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Application Patterns of Life Cycle Assessment within German Companies. - Results and Conclusions of a Survey -

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**Application Patterns of Life Cycle Assessment
within German Companies.**

- Results and Conclusions of a Survey -

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0 Executive Summary

This paper covers part of the research project „The Use of LCA's in Business Decision-making Processes and its Implications for Environmental Policy“ supported by DG XII within the „Climate and Environment“-Programme of the European Community.

Within this project, surveys on the application of Life Cycle Assessment (LCA) - studies have been carried out within Germany, Italy, Sweden and Switzerland using a questionnaire with a standardised structure for all four countries. The questionnaire consists of 5 parts:

- I. General information on the company,
- II. The company and environmental matters,
- III. Product innovation and the environment,
- IV. The use of LCA,
- V. Future public environmental policy in the area.

This paper reports on the German survey in which the questionnaire was sent to 410 companies. 101 (i.e. 25%) answered by filling out and sending back the questionnaire.

The report provides information on some general aspects of all companies. The essential element of the report is a division of all companies into two groups:

1. companies using LCA's
2. companies not using LCA's.

62 companies responding belonged to the first group and 39 to the second. According to this distinction, we describe the relationship between the existence/use of LCA and clients/markets, size, environmental management system, environmental strategies, stakeholder pressures, drivers, functions involved, environmental tools used and perception of environmental measures.

However, a lot of different aspects relate to the existence of LCA within companies. The practices and experiences of the 62 companies which indicated they use LCA are reported in another chapter of this report. We describe pushing factors, current and promising future application areas of LCA's, ??? degree of environmental assessments of products, functions involved in LCA-studies, performer of LCA's, problems, obstacles, balances between costs and benefits, surprises and increase/decrease of LCA-applications.

The report ends by fitting together the different information and results and presents some conclusions on the state of application of LCA-studies within German companies. An essential conclusion is that there are some gaps between the methodological discussions on LCA within the scientific communities and restricted possibilities of companies to apply this tool within environmental management and product development.

1 Preface¹

This report is a part of the research results within the project „The Use of LCA's in Business Decision-making Processes and its Implications for Environmental Policy“ supported by DG XII within the „Climate and Environment“-Programme of the European Community. The project is carried out by five institutes:

- Institut für ökologische Wirtschaftsforschung gGmbH, Heidelberg (Germany) (also the co-ordinator of the whole project);
- Istituto Ricerche Ambiente Italia, Milano (Italy);
- Gothenburg Research Institute, Gothenburg (Sweden);
- Institute for Prospective Technological Studies of the European Commission-Joint Research Centre, Seville (Spain);
- ökoscience Beratung AG, Zurich (Switzerland).

The objectives of this project are to

- make a comprehensive inventory of LCA applications;
- examine the role of LCA techniques within business decision making;
- identify the factors influencing this role negatively and positively (barriers and opportunities);
- examine the links of business decisions-making with implications for environmental policy and analyse the relevance of LCA for public environmental policy.

Altogether, the research focuses on two key issues:

- i) On one hand, the project concentrates on the use of LCAs within business decision making processes. The influence of LCAs on business decision-making processes is analysed within the framework of this project.
- ii) On the other hand, the project considers the policy relevance of LCA. This means that the expectations of business on policy-making activities and of policy makers on business use of LCA are examined.

The **first issue** is explored through a set of at least 20 case-studies of the use of LCA in business (selected countries: Germany, Italy, Sweden, Switzerland). These case-studies include enterprises of different branches and sizes. This part is supplemented by a survey of environmental product management in the four countries which is the subject of the present paper. The **second issue** is explored through the examination of the European environmental policy with a specific focus to product-oriented environmental policy and analysis of the role LCA plays in the European environmental policy portfolio and in selected policy areas.

This paper reports on the German results of the survey that was used in the first above mentioned issue. The survey was carried out in spring 1997 according to a questionnaire that was standardised

¹ I wish to thank Stephan Busch and Patrick Lentz for their support and also Ralf Antes, Alexandra Bültmann, Eckart Hildebrandt and Gerd Scholl for their helpful comments.

and used for Germany, Italy, Sweden and Switzerland; its German version is attached to this report as Annexe². The structure of the final version used was standardised according to a project-internal agreement based on a paper prepared by Ambiente Italia (Frankl 1997). The overall results for all four countries have also been published (Frankl/Rubik 1998).

In **Chapter 2**, we report on selection of companies, process and methods of evaluation.

Chapter 3 describes generally the sample of returned questionnaires.

Chapters 4-7 focus on a deeper analysis of to four general questions:

- Which motivations are important to explain the use of LCA in companies? (**Chapter 4**)
- In which ways do companies apply LCA? (**Chapter 5**)
- Who joins LCA-work within companies with which problems? (**Chapter 6**)
- How is future of LCA regarded (**Chapter 7**)

Chapter 8 looks to the relationship between LCA, other tools and product innovation.

Chapter 9 contains conclusions on survey findings .

The detailed statistical information is contained in *annexes* in **Chapter 10** to the report.

2 Methodology

In this chapter, we describe first the methods and procedure for carrying out the survey. Afterwards, the general results for all companies responding are presented.

2.1 The questionnaire

The questionnaire was put together by all partners of the project team. Its German version was prepared by IÖW in co-operation and communication with Oekoscience. It consists of five parts:

- I. General information on the company,
- II. The company and environmental matters,
- III. Product innovation and the environment,
- IV. The use of LCA,
- V. Future public environmental policy in the area.

The selection method for companies will be described later(see subchapter 2.2).

Returned questionnaires were collected and recorded using MS-Access 7.0. A statistical analysis is restricted to a descriptive statistic; it has been carried out by using SPSS for Windows.

² An English version is available on request.

2.2 Selection of companies

In each of the four countries, it was agreed that approximately 400 different companies would be selected. According to this agreement, we chose 410 companies in Germany for the German survey. It was decided to look on two groups: on companies who are very active in the environmental area and on larger companies:

1. Environmentally oriented companies: They were selected according to one of the following criteria:

- Enterprises that delivered environmental business reports. More than 200 enterprises have carried out such a task. Clausen/Fichter (1996) from IÖW prepared a ranking of 98 environmental reports with the basis year 1995. We decided to take these enterprises in our sample they being better than the average.
- One criterion of this ranking list was whether companies report on product specific characteristics. We included those enterprises in our sample which were better than the average with respect to this criterion (ignoring if they were worse than the average on all criteria).
- All enterprises that carried out or plan to carry out an LCA-study. The companies are identified on the basis of the result of our survey within step 2.1 - Rubik (1996).
- Per random selected enterprises of German „green“ industrial associations (UnternehmensGrün, B.A.U.M. - Bundesdeutscher Arbeitskreis umweltbewußtes Management, future).
- Selected enterprises that won an environmental prize in the past. The prizes considered are prizes of the German Federation of Industry [BDI] and of DG XI of the EC.
- Selected enterprises that were clients of IÖW in the past.

Altogether, we selected 200 companies within this group.

2. The second group consists of two subgroups: largest companies and largest banks. They were selected according to their turnover in 1996. The information was provided by a database of the "Frankfurter Allgemeine Zeitung" newspaper (FAZ 1997) which contains a statistic on the turnover of these companies.

We distinguished between "ordinary" large companies and large banks for a clearer presentation.

Altogether, we selected 210 companies within this group.

These two groups were selected with the objective to get more insights in the LCA-activities of German companies. The criteria which we used for the selection of the companies had sometimes the result that companies belong to both groups, namely large companies which carry out LCA-studies for example. Due to our objective (getting inside in the LCA-activities), we decided not to separate the two groups.

2.3 Process

The mailing began in April 1997. If available, questionnaires were sent either to persons within the companies known to IÖW or to environmental departments.

Two reminder actions were conducted:

- a first phone-call action carried out between May 15th and 25th.
- a second phone-call action carried out between June 9th and 13th.

In some cases, questionnaires were sent a second time.

2.4 Responses

In total, 101 questionnaires were returned.

Table 2.1: Statistics on sent and returned questionnaires

Types	Questionnaires sent	Questionnaires returned	Return rate
1. Environmentally oriented companies	200	59	30%
2a. Biggest companies	190	36	19%
2b. Biggest banks	20	6	30%
Sum	410	101	25%

Some companies informed us that they would not be responding to the questionnaire. Reasons given were inter alia

- the questionnaire was too detailed,
- time constraints,
- no tendency to be involved in the area of LCA.

2.5 Method of evaluation

The questionnaire consisted out of 35 questions. All questions were closed questions. The majority of them were multiple-choice-questions offering several answer possibilities and allowing several answers; the number of allowed answers fluctuated among the questions. Some questions offered rankings starting with „None“ and ending with „Crucial“.

Generally, companies which did not answer a question or a part of one question have been treated as refusal - but only with regard to the specific question respectively subquestion. Refusals have been excluded from any calculation, but have been reported to estimate their importance.

