

The Integrated Activity-Based Costing and Economic Value Added System as a Strategic Management Tool: A Field Study^{*}

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ABSTRACT

This paper describes a field study which examines the implementation of an integrated Activity-Based Costing and Economic Value Added System in two small manufacturing firms. The results of this study suggest that this integrated approach outperforms both traditional cost accounting and standard Activity-Based Costing methods. Furthermore, the findings from two small companies show that the reliability of cost information obtained by this integrated system increases substantially when differences in capital usage exist. Factors that could create these differences in capital usage and lead to distorted cost information are discussed. Using actual data from the field study, possible distortions to product cost as a result of a homogenous capital cost allocation are also examined. Finally, the impact of this integrated approach on the decision-making, strategic planning, and long-term business performance of the two participating companies is discussed.

KEYWORDS

Activity-Based Costing, Economic Value Added, Costing System, Small Business, Small Manufacturers, Strategic Management, Strategic Planning

INTRODUCTION

In today's business environment, many manufacturing companies facing a fierce competition in domestic and global markets implement strategic management tools, in order to increase their competitiveness. Activity-Based Costing (ABC) and Economic Value Added are two such examples of these strategic management tools.

Traditionally, ABC and Economic Value Added methods have been used separately. ABC has been used as a costing system, mainly to improve operating efficiency, while Economic Value Added has been used as a financial performance measure, mainly to improve financial efficiency. In recent years, some researchers have proposed that ABC should be combined with Economic Value Added to create an integrated costing and performance system (Hubbell, 1996a; Hubbell, 1996b; Cooper & Slagmulder, 1999; Roztocki & Needy, 1999c). The ABC component of this integrated system would focus on operating expenses, while the Economic Value Added component would focus on capital costs. This integrated strategic management system would be able to account for all costs incurred in the process of generating products, jobs, or services.

This paper describes a field study at two small manufacturing companies where three different costing systems (Traditional Cost Accounting, ABC, and the Integrated ABC-and-EVA System) were used to obtain product cost information. The results they yielded were compared. The main focus of this analysis was to identify factors that lead to distortions in product cost information in both the Traditional Cost Accounting (TCA) and common ABC systems, and to demonstrate the reliability of product cost information in the Integrated ABC-and-EVA System.

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METHODOLOGY

A field study was chosen as the main research methodology. The field study was carried out in four major phases: system design, system implementation, data collection, and data analysis. The Managers were able to actively participate in each phase of the study.

In preparation for the design phase, managers were familiarized with the Integrated ABC-and-EVA System. Presentations on combining ABC with Economic Value Added, and examples of successful implementations in companies were given. Then, in the first phase, an Integrated ABC-and-EVA System was designed for each participating company.

In the second phase, the individually tailored Integrated ABC-and-EVA Systems were implemented, alongside existing costing and accounting systems. During these initial phases, methodology developed by researchers from the University of Pittsburgh and the State University of New York at New Paltz was applied (Roztocki & Needy, 1999a; Roztocki, Valenzuela, Porter, Monk, & Needy, 1999; Roztocki & Needy, 1999c). (For more details about this methodology, which was developed in order to more efficiently implement the Integrated ABC-and-EVA System in a small business environment, an interested reader may refer to the cited articles.)

In the third phase, data drawn from each costing system was collected from all participants and brought together with the researchers' ongoing calculations.

In the fourth phase, the collected data was analyzed. Using the step-by-step implementation methodology to perform their own calculations, the managers were able to verify the figures which we had recorded independently and to observe the agreement between our calculations and theirs. This "hands on" approach enabled the managers to better understand and appreciate the consistency of the system.

The data analysis yielded individual findings for each company. These findings were then compared in order to reach a conclusion about the value of the Integrated ABC-and-EVA System for manufacturing companies in general. The more specific objective of the data analysis was to investigate which factors may distort information provided by the TCA or ABC system when capital costs are not allocated or are allocated arbitrarily. Because factors such as diversity in production volume, product size, product complexity, material, and setups often tend to distort cost information (Cooper, 1988), these factors are examined closely for possible capital allocation distortions.

By tracing operating costs to cost objects, the ABC system has the ability to eliminate many of these distortions by using multiple (operating) cost drivers. However, because the ABC system does not take into account capital costs, it can be assumed, that an arbitrary capital costs allocation may allow other distortions to occur. In addition, it can be assumed that since the standard ABC cost analysis only considers direct and operating costs, the managers who are forced to make their decisions based on operating profits alone, or who try to somehow arbitrarily allocate capital charges to cost objects will sometimes make poor decisions (Roztocki & Needy, 1998; Roztocki & Needy, 1999b).

FIELD STUDY

In this section, the implementation of the proposed Integrated ABC-and-EVA System at two small manufacturing companies is presented. The managers of the companies wished for their company names to remain anonymous. Therefore, they will be referred to as "Company X" and "Company Y" from here on.

