

## Serie Research Memoranda

Activity-Based Costing in the Food Industry

An international comparison of American and Dutch  
food producing companies

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## ABSTRACT

This study focuses on the experiences of ABC-users and non-ABC users within the food and beverage industry in the Netherlands and in the US. Unlike other surveys we choosed to study a specific sector, expecting to find more similarities between companies in terms of market and technological aspects. Both aspects give reason to expect that product costing is increasingly important. The food and beverage market is strongly competitive: large retail organizations stimulate price competition and frequent on time delivery, while consumers demand a larger array of differentiated products. Production technology provides food producers the means to offer a wider array of products and packing alternatives. This in turn leads to more complex production and distribution systems. Complexity of production and logistic systems, combined with a large number of differentiated products are considered suitable situations for the application of Activity-Based Costing.

A US survey of 96 food producing companies and a Dutch survey of 117 food producing companies provide information on the use of ABC in the food sector, on the organizational and production related characteristics of ABC using food companies and on experiences with designing and implementing ABC systems. Given the specifics of the food sector, we try to draw some conclusions on the reasons behind successful or unsuccessful adoption of ABC. The availability of similar statistics from US and Dutch food companies also provides the opportunity to see if national circumstances have their influence on the acceptance of ABC, the process of ABC implementation and the use of ABC information.

## INTRODUCTION

Despite widespread interest in ABC, it has become evident that its adoption has proceeded at a fairly slow rate in the US, Australia as well as in European countries. A brief overview of recent surveys into the use of ABC shows adoption rates of between 0 and 20 % (see table 1), while the more recent surveys present slightly higher adoption rates. All surveys cited include a broad range of different company sectors, making it sometimes difficult to interpret the findings. For instance, information concerning the relationship between firm characteristics and ABC adoption may be obfuscated by sector related market and technological circumstances. Furthermore, these sector specific factors make it difficult to interpret correctly detailed information about the purposes for which ABC is being used, the benefits derived from using activity-based cost information, and experiences with designing and using ABC systems. Most of this information should be interpreted while taking specific circumstances in different sectors into account. As has been shown by Clarke and Mia (1993), adoption rates as well as reasons for adoption or rejection of ABC may differ significantly between industry groups. This leads to the impression that providing survey information across industry groups may hamper a full understanding of the experiences companies undergo while considering, implementing and using ABC systems.

\*\* Insert Table 1 about here \*\*

An alternative approach to study the adoption of Activity-Based Costing is by comparing case studies of successful and unsuccessful ABC implementations. Most of these studies lead to a more in-depth understanding of the 'factors leading to successful use of ABC in specific circumstances, but they do not permit to draw more generalizable conclusions. Nevertheless, recent publications on ABC case

studies lead to the general idea that successful implementation and use of ABC is influenced by multiple factors. These can be summarized in four basic conditions which have to be simultaneously met to a satisfactory degree. Any newly implemented ABC system should be *technically sound, managerially useful, behaviorally acceptable* and *economically feasible*. Technical soundness relates to the reliability of ABC-data, resulting from adequate definition of cost drivers, cost pools and activities, as well as from measurement of these items (Player & Keys, 1995b). Cobb, Innes and Mitchell (1993) reported that many organizations had trouble designing adequate ABC-systems as well as getting reliable data since most overhead activities crossed departmental boundaries and individual areas of responsibilities. Managerial usefulness means the degree in which ABC-information is helpful in designing and executing the organization's strategy. Although ABC initially has been introduced as a system for reconsidering selling prices and product assortment (Cooper, 1988; Cooper & Kaplan, 1988), in most cases ABC is primarily used for managing overhead costs (Cobb, Innes & Mitchell, 1993; Groot, 1993; Innes & Mitchell, 1995; Selto, 1995). At this stage, ABC information does not only seem helpful in controlling overhead activities and related costs, but also in redesigning business processes (Harr, 1990; Malcom, 1991), in reconsidering value and non-value adding activities (Selto, 1995) and in reevaluating the value chain (Mecimore & Bell, 1995). Clearness about these objectives before ABC implementation is started seems to be a key success factor (Thome & Gurd, 1995). Managerial usefulness of ABC-information is also influenced by the organizational arrangements in which ABC-information have to be used. Waeytens and Bruggeman (1994) found a case of unsuccessful ABC-implementation in which the organization structure consisted of cost centres denying the heads of departments the necessary means for controlling their overhead costs. ABC-introduction should be behaviorally acceptable, meaning that its introduction should not lead to dysfunctional behavior of participants (Henning & Lindahl, 1995). If the ABC-system is used for the reduction of non-value adding activities, some studies show that people are not willing to participate (Shanahan, 1995) or are inclined to report more activities as value adding or to downplay the