Questions with a ranking have been weighted according to the following method: allocation points to the different answer possibilities (non = 1 point, low = 2 points, medium = 3 points, influential = 4

points, crucial = 5 points). Refusals have been excluded. The average values have been calculated by the following formula:

$$\text{Average value} = (1 \cdot x_i + 2 \cdot x_j + 3 \cdot x_k + 4 \cdot x_l + 5 \cdot x_m) / (x_i + x_j + x_k + x_l + x_m)$$

I.e. refusals and „Don't know“ answers have not been taken in consideration in these calculations and calculating averages.

Any analytical statistic evaluation has not taken place; however, a descriptive statistics has been carried out. For this purpose, the companies have been separated into two groups according to a filtering question:

- companies which declared to use LCA
- companies which declared **not** to use LCA

3 General description of the returned questionnaires

In this chapter, we report on some details of the questionnaires we received back.

3.1 National or international corporation?

The companies have been asked if the company is a part of a national or international corporation. More than half of the companies belong to German corporations. The remaining companies are part of multinational corporations.

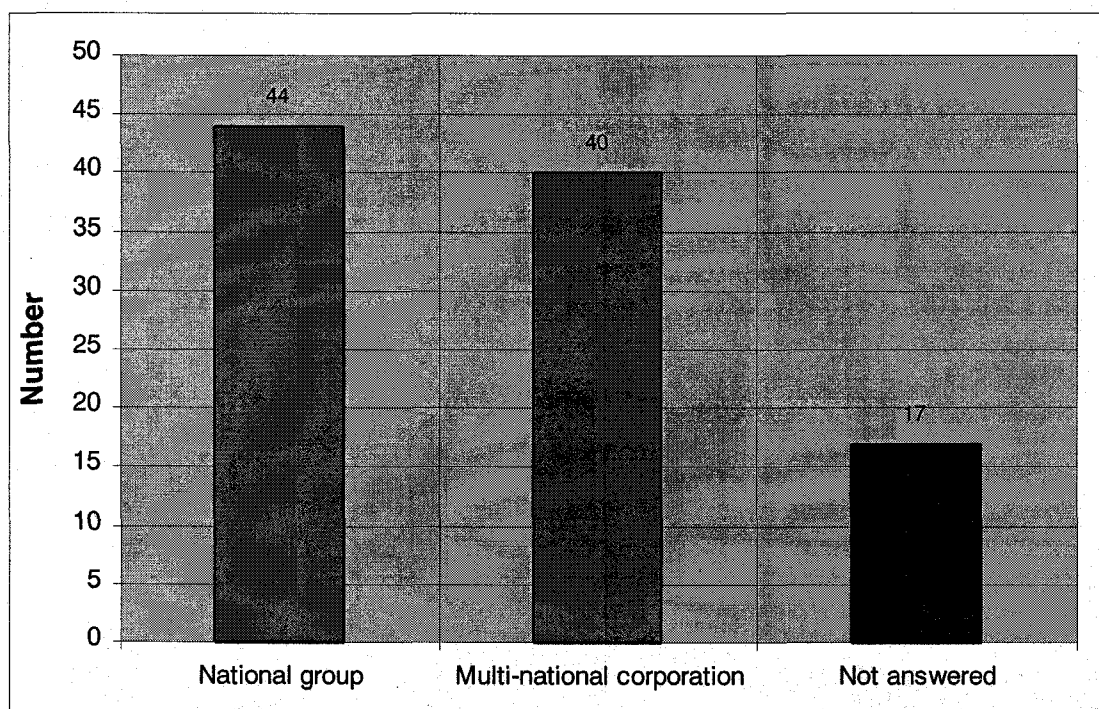


Figure 3.1: (Inter-)nationality of companies [absolute number]
(N= 101; 17 refusals)

3.2 Sectors

The sectoral background of the company might be useful. However, quite often discrepancies between the „official“ sector to which a company belongs and the sector indicated by the person who answered a questionnaire might exist. Therefore, the allocation of companies to sectors has been carried out by IÖW based on information of Hoppenstedt (1995 a and 1995b).

As the relevant sectoral classification, we used the European NACE-classification (Eurostat 1996). However, we decided to aggregate different sectors. The results are presented in the following table.

Table 3.1: Sectors of companies answering [after branch aggregation]
[N= 101; no refusal]

Code	Number of companies	Sector description
1	1	Agriculture, hunting, forestry, fishing
2	12	Manufacture of food products; beverages and tobacco
3	5	Manufacture of textiles / textile products, leather and leather products
4	5	Manufacture of pulp, paper and paper products; publishing and printing
5	3	Manufacture of coke, refined petroleum products and nuclear fuel
6	16	Manufacture of chemicals, chemical products and man-made fibres ♦
7	5	Manufacture of rubber and plastic products
8	7	Manufacture of machinery and equipment in E.C.
9	9	Manufacture of electrical and optical equipment
10	4	Manufacture of transport equipment
11	14	Other industries
12	3	Construction
13	8	Trade
14	9	Other services
Total	101	

3.3 Clients and markets

The companies have been asked for important clients and markets to whom they sell their products³.

³ Several answers have been possible.

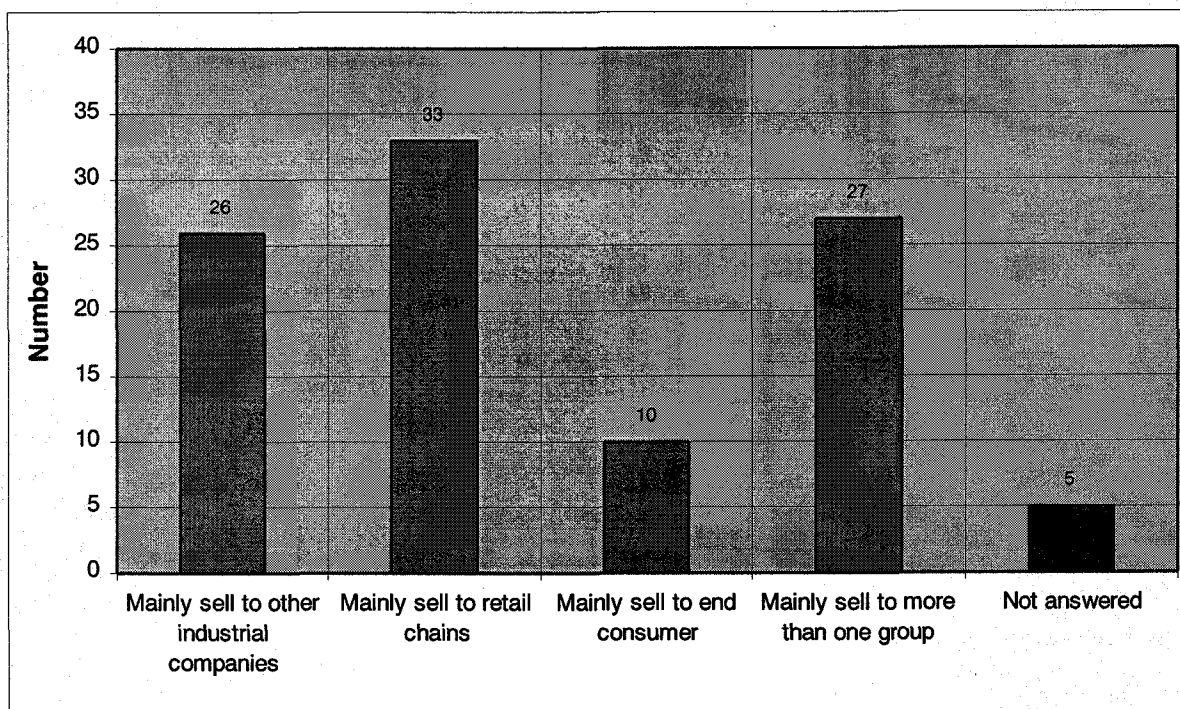


Figure 3.2: Clients and markets [absolute number]
(N= 101; 5 refusals)

26 of the companies sell their products to other industrial companies, 33 (34%) to retail chains and only 10 (10%) directly to final consumers. However, 27 (27%) of the companies indicated to sell their products to more than one client group⁴.

3.4 Size

The number of employees is also useful information⁵. Most of the companies answering are large enterprises. Only 14% are SME's⁶.

⁴ 5% of the companies did not answer this question. The percentages above are so called 'valid' percent and therefore sum up to 100%.

⁵ One answer to this question was possible.

⁶ According to the criterion "number of employees below 250". One also has to keep in mind that at least 50% of the companies in the sample have to be large companies according to the selection method.

