Serie Research Memoranda

Symptoms of Dysfunctional Cost Information Systems: some preliminary empirical evidence from the Netherlands

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Research Memorandum 1992-12
april 1992

vrije Universiteit *amsterdam*

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Paper presented at the European Accounting Association Conference, Madrid, 1992

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ABSTRACT

Burns and Stalker (1961) and Woodward (1965) argued that a dynamic environment and changing technology has a substantial impact on the required information and control systems used within firms. This was later supported by research by Burns and Waterhouse (1975), Hayes (1977) and Daft and Macintosh (1978) and more recently Jones (1985).

Autors like Cooper (1989, 1990) and Johnson and Kaplan (1987) argue that while cost accounting systems would be believed to follow the changing conditions mentioned, this development is actually lagging which in certain circumstances could lead to outdated cost systems. Cooper (1990) gives 11 symptoms that would be indicative for such outdated cost systems.

The empirical study presented here set out to examine the state of the art in cost accounting in the Netherlands in order to find evidence for this believed lagging of cost systems. We tested for a correlation between the symptoms identified by Cooper and the state of the art of the cost accounting system used.

This led us to identify two seperate groups, one that confirmed the existence of these symptoms and one that did not. Next we tested both groups for environmental conditions, like developments in product portfolio, manufacturing processes, level of competition, etc., in order to establish whether or not the existence of these symptoms could be explained by the dynamics of the environment. In addition to this we tested for a relation between both groups and the perceived usefulness of the cost information system on the one hand and the characteristics of the cost system present on the other hand.

Preliminary results show only a slight correlation between Cooper's symptoms and the dynamics of the environment. This also holds true for the correlation between perceived usefulness of the cost accounting system used and the Cooper's symptoms. Only a slight correlation was found for some of the individual symptoms.

In the paper we elaborate on apects like the composition of the sample, the contents of the questionaire, the tests used and the overall empirical results that constitute the output of this research project.

1. The research-project

In the summer of 1991 we[1] sent a questionnaire to the chief financial officer of 3240 manufacturing corporations (which had more than 50 employees) containing 29 questions on three issues: (1) characteristics of the competitive environment and strategic positioning, (2) main characteristics of the cost information being used and (3) the degree of suitability of the available cost information in decision making.
A total of 406 corporations responded (12,5%).

One of the objectives of the research project was to identify **a possible relation between the changing competitive environment and the perceived usefullness of the cost information system**. A more thorough comprehension of the relations between environmental dynamics and cost information system design requires a more fundamental research method. Therefore this research project aims at identifying some starting points for future research on this subject. Because of the preliminary nature of this project we choose to concentrate on the usefullness of the available cost information as a means of supporting managerial decision making from the point of view of the chief financial officer (user of cost-information) and from the point of view of the controller (producer of cost-information).

This paper contains only a part of the results of the research: we focused on the competitive environment, the structure of the cost information system used, and the perceived usefullness of the available cost-information.

[1] This research-project was sponsored by Coopers & Lybrand Management Consultants, Rotterdam, The Netherlands. The project was conducted by Arnick A.M. Boons (Erasmus University Rotterdam), Frans A. Roozen (Free University Amsterdam) and Ronald J. de Weerd (Coopers & Lybrand Management Consultants, Rotterdam, The Netherlands).

2. Basic Premises

Cooper[2] states "to determine whether a firm's cost system is reporting accurate product costs and to guard against its obsolence, management should evaluate it. Managers should ask themselves "Do I really know what my products cost ?" Answering this question requires a detailed analysis of the firm's cost system - an expensive and time-consuming process. Fortunately, management can significantly reduce the risk of undertaking such an analysis unnecessarily by looking for symptoms that usually accompany a poorly designed or obsolete cost system".

Cooper formulates several (11) statements which, if confirmed, might indicate a "poorly designed or obsolete cost system". Based on Coopers suggestions we choose the following seven statements as a point of departure for our research:

Basic Statement	(%) Yes	(%) No
The profitablity of complex or specialty products is substantially higher than the profitability of standard products.	48 %	52 %
Changes in profit margins from one period to the next cannot be explained easily.	30 %	70 %
The competitors high-volume standard products are priced at apparently low levels.	54 %	46 %
The results of bids are difficult to explain.	36 %	64 %
Vendor bids for parts and components are considerably lower priced than expected on the basis of information from our own cost information system.	53 %	47 %
The number of costpools is small and the nature of the costpools is heterogeneous.	56 %	44 %
In addition to the formal management information system all kinds of local information systems are freely in use.	62 %	38 %

Table 1. Basic Statements and respons

In Table 1 the seven basic statements are reproduced including the respondents confirmation as a percentage of total (all respondents) respons on these statements.