time devoted to non-value adding activities (Robinson, 1989; Player & Keys, 1995c; Selto, 1995). On the other hand, ABC-implementation opens the possibility for accountants to have more intensive interactions with colleagues from other areas, like manufacturing, product design and marketing (Sweeting & Davies, 1995; Player & Keys, 1995b). In cases of successful implementation, ABC-systems provide cost information in a format more relevant for decision makers, enhancing communication between accountants and non-accountants which eventually may lead to a positive attitude by decision makers towards ABC (Norris, 1994). The final litmus test of the acceptability of ABC is its economic feasibility. Many studies show that developing and implementing ABC systems is an expensive undertaking. The benefits of improved decision making using ABC-information should therefore at least offset the costs of development, implementation and operation of the ABC system (Staubus, 1990; Horngren, 1989).

Both the survey and the case study approach have their strengths and weaknesses in studying ABC implementation. Survey results are more generalizable but are difficult to interpret at some points. Case studies give more detailed information, leading to a better in-depth understanding of the reasons for failure or success of ABC implementation, but the results are less generalizable. In this study we followed a research strategy, trying to combine the strengths of each of the research approaches by studying only one economic sector. It is expected that technological and market circumstances are more comparable among companies included in our study, making comparisons in the adoption of ABC and in experiences with the use of ABC between firms more meaningful. The survey we used has been complemented with case material and interviews with respondents in order to improve our understanding of the survey results.

## **THE FOOD AND BEVERAGE INDUSTRY**

It was decided to study the Food and Beverage Industry because of two different

reasons. First, we hypothesised that the need for ABC information would be high in food and beverage companies. Clarke and Mia (1993) found that the ABC adoption rate in the Australian food industry (which was 33 %) was the highest of all industry groups studied. Sector specific information (Ernst & Young, 1995a and 1995b) support this impression in three ways: market circumstances, characteristics of food companies and properties of production systems indicate a high need for ABC information and ample possibilities to provide it. We will discuss each of these circumstances briefly.

In Europe, the food industry is the second largest sector with sales amounting to 101,412 million ECU (Eurostat, 1995). The biggest EC industrial sector is transportation, although it is generally believed that the food market will be the biggest EC industry in a few years from now (De Vries & Mulder, 1995). The EC food market, because of EC trade liberalisation measures, becomes more and more internationalized, leading to increased competition among food producers. During the last years, most investments by food companies were aimed at enhancing production efficiency, increasing product quality, introducing new products and entering new markets (De Vries & Mulder, 1995).

In The Netherlands the most dominant strategies in the food sector are focused on product differentiation, flexibilisation in delivery and low cost production (Spronk & Van Wulfen, 1995). These strategies presumably increase the need to calculate 'accurate' product costs and selling prices. Notable is for instance the fierce (price) competition between brand names and private labels. The penalties for applying too high or too low product prices based on inaccurate product cost information can be severe in a highly competitive environment (Cooper, 1988).

The intense competition has also changed some *organizational characteristics* of food companies. A process of concentration of food producers is leading to the emergence of large food processing, transporting and vending companies (De Vries & Mulder, 1995). It is expected that large companies have more funds available

to invest in improving cost accounting systems than smaller companies. Some studies of ABC application suggest that the size of overhead costs is primarily related to production volumes (Foster & Gupta, 1990), giving reason to expect large companies to have more overhead costs than smaller companies.

The common competitive strategy adopted by most food companies has influenced *production characteristics* as well. Most food producers decided to provide a large array of differentiated products to their customers. It is expected that a high diversity of products leads to a high portion of non-volume related overhead costs (Cooper & Kaplan, 1988; Banker & Johnston, 1991). New developments, such as Efficient Consumer Response (ECR), seek to improve on-time and frequent delivery of exact quantities of high-quality products (Ernst & Young, 1995b; Van Wulfen, 1996). These improvements can only be attained by intensive coordination between food producing, transporting and vending companies, for instance in so-called *Cross-docking* systems (Kuipers, 1995). Enhanced coordination may eventually lead to more vertical integration in the food supply chain (Jack Haedicke, Vice President Kraft Foods, 1995). Coordinating activities of this kind incur transactions related overhead costs which tend to be unrelated to quantities produced (Miller & Vollman, 1985; Hayes and Clark, 1985).

The second reason to study the food and beverage sector lies in the possibility to compare our results of the Dutch food and beverage sector with results obtained in a similar study of the US food and beverage industry. This would provide us the opportunity to study two comparable sectors in different countries. Comparisons between these two countries may shed some light on the presumed differences in the appreciation of ABC. Some European writers do not appreciate ABC as a cost accounting renovation, since most of the ABC logic has already been proclaimed before, like by the German academic F. Schmidt (1930) and the Dutch academics J.L. Meij (1960) and H.J. van der Schroeff (1974). The cost accounting technique applied to capture volume-related as well as non-volume related cost drivers in most Dutch companies is called the *Cost Distribution Sheet* (the '*kostenverdeelstaat*'). Differences in adoption of ABC by US and by Dutch

food companies could indicate a difference in opinion about the added value of ABC in comparison with the existing cost systems.

