easiness associated to this updating.

5. CASE STUDY

5.1. Environment Features

The company at issue is an industry in the automobile parts sector which manufactures transmission for vehicles.

The environment chosen for this study was the machining area, which is arranged in cells. This business unit has a large diversity of products, that is manufactured in small and large lots.

5.2. Obtaining Data

The ABC implementation involves the identification of the activities and events which cause activities - cost drivers. The need to identify these activities is based on the assumption that the activity generates costs. The activity identification process and its cost drivers involve discussions with the managers and the workers in the area [Sephton, 1990]. This collect is very complex and it can take a long time. Thus, the use of the ABC system is recommended when the following situations exist:

- Highly competitive market;
- Diversification of the mix of products, processes and customers;
- High indirect costs which are difficult to allocate to the products.

Follows the description of how data for every item in the ABC model was obtained.

Resources

The resources used by ABC are generally the same used in the traditional costing systems. Sometimes, it is necessary to resume the data by grouping the accounts depending on the type of cost allocation for the activities; or to detail these data.

The data for the resources may be available in the General Ledger, in the accounting systems or even the supplies system.

For instance, depreciation and insurance data are available in the General Ledger. However, they can be grouped in the same account, as shown on figure 2, since they will be allocated for activities through the same driver - machine hour.

However, there are resources, such as the tool account, which needs to be detailed so that this resource can be allocated for the activities, as shown on figure 2. This type of data can be obtained through the materials systems.

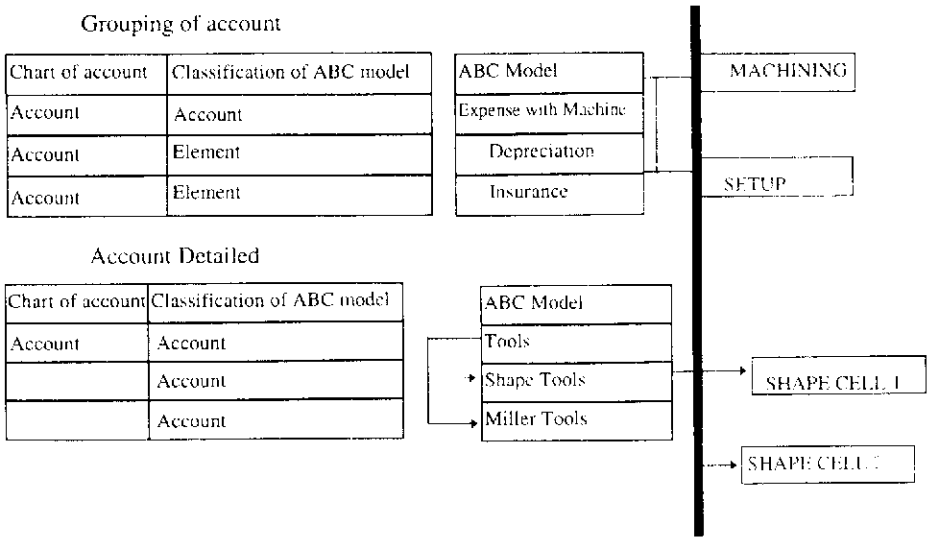

Figure 2. Information requerements to caracterize the resources.

Activities

The companies which use the traditional costing system do not have the activity view. Their cost accounting is made by departments, not taking processes into consideration.

In order to obtain information on activities it is necessary to interview the persons in charge of each section.

Cost Objects

The data on the products can be obtained through the process sheets and through interviews.

Drivers

Some drivers should be obtained monthly, these will be called dynamic drivers. Others do not change every month, they will be called static drivers.

The static drivers are usually obtained through interviews and are related to indirect activities. For instance, the salary resource of people performing administrative activities can be allocated to the activities through the percentage driver of people dedicated to each activity. This driver remains constant in time, unless the process is changed.

However, resources such as the operators' salaries or machine depreciation, should be allocated according to the production mix. The mix is a factor which changes monthly, thus, the model needs these drivers, such as man hour and machine hour, to be updated every month.

The data on the dynamic drivers are usually available in the production schedule and planning system.

There are also some drivers which change every month, but are hard to obtain. Thus, they can not be updated so frequently. For instance, the number of setups. Some companies do not record the number of machine setups, making it difficult to check this driver every month.