Prior to the field study, both companies were using traditional costing systems. The overhead was allocated to product lines based on direct labor hours. In both companies, managers felt that their traditional costing systems were not able to provide reliable cost information.

Company X

Company X, located in Pittsburgh, Pennsylvania, was a small manufacturing company with approximately 30 employees. Company X's main products lines were Overlays, Membranes, Laser, Roll Labels, and N'Caps. In the mid 1990's, a group of investors purchased the company from the previous owner-manager who had retired. At the time of the study, the company was managed by its former vice-president, who was supported by a three-person management group. Investors were primarily concerned with financial performance, rather than daily decision-making. The management group was very eager to participate in the field study for two reasons. First, the management was under pressure from their new investors who were not satisfied with the current return from existing product lines. Second, management was trying to identify the most lucrative product line in order to initiate a marketing campaign with the biggest impact on overall profits.

Company Y

Company Y, also located in Pittsburgh, Pennsylvania, was owned and managed by three owner-managers who bought the company from a large corporation in the mid 1990's. Company Y employed approximately 40 people. The majority of this company's business was in the area of manufacturing electrical devices and their main product lines were Motors and Motor Parts, Breakers, and Control Parts. Company Y sold its products in the domestic market as well as abroad. A portion of the company's output was sold directly to end-users, while the remainder was sold with the help of independent distributors. The management of Company Y was interested in using the Integrated ABC-and-EVA System for the purpose of cost control and profit planning.

Comparison of the costing systems

During the field study, three costing systems (TCA, ABC and the Integrated ABC-and-EVA System) were used to obtain cost information for each company in order to identify factors which may lead to distortions through arbitrary allocation of capital costs. In a comparison, capital costs were only able to be traced by the Integrated ABC-and-EVA System. The nature of the TCA and ABC systems resulted in arbitrary allocations of capital costs.

RESULTS

The main objective of the data analysis presented in this section is to investigate which factors most often distort information provided by the ABC system. As mentioned in the methodology section, factors such as diversity in production volume, product size, product complexity, material consumption, and setups often distort cost information. These factors are examined closely for possible allocation errors.

Data Analysis for Company X

The data analysis for Company X began with an examination of its cost structure. Company X's overall costs for 1998 were evaluated by comparing the percentages of direct costs (direct labor and direct material), operating costs (overhead), and capital costs as shown in Exhibit 1.

Exhibit 1. Cost Analysis for Company X in Thousands of Dollars

Direct Cost	Operating Cost	Capital Cost	Total Cost
1,664	829	326	2,819
59.0%	29.4%	11.6%	100.0%

Capital costs, at 11.6 percent, represented a notable portion of Company X's total costs. This relatively high capital costs could be explained by high investments in special equipment and fixed assets. In addition, Company X required a relatively large amount of working capital to support its wide variety of products.

The next step was to calculate product cost information and examine changes across six product lines and three costing systems. Exhibit 2 and Exhibit 3 present the results.

Exhibit 2. Product Cost Information in Thousands of Dollars

Product Line	TCA	ABC	ABC-and-EVA
Overlays	1,201	1,043	1,216
Membrane	621	681	747
Laser	438	415	482
Roll Labels	134	179	189
N'Caps	52	103	108
Miscellaneous Parts	47	72	77
Total	2,493	2,493	2,819

Exhibit 3. Changes in Product Cost Information after Including Capital Costs

Product Line	TCA to ABC-and-EVA	ABC to ABC-and-EVA
Overlays	+ 1.2 %	+ 16.6 %
Membrane	+ 20.3 %	+ 9.7 %
Laser	+ 10.5 %	+ 16.1 %
Roll Labels	+ 41.0 %	+ 5.6 %
N'Caps	+ 107.7 %	+ 4.9 %
Miscellaneous Parts	+ 63.8 %	+ 6.9 %
Total	+ 13.1 %	+ 13.1 %

The Integrated ABC-and-EVA System, taking into account capital costs, revealed that the overall product cost was actually 13.1 percent higher than either TCA or ABC estimated. The difference in product cost, however, was not uniform across all product lines. After adding capital costs to the product cost obtained from the ABC system, the greatest difference in product cost was observed in the Overlays product line (+ 16.6 %) while the least difference was registered in the N'Caps product line (+ 4.9 %). From this, it can be concluded that an arbitrary allocation of capital costs to the product cost obtained by using the ABC system would produce inexact product cost information. For example, adding 13.1 percent to all product lines would distort the product costs for Company X.