## HYPOTHESES

This discussion leads to the following questions to be addressed by the present study :

1. Given the alleged high portion of non-volume related overhead costs in food companies and the need to provide reliable product costs, it is to be expected that a large percentage of the firms in the food sector apply Activity-Based Costing.
2. Considering the differences in appreciation of ABC as a renewal of cost accounting, the acceptance rate in the Dutch food sector will be considerably lower than in the US food industry.
3. Food companies using ABC differ from food companies not using ABC in two dimensions: in *organizational characteristics* and in *production related characteristics*. The relevant organizational characteristics are the following:
  - a. ABC using companies are bigger than firms not using ABC, since they have more resources available to invest in improvements of cost accounting systems;
  - b. ABC using companies have significantly higher overhead costs (in absolute as well as in relative terms) than firms not using ABC.

The relevant production related characteristics are:

  - c. ABC using companies produce a larger number of different products than non ABC-using companies;
  - d. ABC using firms use for the manufacturing of their products more product lines and packing lines than firms not using ABC.
4. Experiences with designing and implementing ABC systems in Dutch food companies are similar to those in US food companies. If this can be confirmed, than it is a further indication that ABC implementation has its common

problems and pitfalls, irrespective of the national circumstances in which ABC system are implemented.

The remaining of this paper is structured as follows. In the next paragraph, the two survey studies will be introduced and discussed briefly. The following paragraph presents the results related to the first two hypothesis. Each paragraph thereafter discusses the results of each of the remaining three hypotheses. The concluding paragraph summarizes and discusses the main results of this study.

## **SURVEY STUDIES OF THE US AND THE DUTCH FOOD INDUSTRY**

In October 1994 Ernst & Young conducted a survey among 564 food manufacturers, retailers, distributors and brokers in the US. In this survey, 96 usable responses (17 %) were obtained from companies generating average revenues of three billion dollar and employing on average 9,179 workers (Ernst & Young, 1995).

In The Netherlands, a similar survey<sup>1</sup> was administered among 480 Dutch food manufacturers and retailers employing more than 30 workers. In this study 117 usable responses were obtained (24.4 %), including all food sectors in The Netherlands. The Dutch food companies employed on average 520 workers, with a minimum of 32 and a maximum of 20,878 employees. As can be appreciated, the average size of the Dutch sample companies is much smaller than the average size of the US sample companies. This difference may have an impact on the survey results.

Additionally to the survey, the research team visited 13 companies to gain more

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1: The Dutch survey is partly comparable with the US study. The main difference is that the Dutch study contains more questions related to the characteristics of the food companies and their production systems. Also more questions were included related to experiences of the food companies with implementing and operating ABC systems.

in-depth understanding of ABC in food companies. During each visit an interview was conducted with the controller and with employees directly related to the design, implementation and operation of ABC systems. At the time the survey results became available, a meeting was held during which the results have been discussed with over one hundred managers of Dutch food producing companies. We will now turn to each of the research questions and present the corresponding data.

### USE OF ACTIVITY-BASED COSTING

As can be appreciated from tables 1 and 2, the percentage ABC users in the Dutch and in the US sample is not significantly higher than the industry averages found in other studies. US and Dutch Food producers do not seem to face very different circumstances compared to other sectors, or they do not feel extra need to invest in ABC systems to improve profitability.

No significant difference could be found between the percentage Dutch ABC-users and the percentage US ABC-users in the food industry.

\*\* Insert Table 2 about here \*\*

However, significant differences exist in the category food companies which decided *not* to use ABC. Among the Dutch food companies, 63 % reported not to use ABC in the future, while this percentage is only 24 % in the US sample. Some companies interviewed responded as follows:

*... The cost allocation system we currently use is based on the Cost Distribution Sheet and follows the guidelines **of** the Cost Center Method. We think it is generally the same as Activity-Based Costing, although we use a different name **for** it. It is therefore not necessary to implement ABC, although we **feel** that we should constantly reevaluate the*

*usefulness and accuracy of our existing cost allocation system.* " (Controller of a large milk producing company)

These results support the impression that ABC is perceived differently by Dutch food producers in comparison with their US colleagues. A possible explanation for this difference may be found in the alternative cost allocation methods already in use in Dutch food companies.