5.3. Proposed integration model

The data required for building an ABC cost model are difficult to obtain. However, as we can see, most of them are available in the existing company systems. Thus, we should always try to develop a system which can be integrated to the existing data system. Although the installation time is longer - since it is necessary to implement interfaces with the other systems, it prevents redundant and possibly conflicting data when working with an isolated data system, and the obvious need to feed the same data into different systems.

Thus, the ABC data base should be linked to the global management data system, being applicable to the planning, scheduling and production control systems [Barrionuevo, 1995].

This system should not be developed as a set of static procedures, but should be built with a high flexibility level and be so dynamic that it will generate a feedback impulse.

Figure 3 indicates how the proposed model should work. From the company's corporate system it is possible to withdraw accounting data, possibly the General Ledger and machine and men data, possibly from the production schedule module.

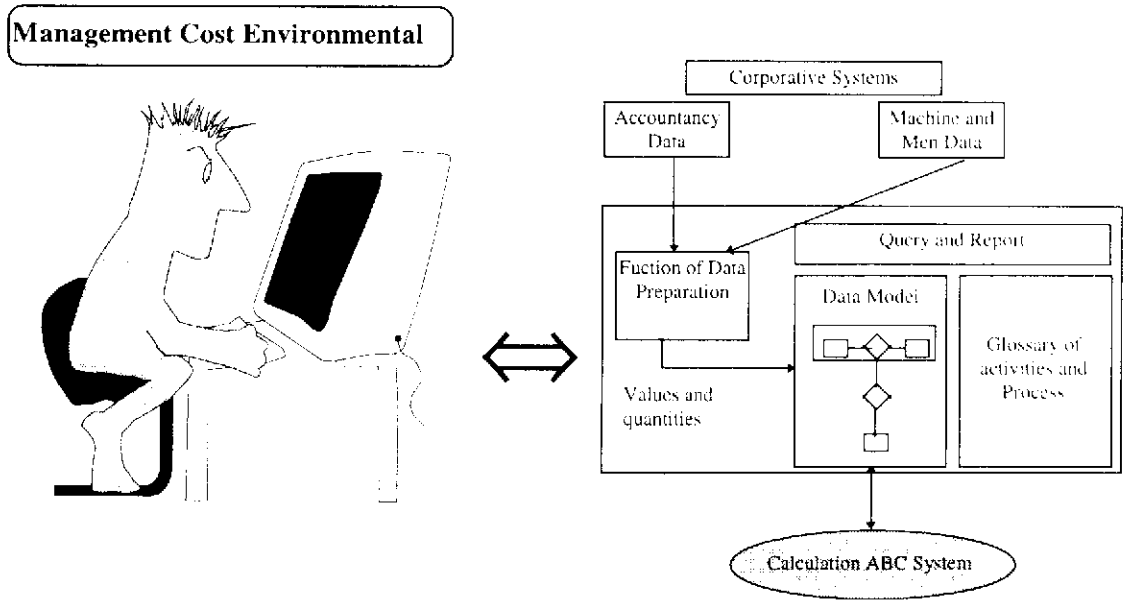

Figure 3. Management Cost Environmental

These data go to a data base through interfaces which adjust this information to ABC model. This data base can also transfer data to an ABC calculation system and retrieve the results. This way, the cost manager does not work with specialized data systems not integrated to the company and starts having automatic access to all corporate data. Besides, this data model can provide the manager with information according to his needs. That is, the manager determines how and which data he wants.

At last, this model can also provide distinct information for the whole corporation. Depending on the access allowed for each user, the model provides only the necessary data for that user.

5.4. Activity-Based Management with the help of performance measurements

Activity-Based Management is an important tool. Through this model, it is possible to classify the activities in value aggregating in the customer's point of view, in order to focus the action in activities which incur the highest costs among those which do not added value.

Another application concerns the quality costs. Activities are grouped in: inspection, correction, prevention. A survey on costs with rejection and guarantee is also made. Starting from this

classification, activities are focused in order to minimize costs referring to rejection, guarantee, correction and inspection; through investments in prevention, as shown on figure 4.