Company X's management was surprised when presented with the results of using the Integrated ABC-and-EVA System. Familiarized with the calculations used, the managers agreed that the results were correct. Knowing that the Overlays product line was the only product line which created economic value, they considered extending marketing efforts for this product line. In contrast, for the Laser product line (considered to be profitable according to the TCA and ABC systems, but revealed to be destructive to shareholder value by the Integrated ABC-and-EVA System), the managers announced changes in their pricing policies, as well as additional cost reduction efforts. Furthermore, they considered new outsourcing policies for unprofitable low-volume product lines (such as N'Caps and Miscellaneous Parts).

Data Analysis for Company Y

The data analysis for Company Y also began with an examination of its cost structure. As in Company X's analysis, Company Y's costs for 1998 were evaluated by comparing the percentages of direct costs (direct labor and direct material), operating costs (overhead) and capital costs as shown in Exhibit 4.

Exhibit 4. Cost Analysis for Company Y in Thousands of Dollars

Direct Cost	Operating Cost	Capital Cost	Total Cost
2,866	2,334	396	5,596
51.2%	41.7%	7.1%	100.0%

Operating costs, at approximately 42 percent, represented a notable portion of Company Y's total costs. Company Y's business, with its customized products (such as motors and generators) required a relatively high amount of effort in engineering design, product specification, and supervision. Therefore, a highly qualified work force was essential. The high salaries paid to these employees were the reason for Company Y's relatively high operating costs.

Next, as in Company X, product cost information for four product lines, obtained by the three costing systems, was investigated and presented to the managers. Exhibit 5 and Exhibit 6 present results of this analysis.

Exhibit 5. Product Cost Information in Thousands of Dollars

Product line	TCA	ABC	ABC-and-EVA
Motors and Motor Parts	1,839	2,348	2,528
Breakers	1,261	1,324	1,437
Control Parts	655	554	590
Miscellaneous Parts	1,445	974	1,041
Total	5,200	5,200	5,596

Exhibit 6. Changes in Product Cost Information after Including Capital Costs

Product line	TCA to ABC-and-EVA	ABC to ABC-and-EVA
Motors and Motor Parts	+ 37.5 %	+ 7.7 %
Breakers	+ 14.0 %	+ 8.5 %
Control Parts	-9.9 %	+ 6.5 %
Miscellaneous Parts	-28.0 %	+ 6.9 %
Total	+ 7.6 %	+ 7.6 %

Again, the Integrated ABC-and-EVA System taking into account capital costs, revealed that the overall product cost was higher than TCA or ABC estimated, this time by 7.6 percent. This difference in product cost, once again, was not uniform across product lines. The greatest difference (compared to ABC) was registered in the Breakers product line (+ 8.5 %), while the least difference was registered in the Control Parts product line (+ 6.5 %). Once again, it can be concluded that an arbitrary allocation of capital costs to the product cost obtained by the ABC system will distort, though not substantially, the product cost.

Company Y's management was especially surprised by the fact that the Motors and Motor Parts product line, which was believed to be highly profitable under both the TCA calculation and the ABC, was not actually able to create any economic value. This assumption of profitability was contradicted by the Integrated ABC-and-EVA System. Because the Economic Value Added for Motors and Motor Parts product line was only slightly negative, the managers believed a slight increase in price would make the Motors and Motor Parts product line a value creator. In their opinion, this price increase was feasible since the company had an especially strong market position in this particular product line.

Summary of the Results

This analysis shows that the ability of the Integrated ABC-and-EVA System to provide reliable cost information increases especially in cases where products are dissimilar, manufacturing technologies and equipment are diverse, and capital cost is high. Of the companies studied, Company X had not only the higher capital costs, but also the greatest product diversity. As a result, the analysis showed a relatively high distortion in product cost between the ABC and ABC-and-EVA systems. The highest distortion in product cost between the TCA and ABC-and-EVA systems was observed in Company Y, which had the higher operating costs. In the case of Company Y, the ABC component of the Integrated ABC-and-EVA System was able to trace operating cost accurately, compared to the TCA system which simply allocated operating cost based on direct labor hours.

CONCLUSIONS

The findings for both companies are highly similar. These findings confirm that traditional accounting systems often provide inaccurate, incomplete, and unreliable cost information. Arbitrary allocation of operating and capital costs may often lead to distortions in product cost.

Furthermore, the results suggest that the ABC system alone, though able to manage operating expenses, shows deficiencies, especially when capital investments are substantially diverse. When capital investments are substantially diverse (because of variation in production volume, technology, setups, materials or product complexity, for example), the ABC system is no longer a reliable strategic management tool for successful decision-making.

The managers of each company in the field study expressed great satisfaction with the reliability and completeness of the Integrated ABC-and-EVA System. They regarded the System as a very useful strategic managerial tool. As a result of this implementation, the managers also changed certain corporate policies. These changes included adjustments in product costing, marketing strategies, and perception of customer profitability. Overall, this field study demonstrated that the integration of a costing system with a financial performance measure in the form of Integrated ABC-and-EVA System, will help manufacturing companies maintain an effective long-term business strategy.

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