In order to find out if the above mentioned statements really discriminate we divided total respons into three separate mutually exclusive groups: group 1 contains all respondents which confirmed five or more of the statements; group

[2] R. Cooper - Does your company need a new cost system ? (in B.J. Brinker (ed.) Emerging Practices in Cost Management, Warren, Gorham & Lamont, Boston, USA, 1990, page 131-135).

3 contains all respondents which confirmed only one or two statements and group 2 contains the other respondents. In numbers the totale respons was divided as shown in table 2[3]:

Group 1	Group 2	Group 3	Total
73	234	99	406

Table 2: Respons divided in three groups

The reason for segregating the respons in this manner is that if the statements, if confirmed, are symptoms of "poorly designed or obsolete cost information systems" there should be a significant distinction between the answers to other questions.

A further division was made between producers of cost-information (controllers) and users of cost-information for decision-making (financial officers and general managers). In table 3 this division is shown in respons numbers:

	Group 1	Group 2	Group 3	Total
Users	24	79	30	133
Producers	35	112	60	207
Missing	14	43	9	66
Total	73	234	99	406

Table 3. Respons divided according to degree of confirmation and function of respondent.

[3] The respondents were classified by the number of symptoms supported (0, 1, 2,...,7). The distribution of the cummulative number of symptoms in descending order (starting with 7 down to 0) was paired with the distribution of the cummulative number of symptoms supported in ascending order (starting with 0 up to 7). In order to have a statistically reliable result in the forthcomming analyses we needed a significant number of respondents in each of both subsamples. We selected the pair that contained approximately 60 respondents in each subsample (this was found at 5 or more symptoms and two or less symptoms). The clustering of the sample in subsamples was based on trial and error.

3. General characteristics of the responding firms

Our first hypothesis was that distorted cost-information is more likely to occur in manufacturing processes usually characterized by many different products. We used the following classification:

	Group 1	Group 2	Group 3	Total
Flow Production	7 %	12 %	14 %	11 %
Mass production	5 %	8 %	5 %	7 %
Large batch production	20 %	25 %	31 %	26 %
Small batch production	40 %	35 %	38 %	36 %
Job order	28 %	19 %	14 %	20 %
Significance	0,13	0,99	0,37	1,00

Table 4. Classification towards nature of manufacturing process.

Following the argument that "traditional" (product-focused) cost accounting will generate more distorted information when the product range is large this classification does not strongly support this hypothesis. In the last row of table 4 the Chi-square Goodness-of-Fit statistic has been reproduced. The results of all respondents (column 5) were used as the null hypothesis and the group-results were tested against it[4]. As the table shows at the 5% level no significant difference exists between each group and the total respons. If the respons of group 3 is tested against the respons of group 1 however a statistic of 0,0005 reveals a very small correspondence between the two groups. The preliminary conclusion may be that at the 5% level of rejecting the null hypothesis there is no significant difference between the answers from either group in comparison with total respons. There is strong evidence for a significant difference between group 1 en group 3.

[4] The question we asked is: 'Can we accept the null-hypothesis that the given distribution of responses come from three subsamples with the same characteristics?'. If so, we would expect the given numbers to be spread evenly over the various groups.

The next question in our questionnair was the type of market on which the products were sold. The answers are shown in table 5:

	Group 1	Group 2	Group 3	Total
Consumer markets	8 %	17 %	20 %	16 %
Industrial markets	62 %	50 %	39 %	50 %
Others	30 %	33 %	40 %	34 %
Significance	0,03	0,96	0,11	1,00

Table 5. Classification towards type of markets.

Table 5 shows a large difference between respondents from group 1 and from group 3. In group 1 a relatively large percentage of respondents (62 %) can be classified as supply industry. In group 2 on the other hand a relatively small part of the respondents can be classified as supply industry. The significance test shows a very small correspondence between total respons and group 1 respons and the test for group 1 versus group 3 is practically 0.