Table 3 gives an overview from the use of ABC in the different sectors of the Dutch food industry. No statistically significant differences between sectors could be found. Marked differences exist in three sectors. The bread and biscuits sector demonstrates a very high percentage of firms decided not to apply ABC, while in the drinks and tobacco sectors a strikingly high percentage of firms decided to use ABC or to plan an ABC pilot. Given the low numbers of firms it seems hazardous to give too much meaning to these results.

\*\* Insert Table 3 about here \*\*

### **CHARACTERISTICS OF USERS AND NON-USERS OF ABC**

It was hypothesized that differences in acceptance of ABC may be attributed to two organizational characteristics and two product related characteristics. The organizational characteristics relate to the size of the company and the share of overhead costs.

#### **Organizational characteristics**

It was hypothesized that the bigger the company, the more resources will be available to develop, implement and operate ABC systems. Table 4 lists the sample companies according to size in terms of full-time employed workers. The differences between the categories 'ABC-users' and 'Non-ABC users' are significant (Chi-square,  $p < 0.05$ ): more than half of the non-ABC users are small companies of between 50 and 100 employees, while half of the ABC using companies employ more than 250 workers. These results

confirm the hypothesis that on average more larger companies apply ABC than smaller companies do, if size is expressed in full-time workers employed.

\*\* Insert Table 4 about here \*\*

If size is expressed in net income, the differences between ABC-using and non-ABC-using companies are not significant any more (see table 5). A possible explanation is that the factor 'number of employees' combines two dimensions which seem to work in the same direction. This factor gives an indication of size and at the same time of labor intensity of the production. In the food industry, highly automated production systems are mostly used, causing the labour force to take up more indirect tasks. If, in spite of the high degree of automatization, food producers still employ high numbers of workers, a relatively large percentage of these employees will be dedicated to overhead activities. This makes it more necessary for the company to establish 'accurate' product costs.

\*\* Insert Table 5 about here \*\*

As can also be appreciated from table 5, overhead costs expressed in absolute as well as relative terms, do not seem to make much difference between ABC-users and non-ABC-users. It looks as if only the combination of size and overhead costs, expressed by number of workers employed, give sufficient explanatory power to the difference between firms using and firms rejecting Activity-Based Costing.

#### **Production related characteristics**

It is generally believed that more product differentiation leads to higher indirect costs, which in turn makes it more worthwhile to apply ABC. The results of our survey do not support this hypothesis: the differences between ABC-users and non-ABC users are not significant when the number of different products is taken into consideration (see table

6).

Perhaps the number of different products is a too crude approximation of the demand for overhead activities and should we take a closer look at in which way food products are produced. It is conceivable that a highly automated production line is capable of producing a large number of different products without incurring much overhead. In this situation, overhead activities are then more confined to maintenance of the production line, than to the number of different products. More overhead costs would then not be related to the number of products but to the number of product lines and packing lines operated,

\*\* Insert Table 6 about here \*\*

Table 7 shows the differences in number of production lines and packing lines between ABC-using food companies and non-ABC-using companies. The difference in number of production lines is as expected and statistically significant: ABC-using firms operate on average more production lines than firms not using ABC. This does however not count for the number of packing lines, presumably because there are not as much overhead activities related to packing as to producing food products.

\*\* insert Table 7 about here \*\*

### **REASONS FOR USING ABC**

In their early writings, Cooper and Kaplan suggested that ABC-information would enable companies to make better selling price, product mix and client mix decisions. The present results show that companies value these properties, but other benefits from ABC information are valued higher, like reduction of overhead costs, planning and budgeting of departments and improvement of production processes. It seems as if ABC is higher valued as a tool for improving management control of production units and departments

then as an aid to strategic decision making.

The US survey generated similar results. Among the highest ranking uses of ABC-information we find 'profitability review', 'process improvement', 'performance measurement' and 'planning and budgeting'. Only 24 % reports the use of ABC information for 'reevaluation of product mix in order to increase profitability'.

\*\* Insert Table 8 about here \*\*

### **REASONS FOR NOT USING ABC**

The food companies not applying ABC systems give different reasons for their decision. The reasons Dutch food producers give are summarized in table 9. Unfamiliarity with ABC is the reason most mentioned, followed by two reasons suggesting that improving cost allocation practices is not a priority issue at this moment. These three reasons are not included in the US survey. On the remaining reasons, US firms, appear to have a different opinion: they seem to value the costs of collecting the appropriate data more important for not accepting ABC as a useful method than that they doubt the value of the ABC information. Dutch food producers seem to value these arguments reversely: they cast more doubt on the added value of ABC information than on the cost of collecting the relevant information. This striking difference could be explained by the use of ABC-alike cost information from the *Cost Distribution Sheet*. This sheet already uses similar data as is required for ABC calculations and therefore the 'cost of collection' argument is not perceived as important any more.