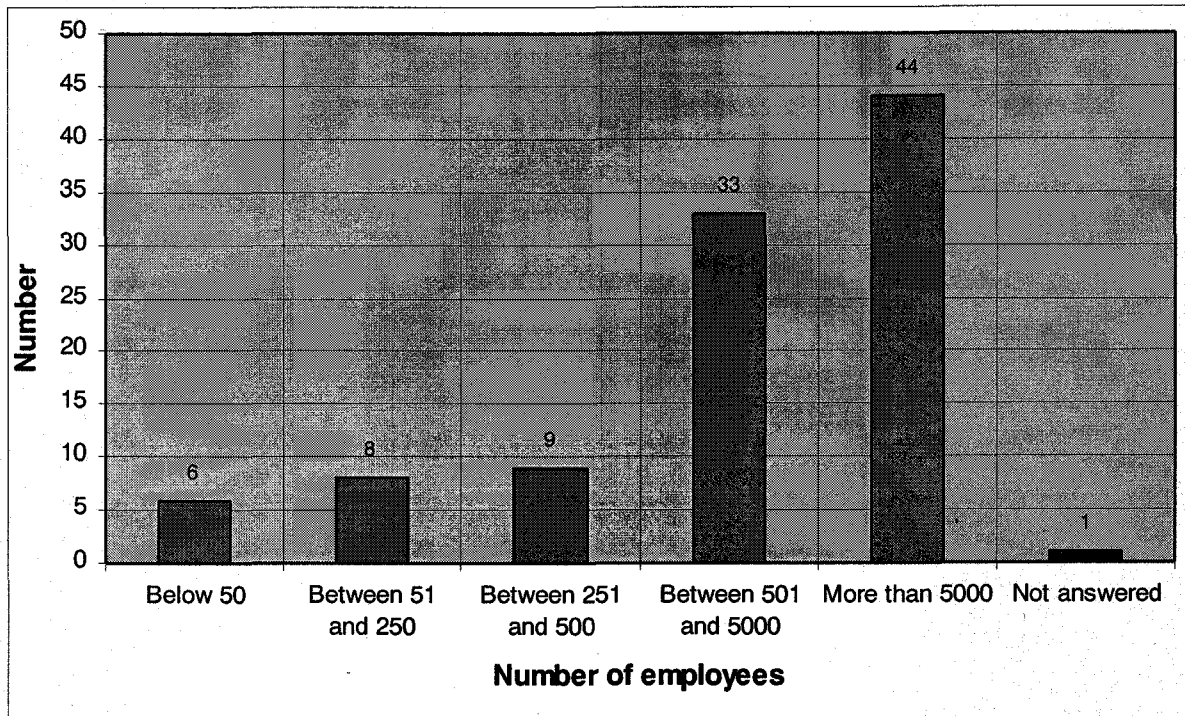


Figure 3.3: Size of companies according to number of employees [absolute number]
(N=101; 1 refusal)

3.5 Strategy of the company

We asked for an opinion on the environmental strategy of the company⁷. The environmental strategy of the company is rated in nine cases as compliance, in 51 (that is about 50%) as proactive and in 32 cases as pioneering and eco-innovative. Nine companies did not answer this question.

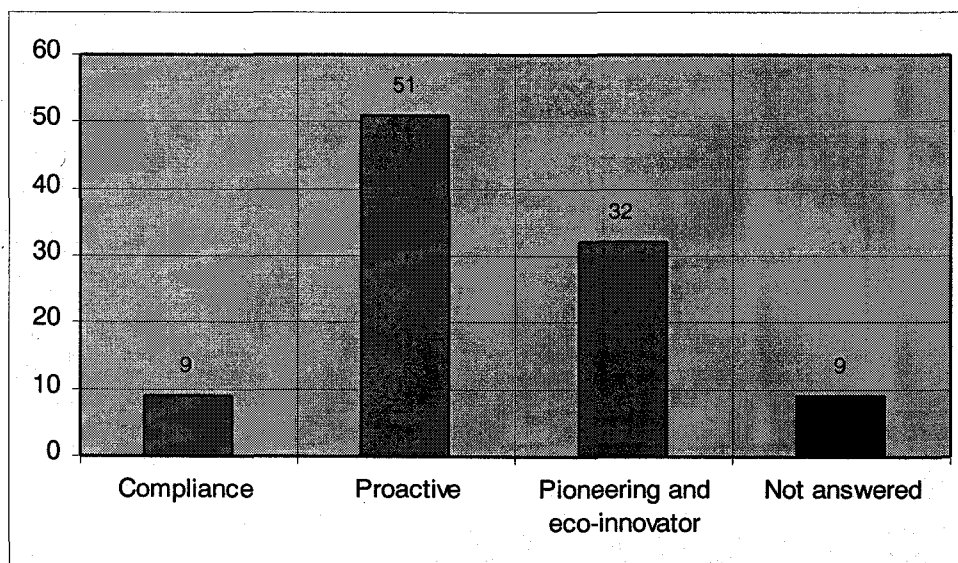


Figure 3.4: Environmental strategies [absolute number]
(N=101, 9 refusals)

⁷

One answer to this question was possible.

3.6 Sufficient business measures

We asked for an opinion whether actions undertaken by the company were sufficient to be ready or if more activities of environmental management would be necessary⁸?

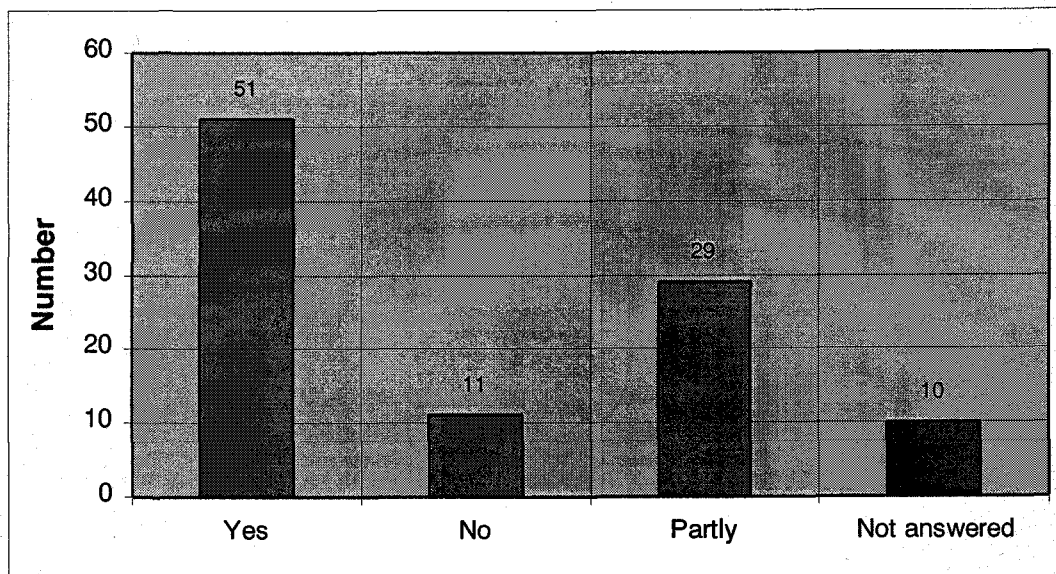


Figure 3.5: Judgement of sufficiency of business' measures
(N=101; 10 refusals)

Most of the respondents (51%) think that actions undertaken by their companies are sufficient. In contrast to this, 11 answered that the actions are not sufficient and 29 regard them as partly sufficient and presented the following explanations (excerpt):

- more exact and detailed reporting of data
- energy management
- product take-back-system
- decided actions are not completely sufficient
- ecological product innovation
- implementation of environmental management system
- continuous improvement

4 Motivation and LCA

In this chapter, we report on the motivations for starting LCA's within companies. The environmental concerns (see section 3.1), the relationship between the application of LCA and EMAS (see section 3.2), the importance of different stakeholders (see section 3.3), the clients and markets (see section 3.4) and the drivers for starting LCA's (see section 3.5) are described.

⁸ One answer to this question were possible.

4.1 Environmental concerns

Companies were asked for their environmental concerns and their importance. The answers were considered for companies using and not using LCA.

Comparing the results based on weighted averages⁹, one can conclude that LCA-applying companies perceive - in general - environmental problems more than companies that do not apply LCA's.

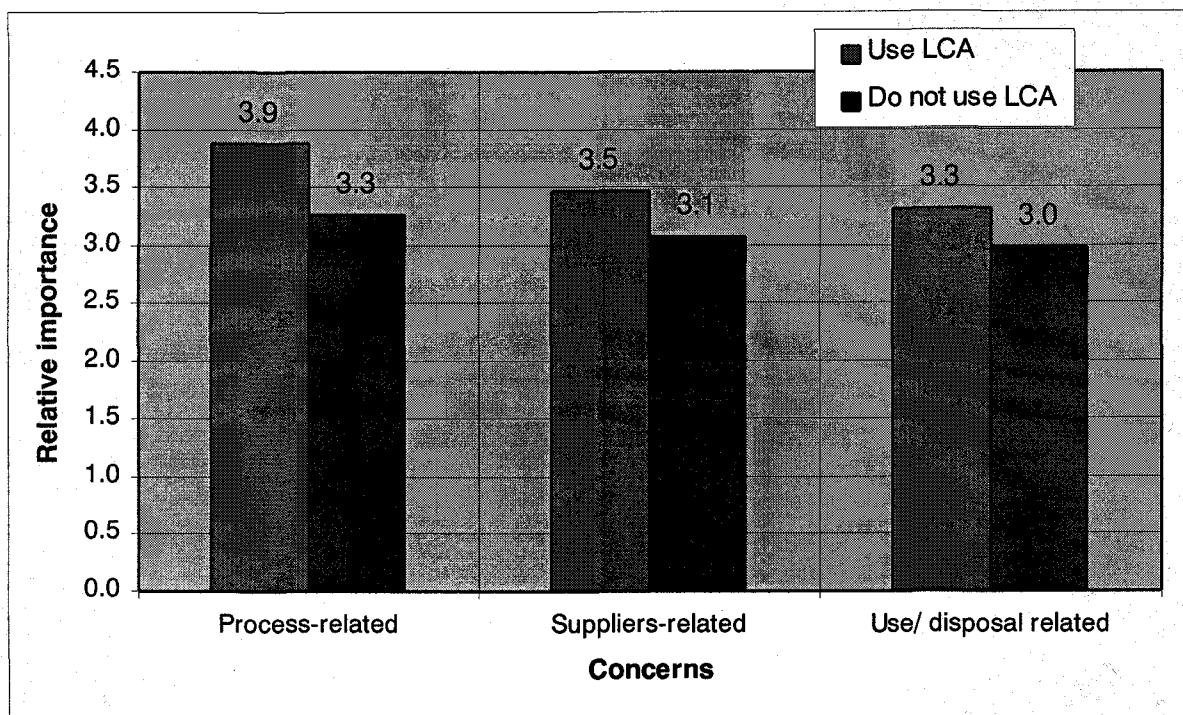


Figure 4.1: Environmental concerns and LCA activities - relative importance [excluding refusals] (N=101; 1-2 refusals)