For the characteristics of the output of firms we found that there is but a slight support for the hypothesis that cost information is distorted due to a large product range. On the other hand we did find support for the hypothesis that the accuracy of cost information is in general more sensitive for industrial markets than it is for consumer markets. There may be several explanations for this fenomenon. One of them could be that industrial products are more customer specific in nature. Given the absence of an efficient supply market one would expect a larger group being dissatisfied with cost information in price setting than would otherwise be experienced.

Another general indicator for an outdated cost accounting system could be the trend in sales compared with the trend in profits. We hypothesize that firms showing a ratio higher than 1 are characterized by the optimum mix in products offered. Where this ratio would be between 0 and 1 one could argue that the product mix offered is suboptimal.

With regard to total salesgrowth and profitgrowth the respondents were classified in five classes: --: less than - 10% yearly growth over the last five years, -: between -10 % and -5% growth per year, -/+: stable between -5% and +5% growth per year, +: between +5% and +10% growth per year and ++: more than +10% growth per year:

	Group 1	Group 2	Group 3	Total
--	7 %	4 %	10 %	6 %
-	4 %	5 %	9 %	6 %
-/+	25 %	24 %	24 %	24 %
+	22 %	31 %	28 %	29 %
++	40 %	35 %	29 %	35 %
Significance	0,24	0,98	0,47	1,00

Table 6. Trends in sales

	Group 1	Group 2	Group 3	Total
--	8 %	8 %	12 %	9 %
-	10 %	7 %	12 %	9 %
-/+	32 %	32 %	20 %	29 %
+	23 %	20 %	19 %	20 %
++	28 %	33 %	38 %	33 %
Significance	0,61	0,98	0,43	1,00

Table 7. Trends in profit

No significant difference was found between the distribution of responses among the various groups. From this point of view that would suggest that there is no correspondence between the trend in sales and profits and the state of the art of the cost accounting system. However when we describe the responses in terms of the trend in sales **compared** with the trend in profits, group 1 shows a significantly different distribution of responses when compared to the total group (see appendix 2). If the distribution of group 1 is compared with group 3 this is further aknowledged. The initial distribution of responses in tabel 6 and 7 suggests that for group 1 the trend in sales is more positive than the trend profits, whereas this distinction is absent for group 3 companies. Among other things this could be explained by a more profitable product and market mix for group 3 companies when compared to group 1 companies, possibly arrived at by more accurate cost information.

4. Competitive environment and strategic positioning

Another important argument in the discussion on cost information system design is the influence from a *broadening* product range. As the product range is broadened while the cost accounting system is not being adapted correspondingly the assesment of 'real-life' profit margins becomes impossible. In our questionnair we asked for an indication on the trend in the product range. Table 8 shows the results:

	Group 1	Group 2	Group 3	Total
--	1 %	1 %	2 %	1%
-	6 %	5 %	4 %	5%
-/+	13 %	20 %	13 %	17%
+	45 %	50 %	50 %	49%
++	35 %	24 %	31 %	28%
Significance	0,52	0,89	0,65	1,00

Table 8. Trend in product range

Table 8 shows the percentage of the respons in five categories: -- strongly narrowed product range, - narrowed product range, -/+ stable product range, + broadened product range and ++ strongly broadened product range. As is evident from the table this is a very cohesive picture. The percentages and the statistics show a corresponding image over all groups. The correspondence test between group 1 and 3 reaches 0,61. The conclusion may be that the trend in the product range does not differentiate between the groups. The hypothesis that the accurateness of the cost information generated is sensitive to a broadening of the product range is therefore not supported.

An important aspect of the competitive environment in which the firm operates are developments in the markets where the major products are sold. The questionnaire focused on two aspects: number of competitors and developments in the marketshare. Both aspects are pictured below.