\*\* Insert Table 9 about here \*\*

## EXPERIENCES WITH ABC

In the Dutch sample, 86 % of the ABC using companies reported that introducing ABC has been a worthwhile experience. This experience was not without any difficulty, however. Most problems were encountered in collecting information, assigning costs to activities, and the identification of activities and cost drivers. The most difficult part of the implementation of ABC was the problem to convert ABC-information into action. As Cooper et.al. (1992) already noted, no organization ever made more money merely because it had a more accurate understanding of its economics. Only when understanding is translated into action is the potential for profit improvement unleashed. The difficulty of translating ABC-information into profit generating actions is reported to be the top problematic area in the Dutch food industry.

The least problematic areas were those related to gaining support from top management, business unit management and workers to cooperate in the implementation of an ABC system. This seems obvious since only the responses of food companies who actually implemented ABC are considered here.

\*\* Insert Table 10 about here \*\*

As table 11 demonstrates, ABC is mostly used to calculate product costs, followed at a large distance by product categories, customers and distribution channels. Calculation of product costs is mostly related to downstream activities and not as much with upstream activities (like suppliers or supplier categories). There are no big differences between the choice of cost objects made by US or by Dutch food companies. In both countries, ABC planners seem to give a slightly higher priority to calculate customer costs.

In the Dutch sample, 86 % of the firms using ABC complement ABC information with cost information from the existing allocation systems, like the cost center method.

The most important purpose for which ABC information is used' lies in improving production efficiency and identifying cost reduction opportunities. Less important are deciding upon selling price, product mix and client mix issues. This picture is the same

for US as well as for Dutch food companies. Most of the Dutch food companies report that the use of ABC information has improved or greatly improved the results in the decision areas mentioned.

\*\* Insert Table 11 about here \*\*

Some writers claim that the introduction of ABC is not an isolated activity, but that it should work in conjunction with other organizational and administrative measures in order to take appropriate effect (Turney, 1991). Cooper et.al. (1992) state that “Management must institute a conscious process of organizational change and implementation if the organization is to receive benefits from the improved insights resulting from an ABC analysis.” They mention specific possibilities to manage activities and processes from a cross-functional, integrated view of the firm. At the same time, given the recency of the ABC-approach in the companies studied, it was too early for Cooper et.al. to detect which concrete organizational measures the companies would take in the course of ABC implementation.

In the Dutch food sector, most ABC-using companies took measures to change the financial performance measures (mostly not affecting compensation schemes) and the bookkeeping systems. Contrary to the expectations of Cooper et.al., only few companies changed their organization structure (see table 12 for an overview).

\*\* Insert Table 12 about here \*\*

Almost all companies state that the ABC system provides more accurate information than the ‘old (existing) cost system’. Mostly, the production of more accurate information requires additional effort, increasing the possibility of delays in the provision of information to decision makers. For only 58 % of the sample firms, ABC outperforms existing cost systems in providing more timely cost information. More than half of the

companies update cost information only yearly, while almost 80 % updates the cost drivers yearly (see table 13). It looks as if the complexity of ABC systems seems to hinder frequent updating of ABC information. This may lead to an important disadvantage for food companies, since they operate in dynamic competitive environments requiring frequent updating of information in order to be able to react adequately to changing circumstances.

\*\* Insert Table 13 about here \*\*

By 70 % of the Dutch food companies using ABC information, this information has also been used to value inventories for financial reporting purposes.

#### **SUMMARY AND CONCLUSIONS**

At the start of this project, it was expected that the use of ABC would be more widespread within the US and Dutch food sectors than the industry-wide averages reported in other ABC survey studies. This proved not to be the case: the adoption percentages of 18 % (US) and 12 % (Netherlands) are within the range reported by other studies. Also the difference between US and Dutch food companies is not significant. However, the percentages of companies having decided not to use ABC are surprisingly different between US and Dutch food producers. Where 24 % of US food firms decide not to implement ABC, this percentage is 63 % among Dutch food companies. A first possible explanation for this large difference could lie in the widespread use in The Netherlands of the Cost Center Method, applying the Cost Distribution Sheet, which is able to provide similar cost information as ABC systems do. This ad hoc explanation is supported by another finding in this study. The Dutch food managers who decided not to use ABC information report more frequently the expectation that ABC would not be able to provide valuable information (in addition to the existing cost systems) than their US colleagues. US food managers mostly reject ABC because of the expected difficulty in collecting the information and of the predicted costs of designing and implementing ABC systems. A

second possible explanation we found is the unfamiliarity with ABC among Dutch non-ABC users.