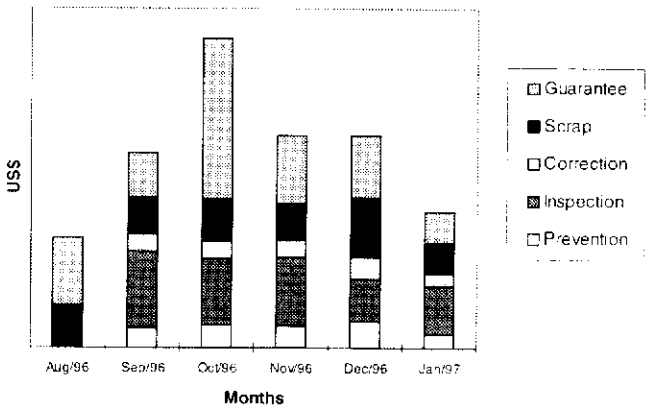

Figure 4. Quality Costs

Besides managing the activities, performance measurements are also carried on. It's usual to link these measurements to the drivers. This can cause a few problems. For instance, the setup activity receives resources such as: men, auxiliary materials, depreciation, etc. This cost is divided by an output, which is typically the setup number, to determine the cost per setup. The setup cost can be reduced by three ways: reducing the cost of the setup activity, reducing the number of setups, or both. However, more setups result in faster customer calls. Thus, it would be interesting to reduce a setup time. A tendency to reduce the number of setups in order to make a product more profitable can be noticed. Thus, the Activity Based Costing shows that it is more profitable to produce and sell large lots in order to save on adjustment and order processing costs, as shown on figure 5.

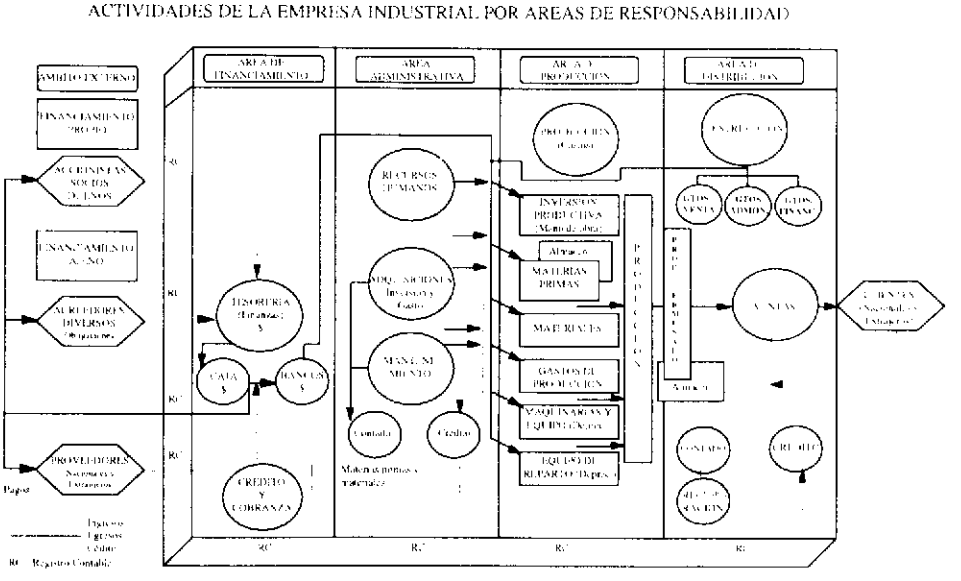

Figure 5. Costing Point of View versus Process Point of View

This approach can, however, harm the company's global performance, since the customers do not want to purchase large lots with long time intervals. The ABC data on product cost did not show the necessary changes to achieve a flexible manufacturing system.

In this case, the correct performance measurement is the time for each setup, since as time is reduced, it is possible to make more setups and reduce the lot size more and more. That is, the performance measurement should be capable of pulling the company up to a higher competitive level [Giffi, 1990].

Other commonly used measurement are:

1. *Idle capacity:* A simple and direct way to evaluate the idle capacity of a plant is to compare the manufacturing production capacity to the present production volume. The excess capacity can be transformed into flexibility increment in the production mix through lot reduction [Maskell, 1991].
2. *Inventory Turnover:* Inventory turnover will be defined as:

$$\text{Inventory Turnover} = \frac{\text{Sales Cost}}{\text{Average or year-end inventory}}$$

or

$$\text{Inventory Turnover} = \frac{\text{Average Deman}}{\text{Average or year-end inventory}}$$

The inventory turnover measures the timing of the company's materials management systems. This index is sensitive to the vertical integration. Figure 6 shows the performance at the study industry.