In addition to that, there is in general a hierarchy of focus: first processes, then suppliers-related concerns and the use and disposal-related concerns. LCA-companies have - in general - a stronger perception of environmental concerns than companies not using LCA. One might conclude that environmentally consciousness seems to be a necessary but not sufficient condition for LCA.

4.2 Management systems

Different management systems exist. We queried the existence of an environmental, of a quality and of a risk/health management system¹⁰.

More than 50% (57 companies) of the companies responding claimed to have an environmental management system. Only 13 do not have it, 29 plan to introduce it. It seems as if a lot of companies use or plan to introduce an environmental management system. Also quality management is very well

⁹ The refusals are excluded. A comparison between the two methods was carried out; the differences were modest (less than 0,15 points) and therefore not reported.

¹⁰ One answer for every management system was possible.

introduced: Nearly $\frac{3}{4}$ of all answers indicated it. Nearly $\frac{2}{3}$ of the companies responding indicated that they have a risk and occupational health and safety management system.

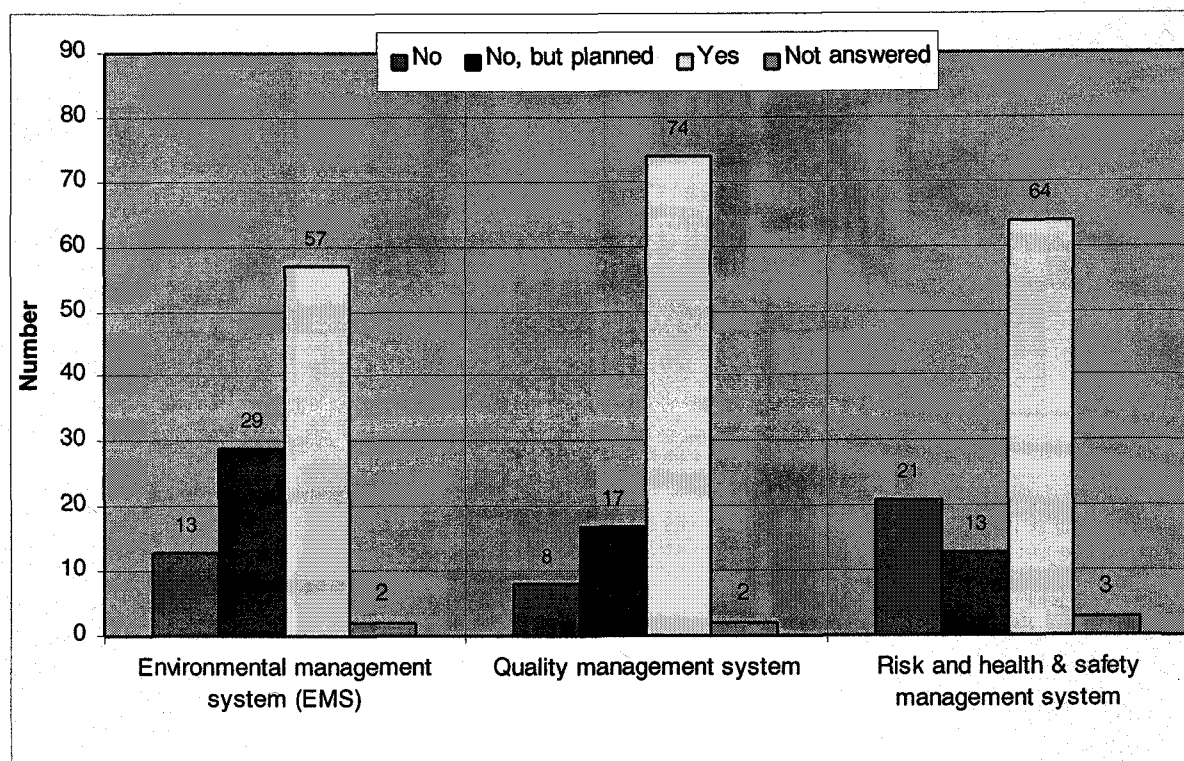


Figure 4.2: Management systems [absolute number]
(N=101; 2 to 3 refusals)

Looking on the both groups of companies (using LCA and not using LCA), the existence of an environmental management system does not influence the use of LCA if one takes together the actual existence and the plans to introduce it. The shares are nearly the same (67% and 60%).

However, one might also conclude that the existence of an environmental management system seems to be a necessary, but not sufficient condition for an LCA.

Table 4.1: Environmental management systems / LCA [absolute numbers]
(N=101, 2 refusals)

	Use LCA	Do not use LCA	Total:
No	8	5	13
No, but planned	14	15	29
Yes	38	19	57
Not answered	2	0	2
Sum:	62	39	

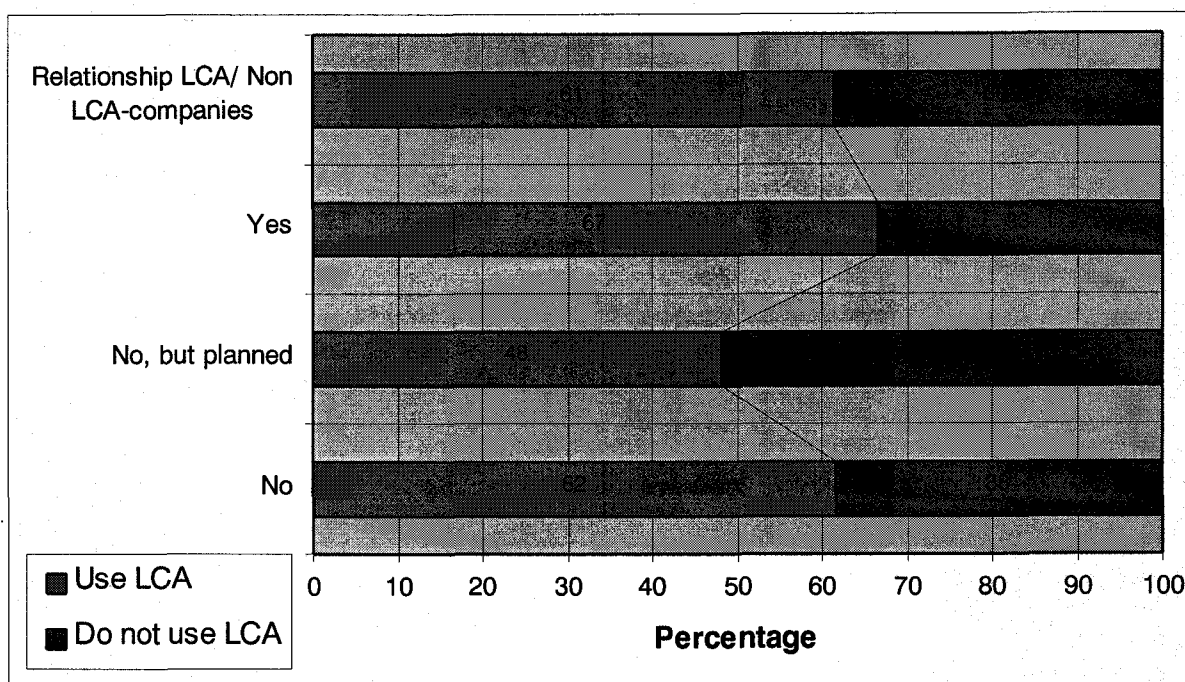


Figure 4.3: Environmental management systems and LCA activities [relative shares in %]
(N=101; 2 refusals)

4.3 Importance of stakeholders

The pressure of stakeholders is often a driver for environmental activities of business. Considerable differences between companies using and not using LCA's mostly do not exist. This statement is also valid for the estimation of the present and of the future. However, comparing the results, one recognises that LCA-using companies tend to rank some stakeholders (especially NGO's) higher than the non-LCA-using companies.

A weighting¹¹ of stakeholders reveals that policy-makers and the market are the most *current* important stakeholders influencing both groups of companies. The only difference between the two groups worth mentioning is the higher ranked influence of environmental and consumer groups by LCA-companies. The less important stakeholders are trade unions, local communities and banks/insurances.