The main differences between companies in the Dutch sample using ABC and not using ABC can be attributed to two dimensions: one organizational characteristic and one production related characteristic. The dominant organizational characteristic proves to be the size of the company, expressed in terms of number of employees. Net income and overhead costs (in absolute or relative terms) do not make a difference between ABC-users and non-users. This could be explained by the nature of the factor 'number of employees', which seems to combine two dimensions working in the same direction. A large number of employees characterizes large companies which also employs labour-intensive production systems. Since most of the production technology in the food sector is highly mechanized and automated, a large part of the labour employed is supposed to carry out overhead activities.

The US and Dutch samples show that the main reason for applying ABC is *not* based on the need to decide more accurately in selling price, product mix or client mix issues. This was originally stated as the decision areas where ABC could be most helpful (Cooper, 1988). In stead, ABC information is mostly used to make profit reviews, to improve production processes and to measure performance. These areas are very much oriented towards cost management issues than to more strategic issues.

Finally, the experiences of Dutch food producers are very similar to those obtained by their US colleagues. Both encountered the same problems while implementing ABC systems and both selected the same cost objects while applying the ABC methodology. These results indicate that ABC design and implementation has its common problems and pitfalls, irrespective of the national circumstances in which ABC systems are implemented.

Besides some clear answers to our hypothesis, the survey data also convey some results which are difficult to interpret. We are not able to give a satisfactory explanation for the finding that more Dutch food producing companies decided *not* to use ABC compared with their American colleagues. Some more in-depth studies of ABC and non-ABC users are needed to identify the exact reasons for non-adaption. Special attention should be given

to the role of the Dutch cost allocation methods in Dutch food producing companies which decided not to implement ABC.

Another striking result which we could not explain satisfactorily is the finding that the use of ABC is significantly related to the number of production lines and not to the number of packing lines. We expect this to be a result of the way production processes are structured. It still could also be the result of the type of decisions requiring ABC-analysis; may be the costs differences of package alternatives are not material, or they may already been included in the costs of production.

To conclude, Dutch ABC-users seem to perceive as the most problematic area the conversion of ABC-information into action. We do not have much detailed knowledge about this area, and yet it seems of great importance for the managers involved. Detailed study into follow-up questions related to the managerial use of Activity-Based Costing information is therefore urgently needed.

Our research strategy consisted of narrowly focusing on one specific economic sector, using surveys, some case studies and a general meeting for discussing the survey results. This strategy gave some interesting results. Nevertheless, we must also conclude that for getting satisfactory answers on the three remaining issues the use of a series of case studies may provide more appropriate answers.

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Table 1: Recent surveys concerning the use of Activity-Based Costing

| Country        | Year | Current-ly usmg ABC | Currently implemen-tmg ABC | Currently consid-ering ABC adoption | Rejected ABC after assessment or no considera-tion of ABC to date | Author(s)        |
|----------------|------|---------------------|----------------------------|-------------------------------------|---|------------------|
| Finland        | 1994 | 0.0                 | 6.0                        | 23.9                                | 70.1  | Lukka & Granlund |
| Sweden         | 1992 | 0.0                 | 22.5                       | --                                  | 77.5  | Ask & Ax         |
| United Kingdom | 1992 | 4.0                 | 9.0                        | 37.0                                | 50.0  | Drury & Tayles   |
| United Kingdom | 1992 | 10.0                | 18.0                       | 62.0                                | 10.0  | Nicholls         |
| United Kingdom | 1995 | 19.5                | --                         | 27.1                                | 53.4  | Innes & Mitchell |
| Ireland        | 1992 | 14.0                | --                         | 34.1                                | 51.9  | Clarke           |
| Australia      | 1993 | 13.6                | 29.5                       | --                                  | 56.0  | Clarke & Mia     |

**Table 2:** Use of Activity-Based Costing in the Dutch Food Industry in 1995 and the US Food Industry in 1994 (sources: Ernst & Young, 1995; Van Gool e.o., 1995)

| Dutch survey             |            | US survey |            |            |
|--------------------------|------------|-----------|------------|------------|
| Number                   | Percentage | Number    | Percentage | Percentage |
| Currently using ABC      | 14         | 12.0      | 17         | 17.7       |
| Conducting a pilot study | 4          | 3.4       | 14         | 14.6       |
| Planning a pilot study   | 25         | 21.4      | 42         | 43.8       |
| Decided not to use ABC   | 74         | 63.2      | 23         | 23.9       |
| Total                    | 117        | 100.0     | 96         | 100.0      |

**Table 3:** Number and percentage of Dutch food companies currently using ABC, planning to implement an ABC system (the categories 'planning a pilot study' and 'conducting a pilot study' combined) and having decided not to use ABC.