	Group 1	Group 2	Group 3	Total
--	1 %	5 %	5 %	4 %
-	30 %	28 %	22 %	27 %
-/+	28 %	33 %	36 %	33 %
+	37 %	28 %	31 %	30 %
++	4 %	6 %	6 %	5 %
Significance	0,27	0,96	0,79	1,00

Table 9. Development in the number of competitors

Group 1 versus Group 3: 0,0002

	Group 1	Group 2	Group 3	Total
--	1 %	1 %	1 %	1 %
-	15 %	12 %	5 %	11 %
-/+	35 %	31 %	33 %	32 %
+	44 %	51 %	50 %	50 %
++	4 %	5 %	10 %	6 %
Significance	0,54	0,99	0,20	1,00

Table 10. Development in market share

Group 1 versus group 3: 0,002

For both aspects no significantly different distribution of responses was found that could be used to discriminate group 1 from other groups. However, if we compare the distribution of responses in table 9 with the distribution in tabel 10 we do find some differences between the increase in the number of competitors compared with the increase in market share that could be significant. As table 9 and 10 indicate the increase in both the number of competitors and market share for group 1 companies is almost equal. On the other hand the increase in the number of competitors is significantly lower than the increase in market share for group 3 companies. This

could suggest that group 3 companies perform relatively better than group 1 companies because of more accurate cost information.

We have tried to approach the strategic positioning of the firm in two ways: (1) the factors which are critical for the competitive advantage of the firm and (2) the way markets will be appoached in the near future.

In order to quantify the priority in factors which are critical for the competitive succes of the firm we asked the respondents to reveal their priorities on a scale from 1 (very important) to 10 (least important) on a list containing nine factors and a possibility to ad firm-specific factors (other than the above mentioned). The results are summarized in table 11:

Factors	Priority ranking for Group 1	Priority ranking for Group 2	Priority ranking for Group 3	Priority ranking for Total
Product quality	1 (1,76)	1 (1,73)	1 (1,63)	1 (1,73)
Reliability in delivery	2 (3,07)	2 (3,07)	2 (3,28)	2 (3,12)
Selling price	3 (3,87)	3 (4,06)	3 (4,31)	3 (4,09)
Product development	5 (4,97)	6 (5,20)	6 (4,96)	6 (5,10)
Relations with customers	4 (4,40)	4 (4,42)	5 (4,84)	4 (4,53)
On time delivery	6 (5,03)	5 (4,58)	4 (4,64)	5 (4,68)
Product range	7 (6,63)	7 (6,34)	7 (5,94)	7 (6,29)
Distribution channels	9 (7,93)	9 (6,96)	9 (6,64)	9 (7,06)
Market share	8 (7,09)	8 (6,63)	8 (6,49)	8 (6,68)
Significance	0,008	0,99	0,26	1,00

Table 11. Priority ranking of factors critical for competitive success.

Correspondence between group1 and 3: 0

There is a significantly different distribution of responses for group 1 companies compared to the other groups. Group 1 companies indicate that 'selling price', 'product development', and 'customer relations' are reletively more important critical

success factors whereas 'on time delivery', 'product range', 'distribution channels', and 'market share' are relatively less important critical success factors when compared to the other groups. If we assume that the need for accurate cost information is higher for critical success factors like 'selling price', 'product development', and 'customer relations' (when interpreted e.g. as customer specific products and orders) and if the number of Cooper's symptoms is an indication for the accurateness of cost information, this could mean a serious problem for group 1 companies.

The final element in this group which we tested for was the strategic positioning of firms. It was expected that firms with an 'obsolete' cost accounting system could be characterized by more heterogeneous and possibly contradicting strategies. The way in which firms approach markets was 'framed' in the well-known dichotomy: existing products and new products versus existing markets and new markets. A large part of the respondents gave more than one answer. We condensed the respons in five possible catagories:

Conservative strategy:	only existing products on existing markets;
Innovative strategy :	only new products on new markets;
Product focus:	only new products on existing markets
	new and existing products on existing markets
	new and existing products on new markets;
Market focus:	only exisiting products on new markets
	existing products on new and existing markets
	new products on existing and new markets;
Others:	existing products on existing markets and new products on new markets
	New products on existing markets and existing products on new markets
	strategies with more than 2 options.

The results are shown below:

	Group 1	Group 2	Group 3	Total
Conservative	14 %	14 %	19 %	15 %
Innovative	1 %	5 %	9 %	6 %
Product focus	22 %	23 %	28 %	24 %
Market focus	27 %	28 %	22 %	27 %
Other	36 %	29 %	21 %	28 %
Significance	0,15	0,99	0,21	1,00

Table 12. Different product-market strategies

Correspondence between group 1 and 3: 0,00..

No significant difference was found when testing group respons against total respons. On the other hand we did find a significant difference when testing group 3 against group 1. This is in part explained by the relatively high number of firms in group 1 opting for the category 'other strategies' which is more heterogenuous in nature and possibly even contradictory. It supports the idea that distorted cost information results in non-optimal strategic decisions.