Also the future influence of different stakeholders is ranked¹² in general higher by companies using LCA's than by companies not using them. Also the influence of the market seems to be estimated higher in the future.

¹¹ Method of weighting: allocation points to different answer possibilities (none= 1 point, low=2 points, medium=3 points, influential=4 points, crucial=5 points) and calculating averages.

The refusals are excluded from the calculation. A comparison revealed modest differences (< 0.18 points). For banks and insurances the difference is a little bit higher (<0,31 points).

¹² Method of weighting: allocation points to the different answer possibilities (none= 1 point, low=2 points, medium=3 points, influential=4 points, crucial=5 points) and calculating averages.

The refusals are excluded from the calculation. A comparison revealed differences (< 0.50 points).

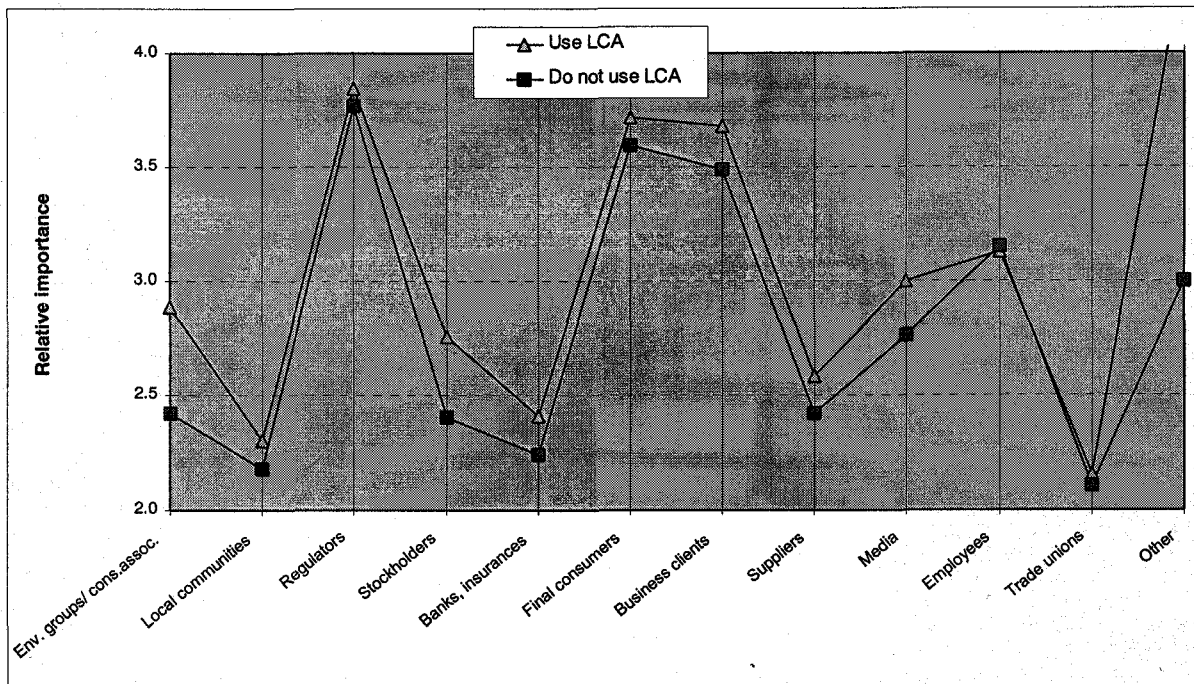


Figure 4.4: Comparison of **current** pressure of different stakeholders on LCA using and not using companies - relative importance [excluding refusals]¹³
(N=62 and 39)

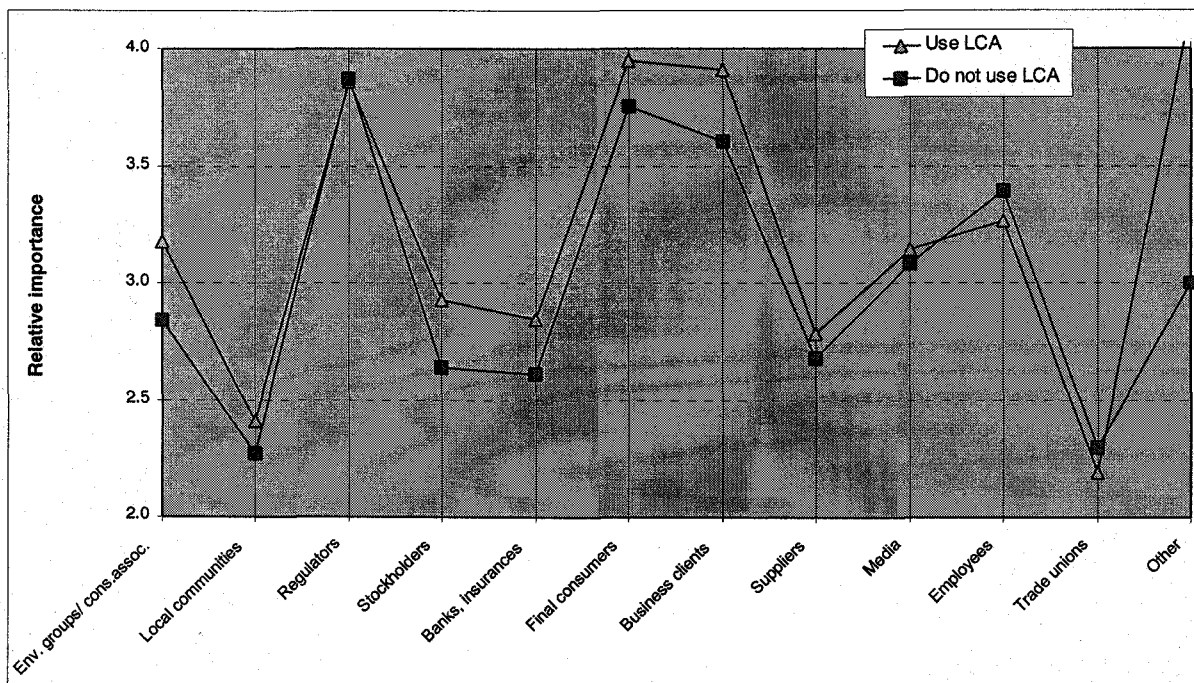


Figure 4.5: Comparison of **future** pressure of different stakeholders on LCA using and not using companies - relative importance [excluding refusals]
(N=62 and 39)

¹³ The group „Other“ consists of some stakeholders which have been listed additionally by the companies answering the questionnaire. In total, they are not important.

The pressure of different stakeholders is quite often ranked similarly between companies using and not using LCA's. Some differences exist: In general, companies using LCA's rank stakeholders higher than other companies. A remarkable difference exists in the case of environmental and consumer groups. Altogether, the market and the policy have the highest influence on both groups of companies.

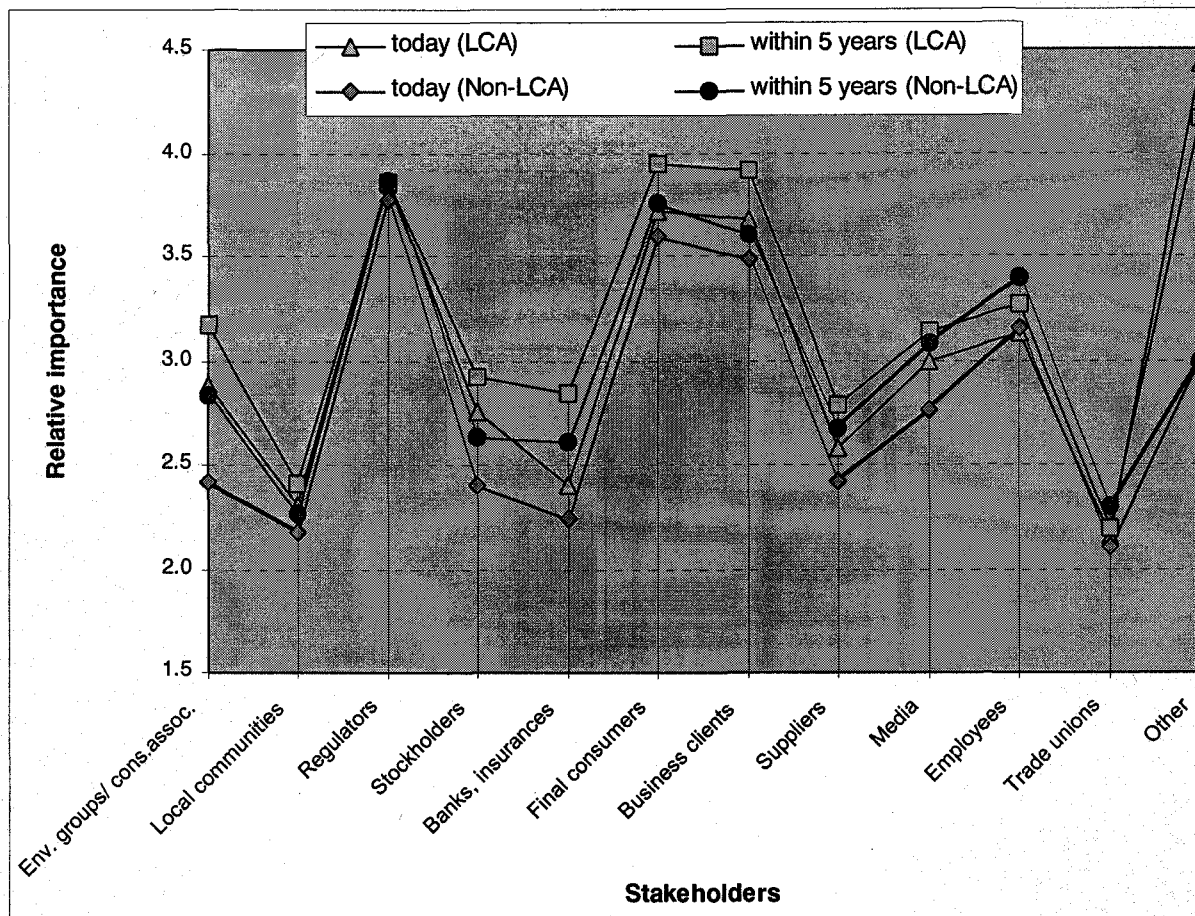


Figure 4.6: Stakeholder pressure for companies - relative importance [excluding refusals]¹⁴
(N=101)