| Sectors                    | ABC users |              | ABC planners |              | Non-ABC users |              | Total      |               |
|----------------------------|-----------|--------------|--------------|--------------|---------------|--------------|------------|---------------|
|                            | n         | %            | n            | %            | n             | %            | n          | %             |
| diary & milk               | 3         | 18.8%        | 5            | 31.3%        | 8             | 50.0%        | 16         | 100.0%        |
| meat products              | 2         | 11.1%        | 5            | 27.8%        | 11            | 61.1%        | 18         | 100.0%        |
| bread & biscuits           | 0         | 0.0%         | 4            | 22.2%        | 14            | 77.8%        | 18         | 100.0%        |
| cacao, chocolate & sweets  | 2         | 11.8%        | 4            | 23.5%        | 11            | 64.7%        | 17         | 100.0%        |
| cattle-fodder              |           | 12.5%        | 1            | 12.5%        | 6             | 75.0%        | 8          | 100.0%        |
| vegetables & fruit         | 0         | 0.0%         | 1            | 16.7%        | 5             | 83.3%        | 6          | 100.0%        |
| margarine, oil & fat       | 0         | 0.0%         | 1            | 50.0%        | 1             | 50.0%        | 2          | 100.0%        |
| drinks                     | 2         | 22.2%        | 5            | 55.6%        | 2             | 22.2%        | 9          | 100.0%        |
| tobacco                    | 2         | 66.7%        | 0            | 0.0%         | 1             | 33.3%        | 3          | 100.0%        |
| fish processing            |           | 50.0%        | 0            | 0.0%         | 1             | 50.0%        | 2          | 100.0%        |
| snacks & convenience goods | 0         | 0.0%         | 0            | 0.0%         | 4             | 100.0%       | 4          | 100.0%        |
| potatoflour                |           | 20.0%        | 1            | 20.0%        | 3             | 60.0%        | 5          | 100.0%        |
| others                     | 0         | 0.0%         | 2            | 22.2%        | 7             | 77.8%        | 9          | 100.0%        |
| <b>Total</b>               | <b>14</b> | <b>12.0%</b> | <b>29</b>    | <b>24.8%</b> | <b>74</b>     | <b>63.2%</b> | <b>117</b> | <b>100.0%</b> |

**Table 4:** Dutch food companies using ABC, planning the implementation of ABC and not using ABC, according to number of workers employed

| Workers<br>Employed | ABC users |       | ABC planners |              | Not using ABC |              | Total |        |
|---------------------|-----------|-------|--------------|--------------|---------------|--------------|-------|--------|
|                     | n         | %     | n            | %            | n             | %            | n     | %      |
| 50-100              | 1         | 3.0%  | 2            | 6.1%         | 30            | 90.9%        | 33    | 100,0% |
| 100-150             | 3         | 20.0% | 4            | 26.7%        | 8             | 53.3%        | 15    | 100.0% |
| 150-250             | 2         | 8.3%  | 7            | 29.2%        | <b>15</b>     | 62.5%        | 24    | 100.0% |
| 250-500             | 5         | 20.0% | 8            | <b>32,0%</b> | 12            | 48.0%        | 25    | 100.0% |
| > 500               | 2         | 11.1% | 8            | 44.4%        | 8             | 44.4%        | 18    | 100.0% |
| Total               | 13        | 11.3% | 29           | 25.2%        | 73            | <b>63,5%</b> | 115   | 100,0% |

**Note:** differences between categories are statistically significant (Chi-square,  $p < 0.05$ )

Table 5: Organizational Characteristics of ABC using Food Companies and non-ABC using companies

| Characteristics   | ABC-users | Non-ABC users | 1-tailed t-test |
|---|-----------|---------------|-----------------|
| Net income in 1993 (after tax & interest) in millions of guilders | 5.65      | 17.86         | p = .308        |
| Net income in 1994 (after tax & interest) in millions of guilders | 5.88      | 23.01         | p = .313        |
| Overhead, in millions of guilders                                 | 28.1      | 24.4          | p = .418        |
| Overhead, in % of total costs                                     | 24.5      | 27.4          | D = .295        |

**Table 6:** Dutch food companies using ABC, planning the implementation of ABC and not using ABC. according to number of different products produced

| Number of Products | ABC users |              | ABC planners |              | Not using ABC |              | Total |        |
|--------------------|-----------|--------------|--------------|--------------|---------------|--------------|-------|--------|
|                    | n         | %            | n            | %            | n             | %            | n     | %      |
| < 50               | 3         | 9.7%         | 4            | <b>12,9%</b> | 24            | 77.4%        | 31    | 100.0% |
| 50-150             | 3         | 13.6%        | 8            | <b>36,4%</b> | 11            | <b>50,0%</b> | 22    | 100.0% |
| 150-250            | 3         | 18.8%        | 3            | 18.8%        | 10            | 62.5%        | 16    | 100.0% |
| 250-500            | 3         | 14.3%        | 7            | 33.3%        | 11            | 52.4%        | 21    | 100.0% |
| > 500              | 2         | 7.7%         | 7            | 26.9%        | 17            | 65.4%        | 26    | 100.0% |
| Total              | 14        | <b>12,1%</b> | 29           | 25.0%        | 73            | 62.9%        | 116   | 100,0% |