5. Cost composition and structure cost accounting system

This part of the questionnaire focused on the composition or structure of a firm's total costs on the one hand and the structure of its cost accounting system on the other. We hypothesized that firms positioned in group 1 could be characterized by a relatively higher level of indirect costs and a somewhat more simple cost accounting system in terms of e.g. the number of different allocation bases used.

The ratio direct costs/indirect costs was calculated in two different ways. Tabel 13 shows the ratio as (direct labor + direct materials) / other costs. Table 14 on the other hand gives the ratio as (direct labor + direct materials + direct factory costs) / other costs.

Group 1	Group 2	Group 3	Total
3,00	3,17	2,86	3,07

Table 13: Direct versus indirect costs - I

Group 1	Group 2	Group 3	Total
6,27	6,71	5,64	6,37

Table 14: Direct versus indirect costs - II

No matter what definition was used to calculate the ratio, in both circumstances the hypothesis was not supported. In fact the outcomes show a reversed relation. The outcomes could however be biased because of a different interpretation of direct and indirect costs among firms.

An indication for the 'state of the art' of the cost accounting system used could be the average number of different allocation bases used by a firm. Table 15 summarizes the results.

Group 1	Group 2	Group 3	Total
2,32	2,25	2,45	2,31

Table 15: Average number of allocation bases

Although a higher average number of allocation bases in group 3 indicates some support for a more state of the art cost accounting system, the actual difference is in our opinion too insignificant to really discriminate between group 1 and 3.

The final questions of this part of the analysis focussed on the frequency with which the cost accounting system is evaluated and the use that is made of it.

In order to remain accurate a cost accounting system should be evaluated periodically. This prevents it from becoming outdated due to significant changes in the environment of firms. Firms were asked to indicate whether or not their cost accounting system was periodically evaluated. Table 16 summarizes the outcomes of this question.

Evaluation	Group 1	Group 2	Group 3	Total
Yes	75%	67%	62%	67%
No	25%	33%	38%	33%

Table 16. Periodic evaluation of the cost accounting system

Even without some statistic test it is evident that there is a significant difference between the three groups. Though significant it does not support our hypothesis. On the contrary, the group characterized by a more or less 'obsolete' cost accounting system also evaluates its cost accounting system more frequently.

If the number of Cooper's symptoms subscribed is indicative for the accurateness of the cost information produced we would expect a less intensive use of cost information among group 1 companies. We therefore asked which analyses based on cost information are usually made (appenidx 4 describes the set of possibilities that were included in the questionnaire). Table 17 summarizes the average number of analyses for each group and the total population.

Group 1	Group 2	Group 3	Total
6,90	7,58	7,59	7,45

Table 17: Number of different analyses

The small difference between group 1 and the other groups slightly supports the hypothesis.

6. Perceived usefullness of the available cost information

The last part of the questionaire focussed on the perceived usefullness of the cost information generated. We asked the respondents to score the usefullness of cost information as a mean of support in managerial decision making. In this we hypothesized that obsolete cost system would not support decisions like price setting, performance evaluation of departments and processes, capital budgetting decisions, make or buy, product or proces development related problems and decisions related to the withdrawal of products. When testing for the perceived usefullness of cost information there is always the chance of testing biased information. Though the bias in the information gathered cannot be excluded completely, it is our opinion that by distinquishing between 'users' (financial or general managers) and 'producers' (controllers) we would at least expect a more accurate picture on the usefullness tested. We expected to find the producer of cost information to have a more positive opinion about the cost information produced, whereas the user of the information would have a more moderate opinion.

The first managerial decision for which we tested the perceived usefullness of the cost system was price setting. Table 18 shows the percentage of the respons in five categories: -- very useless, - useless, +/- marginally useful, + useful, ++ very useful.

	Group 1	Group 2	Group 3	Total
--	4 %	4 %	3 %	4 %
-	3 %	8 %	15 %	9 %
-/+	18 %	19 %	16 %	19 %
+	44 %	38 %	37 %	39 %
++	31 %	31 %	25 %	30 %
Significance	0,32	0,99	0,17	1,00

Table 18. Usefullness of cost information in price setting

Correspondence between group 1 and 3: 0,01

We expected to find that the respons of firms in group 1 would show a distribution among the five classes indicating relatively less usefulness when compared with the total population. This however was not supported. No significant differences were found in the distribution among classes between the three groups. If we test group 1

against group 3 we do find a significant difference. This however shows a reversed outcome in relation to what we expected to find.