4.4 Motivations for LCA (pushing factors)

A lot of different impulses to start LCA exist¹⁵. The most important pushing factors¹⁶ are cost saving opportunities (Ø 3.1). The second group of factors includes: product environmental problems (Ø 2.9), willingness to respond to emerging green markets (Ø 3.0), participation in collaborative LCA-studies with external organisations (Ø 2.9), decision by the company's management (Ø 2.9), perceived environmental discussions (e.g. Agenda 21) (Ø 2.8).

¹⁴ The group „Other“ consists of some stakeholders which have been listed additionally by the companies answering the questionnaire. In total, they are not important.

¹⁵ Several answers to this question were possible.

¹⁶ Method of weighting: allocation points to the different answer possibilities (none= 1 point, low=2 points, medium=3 points, influential=4 points, crucial=5 points) and calculating averages (see also section 1.5).
The refusals are excluded from the calculation. A comparison revealed modest differences (between 0.25 and 0.44 points).

With a modest distance the next factor is the evolution of environmental legislation (\emptyset 2.7). All the other factors are of minor importance.

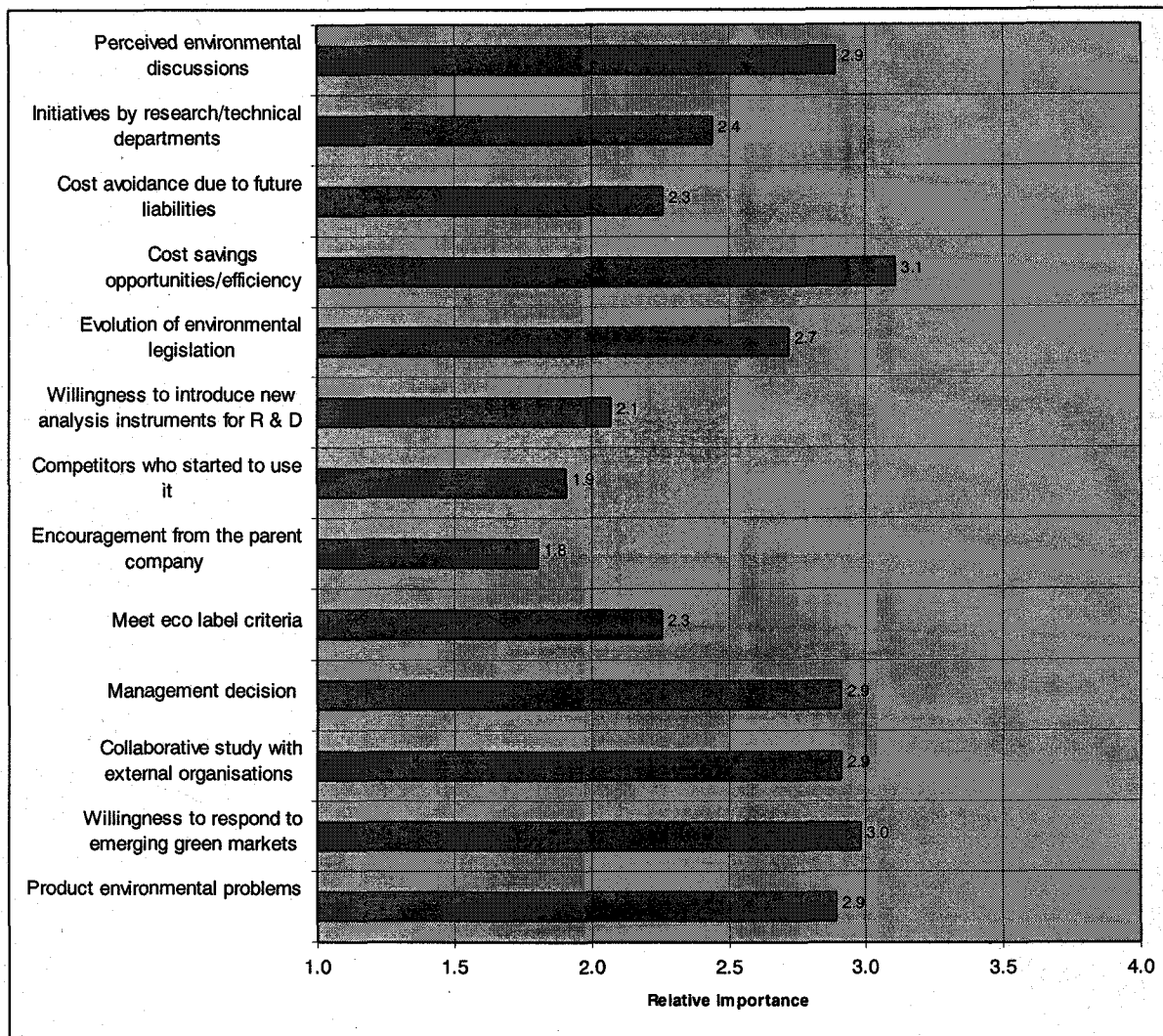


Figure 4.7: Pushing factors for LCA- relative importance [excluding refusals]
(N=62; six up to fifteen refusals)

Other influential / crucial factors listed are development of the ISO standard 14040, „we want to know it!“, LCA-inventories as information sources for inputs and outputs, membership in green business associations, business internal product information.

5 Application of LCA

This section reports on the different applications of LCA in business. It refers both to a set of different kind of applications along the product development chain and to different kind of products (some vs. all products, existing vs. new products, etc.). Both current and expected future applications are taken into account. Possible applications along the product development chain range from strategic applications (anticipate and negotiate legislation, radical changes in the product life cycle, shift from product to service), to research, development and design, production and procurement (bottleneck identification, procurement specifications), marketing (compare existing product with planned alternatives; compare

existing company products with products of competitors; define marketing & advertising policies and join eco-labelling criteria, assessing the gap from eco-label criteria, environmental cost allocation up to information (internal information and training; information and education to consumers and stakeholders).

Of course, the results presented refer only to LCA-using companies.

5.1 Use of LCA's

62 of 101 companies indicated that they use LCA's (or parts of it). That means that about 62% of the companies answering the questionnaire are familiar with this tool. 39 companies declared they did not use LCA's.

5.2 Current applications

LCA can be applied for a series of different possibilities. We asked the companies for the most frequent current applications¹⁷.

5.2.1 Current applications in general

The most frequent applications of LCA are the identification of bottlenecks and the information/education of consumers and stakeholders. That means that on one side internal purposes of improving processes and on the other side an external communication are the main topics.

Research development and design, procurement specifications/supplier screening product co-maker-ship, comparison of existing company products with products of competitors and comparisons of existing products with **planned** alternatives are the next main application areas. The use for other purposes is seldom.

¹⁷ Up to four answers to this question were possible.