Note: differences between categories are statistically not significant (chi-square test,  $p = 0.40$ )

**Table 7:** Production Characteristics of ABC using Food Companies and non-ABC using food companies in The Netherlands

| Firm Characteristics       | ABC-users | Non-ABC users | l-tailed t-test |
|----------------------------|-----------|---------------|-----------------|
| Number of Production Lines | 9.1       | 5.8           | p = .033        |
| Number of Packing Lines    | 8.9       | 18.1          | D = .364        |

**Table 8:** Number of Dutch food companies indicating the use they make of ABC information

| Use of ABC information                     | ABC users | Planning and conducting Pilot study |
|--|-----------|-------------------------------------|
| Reduction of overhead costs                | 11        | 22                                  |
| Calculation of product profit margin       | 10        | 21                                  |
| Planning and Budgeting of departments      | 9         | 16                                  |
| Improvement of production processes        | 9         | 14                                  |
| Performance evaluation of production units | 8         | 15                                  |
| Calculation of selling prices products     | 7         | 16                                  |
| Benchmarking product costs                 | 6         | 6                                   |
| Composition of product mix                 | 4         | 11                                  |
| Composition of client mix                  | 1         | 4                                   |
| Other                                      | 3         | 1                                   |

note: respondents had the opportunity to give more than one answer

Table 9: Rankorder of reasons given by Dutch and American food producers for *not* using ABC

| Reason   | Dutch producers | US producers |
|--|-----------------|--------------|
|  | Rankorder       | Rankorder    |
| Unfamiliarity with ABC   | 1               | --           |
| Other high priorities  | 2               | --           |
| Lack of time   | 3               | --           |
| ABC is not expected to provide valuable information                      | 4               | 4            |
| Costs of design and implementation of ABC systems are prohibitively high | 5               | 3            |
| Required data not available or too costly to collect                     | 6               | 1            |
| Internal resistance to change  | 7               | 2            |
| Lack of necessary computer facilities                                    | 8               | --           |

**Table 10:** By Dutch food industry managers identified most and least problematic areas in the design, implementation and operation of ABC systems

| Most problematic areas             | Least problematic areas                  |
|------------------------------------|--|
| converting information into action | convincing top management                |
| collecting information             | lack of support from top management      |
| assigning costs to activities      | scarce computer resources                |
| the large amount of work           | convincing business unit management      |
| lack of sufficient staff support   | lack of business unit management support |
| identification of activities       | convincing workers                       |
| identification of cost drivers     |  |

**Table 11:** Selection of Cost Objects by Dutch and US food companies, currently using ABC or planning and/or conducting a pilot to implement ABC, according to priority given (1 is highest), number of responses between parentheses

| Cost objects          | Dutch Food companies |              | US Food companies |              |
|-----------------------|----------------------|--------------|-------------------|--------------|
|                       | ABC users            | ABC planners | ABC users         | ABC planners |
| Products              | 1 (11)               | 1 (24)       | 1 (13)            | 2 (33)       |
| Product categories    | 2 (7)                | 5 (5)        | 2 (8)             | 3 (32)       |
| Customers             | 3 (5)                | 2 (9)        | 3 (4)             | 1 (40)       |
| Distribution channels | 3 (5)                | 4 (6)        | 4 (3)             | 4 (21)       |
| Customer Groups       | 4 (3)                | 3 (7)        | 4 (3)             | 4 (21)       |
| Suppliers             | 5 (1)                | 7 (1)        | 3 (4)             | 4 (21)       |
| Supplier groups       | 6 (0)                | 6 (2)        | 5 (1)             | 5 (6)        |

Table 12: Number of Dutch food companies which introduced additional administrative and organizational changes, aimed at supporting ABC analysis

| Changes                        | Yes | No | Total |
|--------------------------------|-----|----|-------|
| Organization structure         | 4   | 10 | 14    |
| Financial performance measures | 10  | 3  | 13    |
| Compensation schemes           | 1   | 12 | 13    |
| Bookkeeping system             | 10  | 4  | 14    |
| Administrative procedures      | 4   | 3  | 7     |

Table 13: Frequency of updating ABC systems as reported by Dutch food companies

| Frequency        | Updating cost information (in %) | Updating cost drivers (in %) |
|------------------|----------------------------------|------------------------------|
| monthly          | 0                                | 0                            |
| quarterly        | 22                               | 7                            |
| biannually       | 14                               | 14                           |
| yearly           | 64                               | 79                           |
| less than yearly | 0                                | 0                            |