In addition to a classification by groups we further differentiated the respons by users and producers. Table 19 summarizes the results:

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	0 %	3 %	6 %	4 %
-	4 %	10 %	3 %	16 %
-/+	13 %	17 %	24 %	18 %
+	42 %	33 %	48 %	42 %
++	42 %	37 %	18 %	21 %
Significance	0,0083/tot	0,54/tot	0,010/tot	0,08/tot

Table 19. Usefullness of cost information in price setting differentiated by user and producer

Correspondence between group 1 users and 3 users is 0,0305
Correspondence between group 1 producers and 3 producers is 0
Correspondence between group 1 users and total group 1 is 0
Correspondence between group 1 producers and total group 1 is 0
Correspondence between group 3 users and total group 3 is 0,098
Correspondence between group 3 producers and total group 3 is 0,81

Where there is no significant difference between the distribution of respons among each group, we do experience a significant difference between group 1 users and group 1 producers of which the user group is significantly more optimistic. This is in contradiction with our expectations on the perception of the accurateness of the cost information generated.

In appendix 1 we give the responses on the other questions regarding the perceived usefullness of cost information in managerial decision making. This analysis indicates a somewhat controversial picture. In some instances we do find support for both hypotheses, while in others we do not.

7. Concluding remarks

Given the evident shortcommings of this kind of empirical research the conclusivenss of the outcomes is limited. A more profound view on the outcomes thus far could possibly be arrived at by expanding the study to include e.g. interviewing several of the respondents.

Considering the preliminary results this far we found only a slight correlation between Cooper's symptoms and the dynamics of the environment. This also holds true for the correlation between the perceived usefulness of the cost accounting system and the Cooper's symptoms. Only a slight correlation was found for some of the individual symptoms.

The results of the study are of a somewhat ambiguous nature. In some cases we did find, however small, support for the hypothesis derived from Cooper's symptoms of outdated cost systems. Only in a few cases did we truely find a significant difference in the distribution of responses of a single group compared with the total group (which was defined as the null-hypothesis). Significance was also found when comparing subsamples (group 1 versus group 3). In other cases, where support was expected it was either absent or even reversed in nature.

We found some support for:

1) the hypothises that the accuracy of cost information is in general more sensitive for industrial markets than it is for consumer markets (table 5).
2) a possible correspondence between the state of the art of the cost accounting system and the trend in sales **combined** with the trend in profits (table 6 and 7 and appendix 2).
3) somewhat of a similar correspondence between the accurateness of cost information and the development in the number of competitors **combined** with the development in market share (table 9 and 10).
4) a significant difference in the strategic positioning of group 1 and group 3 firms which could at least in part be explained by the relatively high number of firms in group 1 opting for the category 'other strategies' which is more heterogenuous in nature and possibly even contradictory. This supports the idea that distorted cost information could results in non-optimal strategic decisions (table 12).

Finally we found a rather unbalanced pattern among the perception of the usefuliness of available cost information for managerial decision making (see table 18 and 19 and appendix 1).

Appendix 1: Perceived usefullness of cost information in managerial decision making

Perceived usefullness of cost information in evaluating the performance of departments.

	Group 1	Group 2	Group 3	Total
--	3 %	4 %	3 %	3 %
-	13 %	9 %	15 %	11 %
-/+	16 %	32 %	18 %	26 %
+	39 %	40 %	43 %	40 %
++	29 %	16 %	21 %	20 %
Significance	0,08	0,58	0,38	1,00

Usefullness of cost information in evaluating the performance of departments differentiated by user and producer

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	4 %	7 %	3 %	2 %
-	13 %	14 %	16 %	14 %
-/+	13 %	0 %	16 %	26 %
+	39 %	43 %	44 %	40 %
++	40 %	36 %	22 %	18 %
Significance	0,016/tot	0,00../tot	0,151/tot	0,852/tot

Correspondence between group 1: users and 3: users is 0,0019
Correspondence between group 1: producers and 3: producers is 0,094
Correspondence between group 1 users and total group 1 is 0,91
Correspondence between group 1 producers and total group 1 is 0,55
Correspondence between group 3 users and total group 3 is 0
Correspondence between group 3 producers and total group 3 is 0,33

Perceived usefullness of cost information in evaluating the performance of manufacturing processes.