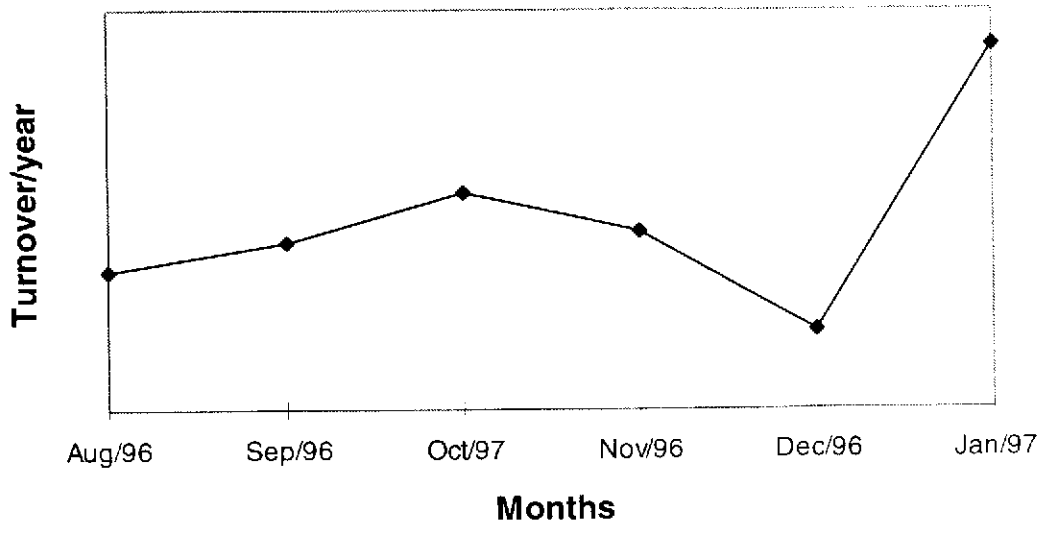

Figure 6. Turnover inventory

3. *Productivity:* Direct labor productivity measurement has always been made, but focused on work stations. In the World Class Manufacturing this measurement is made based on finished products. Still according to Giffi [1990], this is the most significant performance measurement due to its comprising and easy utilization, this productivity measurement is defined as:

$$\text{Productivity} = \frac{\text{Products sold}}{\text{Resources used}}$$

$$\text{Productivity} = \frac{\text{Products sold}}{\text{Person}}$$

Figure 7 shows the performance at the study industry.

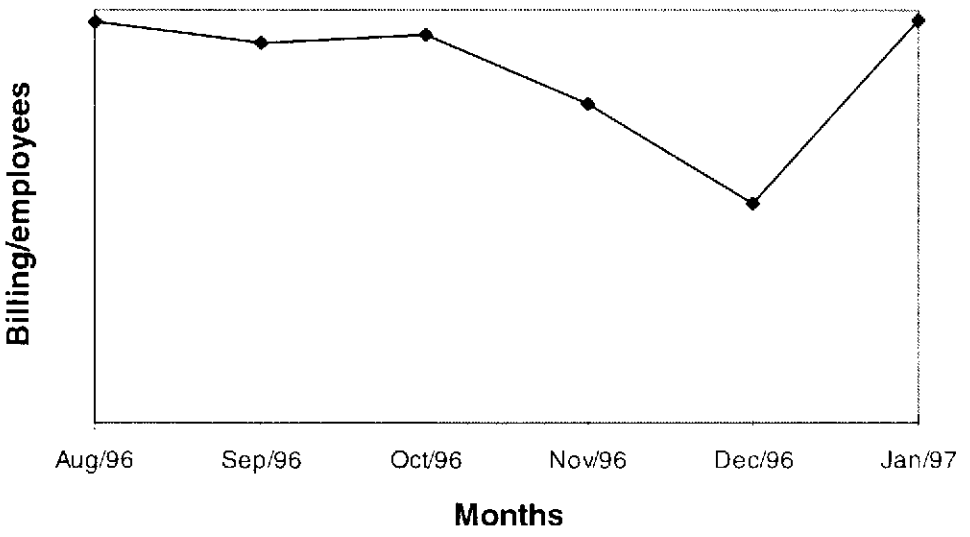

Figure 7. Productivity

6. CONCLUSION

Activity-Based Management complies with the need of companies which are trying to be more competitive, however in order to achieve this it is necessary to have an information system which shapes correctly all the processes accomplished in the company and shows the results to the management in a simple and flexible way. The model presented has supplied this need and has allowed the integration of the ABC specialist system, whatever that may be, to the corporate data systems.

The assumptions for an efficient Cost Management System are the availability of a high quality data system and a well structured activity analysis method which allows a fast analysis of the incurred costs.

Being integrated, the data are much more reliable, since they are united in a single data base, making mangers much more confident as they make decisions.

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