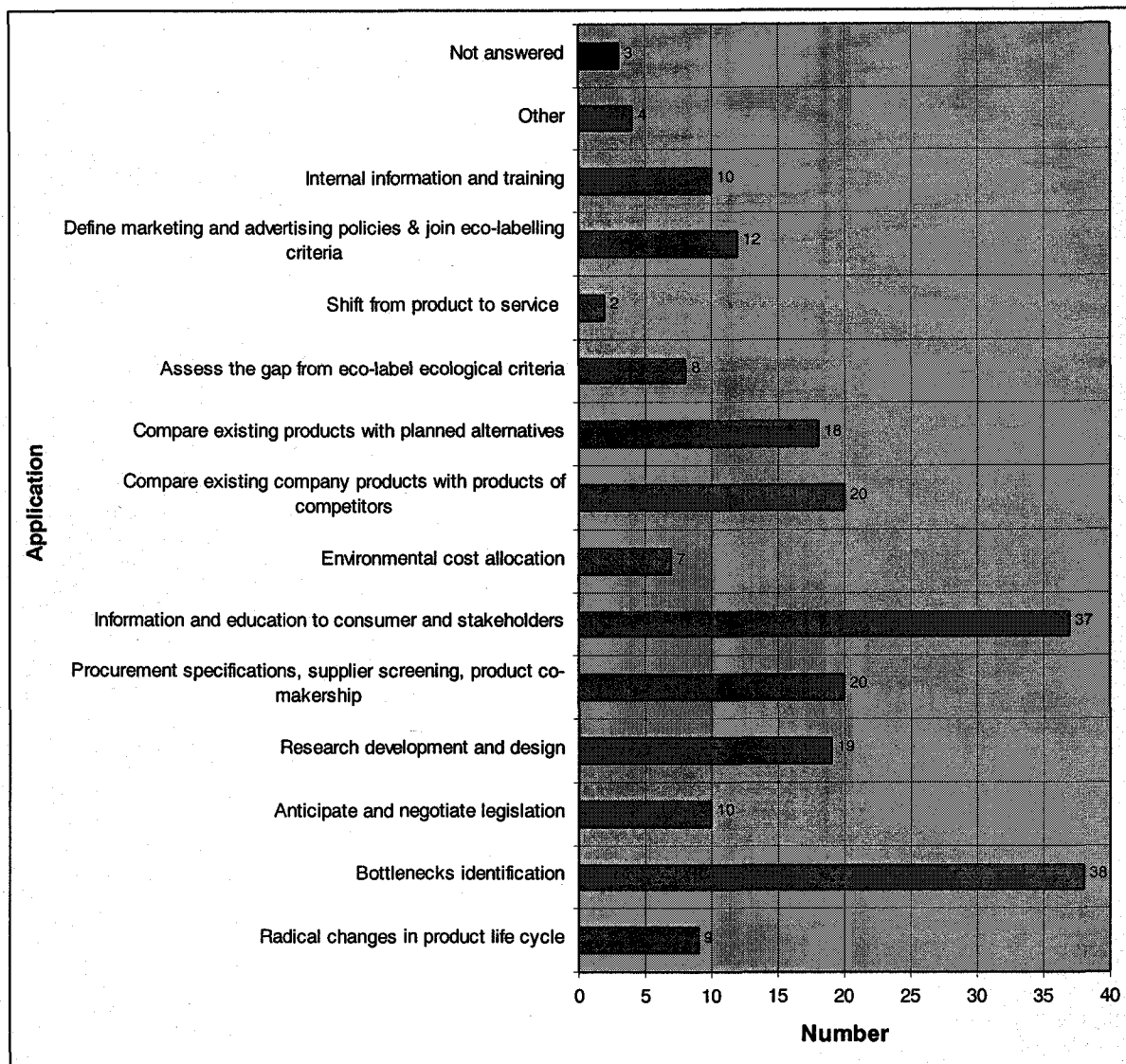


Figure 5.1: Frequent applications of LCA's [absolute numbers]
(N=62; 3 refusals)

5.2.2 Do LCA applications depend upon the enterprise sector?

There might be differences between application types and sectors. To avoid any overburden with information, we compared the data from the cross-tabulation of sectors and applications with the average distribution of sectors. The number of companies using a certain application has been divided with the average distribution. Only the posts which have resulted in a number higher than two are presented in the following table.

Table 5.1: LCA applications / sectors [deviations from averages more than two]
(N=62; 0 refusal)

	Agri- culture	Food	Tex- tiles	Pulp/ paper	Pe- troleum	Chem- icals	Plastics	Ma- chinery	Elect- rical	Auto- mobile	Other indus- tries	Trade	Other services
Radical changes in product life cycle										2			
Bottlenecks identification											3		
Anticipate and negotiate legislation					2								
Research, development and design						2		2			-2		
Procurement specifications et al				3		-2							
Information/ education to consumer and stakeholders		2							-3		2		
Environmental cost allocation													
Compare existing company products with products of competitors						2			-2			2	
Comparison of existing with planned products						2					-3		
Assess the gap from eco-label ecological criteria													
Shift from product to service													
Marketing / advertising policies											2		
Internal information and training													

The distribution of the different application possibilities follows in most cases the expected average distribution. In some cases, deviations exist:

- The food sector applies LCA's more for the information of consumers. A reason might be that the topics of the LCA-studies of this sector are packaging; the information on the environmentally preferable packaging might be addressed towards the consumer.
- The pulp and paper sector applies LCA's more for the procurement. A reason might be that the selection of resources is the main task of this branch.
- The chemical industry applies LCA's more for R&D and comparisons and less for procurement.
- The electrical sector applies LCA less for the information of consumers. A reason might be that the products of this sector are too complex for reporting on their environmental profiles to consumers.

In general, the conclusion is that only some specific application patterns within the sectors seem to exist.

5.3 Promising applications of LCA

Companies were asked for the most promising future applications of LCA's within the companies¹⁸. The most promising applications of LCA are bottlenecks identification and information/ education of consumers and stakeholders. Nearly all other asked application areas are ranked on a modest level: radical changes in product life cycle, anticipate and negotiate legislation, research development and design, procurement specifications/supplier screening/product co-maker ship and stewardship, environmental cost allocation, comparison of existing company products with products of competitors, comparison of existing products with non existing alternatives), definition of marketing and advertising policies and join eco-labelling criteria and internal information/ training.

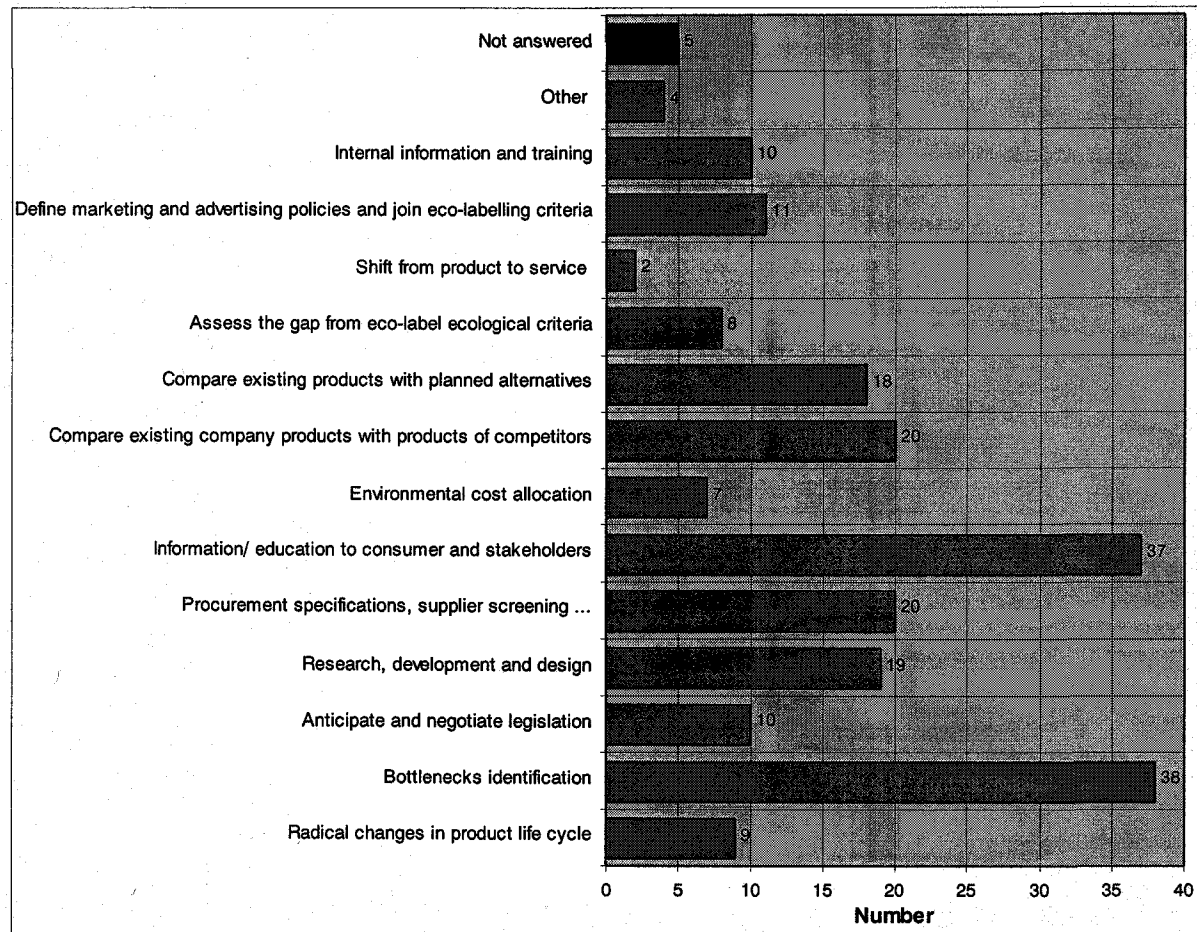


Figure 5.2: Promising LCA application areas [absolute numbers]
(N=62; 23 refusals)

However, radical changes in the life cycle of a product and environmental cost allocation are ranked much higher. 23 companies (that is 38%) of the companies answering this part of the questionnaire did not answer this question.

¹⁸ Up to four answers to this question were possible.

5.4 Promising and current applications

It is interesting to compare the results of the promising applications with the current ones. Obviously, the main application areas will be the same: bottleneck identification and information/ education of consumers and stakeholders.