	Group 1	Group 2	Group 3	Total
--	1 %	4 %	4 %	3 %
-	11 %	11 %	12 %	11 %
-/+	20 %	33 %	16 %	26 %
+	34 %	35 %	49 %	38 %
++	33 %	17 %	19 %	21 %
Significance	0,04	0,52	0,105	1,00

Usefullness of cost information in evaluating the performance of manufacturing processes differentiated by user and producer

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	0 %	10 %	3 %	2 %
-	4 %	7 %	18 %	15 %
-/+	22 %	3 %	18 %	22 %
+	43 %	57 %	30 %	44 %
++	30 %	23 %	30 %	18 %
Significance	0,013/tot	0,00../tot	0,014/tot	0,44/tot

Correspondence between group 1: users and 3: users is 0,00..
Correspondence between group 1: producers and 3: producers is 0,011
Correspondence between group 1 users and total group 1 is 0,08
Correspondence between group 1 producers and total group 1 is 0,052
Correspondence between group 3 users and total group 3 is 0
Correspondence between group 3 producers and total group 3 is 0,33

Perceived usefullness of cost information in capital budgetting decisions

	Group 1	Group 2	Group 3	Total
--	3 %	3 %	1 %	2 %
-	6 %	7 %	7 %	7 %
-/+	35 %	28 %	23 %	28 %
+	36 %	51 %	45 %	47 %
++	20 %	10 %	23 %	16 %
Significance	0,20	0,54	0,34	1,00

Correspondence between group 1 and 3: 0,08

Usefullness of cost information in capital budgetting decisions differentiated by user and producer

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	5 %	0 %	3 %	2 %
-	9 %	7 %	3 %	9 %
-/+	32 %	25 %	42 %	19 %
+	45 %	43 %	33 %	46 %
++	9 %	25 %	18 %	25 %
Significance	0,07/tot	0,10/tot	0,0067/tot	0,07/tot

Correspondence between group 1: users and 3: users is 0,0002
Correspondence between group 1: producers and 3: producers is 0
Correspondence between group 1 users and total group 1 is 0,02
Correspondence between group 1 producers and total group 1 is 0,50
Correspondence between group 3 users and total group 3 is 0,84
Correspondence between group 3 producers and total group 3 is 0,65

Perceived usefullness of cost information in make or buy decisions

	Group 1	Group 2	Group 3	Total
--	3 %	3 %	5 %	2 %
-	10 %	12 %	15 %	7 %
-/+	33 %	31 %	24 %	28 %
+	43 %	42 %	40 %	47 %
++	10 %	13 %	16 %	16 %
Significance	0,26	0,24	0,0042	1,00

Correspondence between group 1 and 3: 0,04

Usefullness of cost information in make or buy decisions differentiated by user and producer

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	5 %	0 %	3 %	8 %
-	18 %	12 %	9 %	19 %
-/+	18 %	12 %	39 %	25 %
+	55 %	54 %	36 %	36 %
++	5 %	23 %	12 %	13 %
Significance	0,00../tot	0,0008/tot	0,06/tot	0,00../tot

Correspondence between group 1: users and 3: users is 0,000005
Correspondence between group 1: producers and 3: producers is 0,00006
Correspondence between group 1 users and total group 1 is 0,0004
Correspondence between group 1 producers and total group 1 is 0,60
Correspondence between group 3 users and total group 3 is 0,0006
Correspondence between group 3 producers and total group 3 is 0,42

Perceived usefullness of cost information in process development related questions

	Group 1	Group 2	Group 3	Total
--	10 %	5 %	7 %	7 %
-	26 %	18 %	20 %	20 %
-/+	32 %	32 %	28 %	31 %
+	26 %	38 %	39 %	36 %
++	6 %	7 %	6 %	6 %
Significance	0,21	0,90	0,97	1,00

Correspondence between group 1 and 3: 0,09

Usefullness of cost information in process development related questions differentiated by user and producer

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	9 %	4 %	12 %	9 %
-	35 %	12 %	18 %	25 %
-/+	26 %	31 %	42 %	30 %
+	30 %	42 %	24 %	34 %
++	0 %	12 %	3 %	2 %
Significance	0,0006/tot	0,02/tot	0,01/tot	0,33/tot

Correspondence between group 1: users and 3: users is 0
Correspondence between group 1: producers and 3: producers is 0,02
Correspondence between group 1 users and total group 1 is 0,03
Correspondence between group 1 producers and total group 1 is 0,11
Correspondence between group 3 users and total group 3 is 0,03
Correspondence between group 3 producers and total group 3 is 0,26

Perceived usefullness of cost information in product development related questions

	Group 1	Group 2	Group 3	Total
--	11 %	5 %	9 %	7 %
-	24 %	20 %	23 %	22 %
-/+	21 %	30 %	27 %	27 %
+	34 %	37 %	36 %	36 %
++	10 %	8 %	6 %	8 %
Significance	0,35	0,89	0,89	1,00

Correspondence between group 1 and 3: 0,43

Usefullness of cost information in product development related questions differentiated by user and producer

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	13 %	4 %	12 %	13 %
-	30 %	11 %	18 %	30 %
-/+	22 %	33 %	24 %	22 %
+	30 %	48 %	38 %	28 %
++	4 %	4 %	9 %	7 %
Significance	0,02/tot	0,007/tot	0,30/tot	0,03/tot

Correspondence between group 1: users and 3: users is 0,005
Correspondence between group 1: producers and 3: producers is 0,06
Correspondence between group 1 users and total group 1 is 0,20
Correspondence between group 1 producers and total group 1 is 0,63
Correspondence between group 3 users and total group 3 is 0,005
Correspondence between group 3 producers and total group 3 is 0,15

Perceived usefullness of cost information in questions related to the withdrawal of products.

	Group 1	Group 2	Group 3	Total
--	12 %	6 %	7 %	7 %
-	18 %	15 %	22 %	17 %
-/+	28 %	32 %	26 %	30 %
+	27 %	36 %	36 %	34 %
++	15 %	12 %	9 %	12 %
Significance	0,20	0,96	0,58	1,00

Correspondence between group 1 and 3: 0,03

Usefullness of cost information in questions related to the withdrawal of products differentiated by user and producer

	Group 1: users	Group 3: users	Group 1: producers	Group 3: producers
--	22 %	4 %	3 %	9 %
-	13 %	25 %	23 %	18 %
-/+	30 %	21 %	23 %	29 %
+	22 %	39 %	39 %	35 %
++	13 %	11 %	13 %	9 %
Significance	0,00../tot	0,07/tot	0,14/tot	0,04/tot

Correspondence between group 1: users and 3: users is 0,00..
Correspondence between group 1: producers and 3: producers is 0,06
Correspondence between group 1 users and total group 1 is 0,026
Correspondence between group 1 producers and total group 1 is 0,006
Correspondence between group 3 users and total group 3 is 0,50
Correspondence between group 3 producers and total group 3 is 0,80

Appendix 2: Sales versus profit analysis

Sales versus Profit: Total

	−−	−	−/+	+	++
−−	4.9%	0.3%	0.3%	0.0%	0.3%
−	2.0%	2.3%	0.9%	0.0%	0.6%
+/−	1.4%	3.4%	13.8%	4.0%	2.0%
+	0.0%	2.3%	8.9%	9.2%	8.3%
++	0.9%	0.6%	5.5%	6.6%	21.6%

Sales versus Profit: Group 1 1

	−−	−	−/+	+	++
−−	3.2%	0.0%	1.6%	0.0%	0.0%
−	3.2%	1.6%	0.0%	0.0%	0.0%
+/−	1.6%	3.2%	16.1%	4.8%	1.6%
+	0.0%	3.2%	4.8%	11.3%	3.2%
++	0.0%	1.6%	9.7%	6.5%	22.6%
Significance:		0.01			

Sales versus Profit: Group 3 1

	−−	−	−/+	+	++
−−	8.2%	1.2%	0.0%	0.0%	0.0%
−	1.2%	3.5%	0.0%	0.0%	2.4%
+/−	2.4%	5.9%	10.6%	3.5%	2.4%
+	0.0%	1.2%	9.4%	4.7%	12.9%
++	0.0%	0.0%	0.0%	10.6%	20.0%
Significance:		0.1			

1

Correspondence between Group 1 and Group 3: 0.001