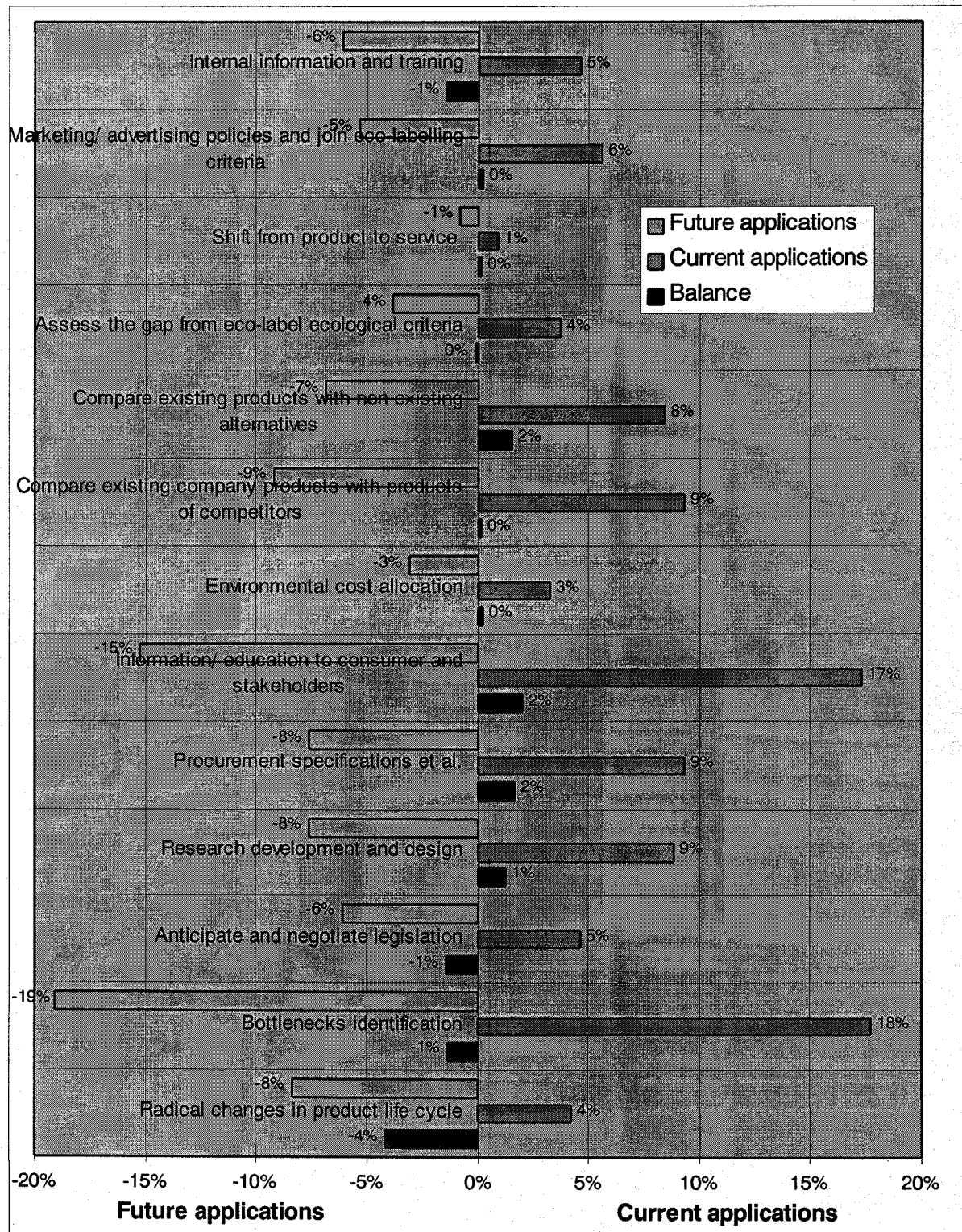


Figure 5.3: Comparison of current and promising applications of LCA's [relative shares in %]
(N=62; 3 and 23 refusals)

One might conclude that the main application areas are the same. However, assessment of more radical changes in products life cycle might increase. Other deviations are not worth commenting upon.

5.5 Products

Which products are examined with LCA-studies?¹⁹

5.5.1 Products in general

LCA-studies are mainly used for the examination of some existing products. A deep and complete use for **all** new product developments is almost never applied. This statement has to be contrasted with the reply in 14 cases by companies that they applied LCA's to **all** existing products. It seems that a prospective use is happening in some cases in contrast to a retrospective use.

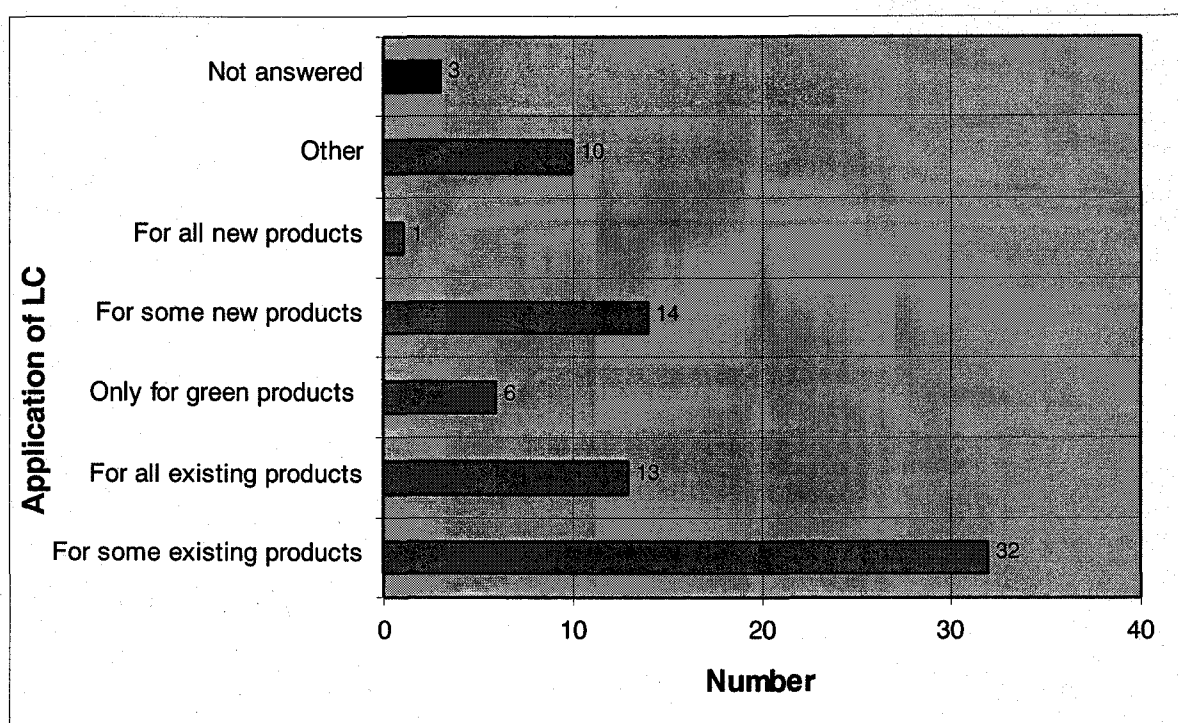


Figure 5.4: Examined products by of LCA's [absolute numbers]
(N=62; 3 refusals)

Other mentioned applications are - inter alia - as material and process-related decisions, environmental assessment of returnable systems, all important products and product groups, improvement of product packaging, important material and energy inputs.

5.5.2 Is there any relationship between the products analysed and the sector of the company?

There might be differences between the application types and the size of the companies. To avoid any overburden with information, we compared the data from the cross-tabulation of products and sectors

¹⁹ Up to two answers to this question were possible.

with the average distribution of sectors. The number of companies analysing products has been divided with the average distribution. Only the posts that have resulted in a number higher than two are presented in the following table.

Table 5.2: Products / sectors [absolute numbers]

(N=62; 1 refusal)

	Agri- culture	Food	Tex- tiles	Pulp/ paper	Pet- roleum	Chem- icals	Plas- tics	Machi- nery	Elec- trical	Auto- mobile	Other industries	Con- struction	Trade	Other services
For some existing products						4					-2			
For all existing products		3				-2					4			
Only for green products														
For some new products											-2			
For all new products														
Other														

The distribution of the different product-checks follows in most cases the expected average distribution. In some cases, deviations exist:

- More companies in the food sector declared that they assessed all existing products by LCA's. However, there might be a misinterpretation: do the food companies really assess their products or „only“ the packaging?
- More companies of the chemical industry use LCA for some existing products.

In general, the conclusion is that specific application patterns seem to exist only for the chemical industry.

6 Techniques

This part reports on the “technique” of carrying out an LCA and interpreting/applying its results. Of course, it refers only to the group of LCA-using companies.

6.1 Functions involved

LCA's can be carried out with the participation of different company functions²⁰. The company function mainly involved in LCA's is the environmental officer/department. Also often involved are top management, R&D and marketing and sales departments. Seldom involved are production management, product development and design function and purchasing department. An involvement of health and safety is very rare.

Other involved functions mentioned are environmental management, department environmental development, distribution logistics, application technique, product safety.

²⁰ Several answers to this question were possible.

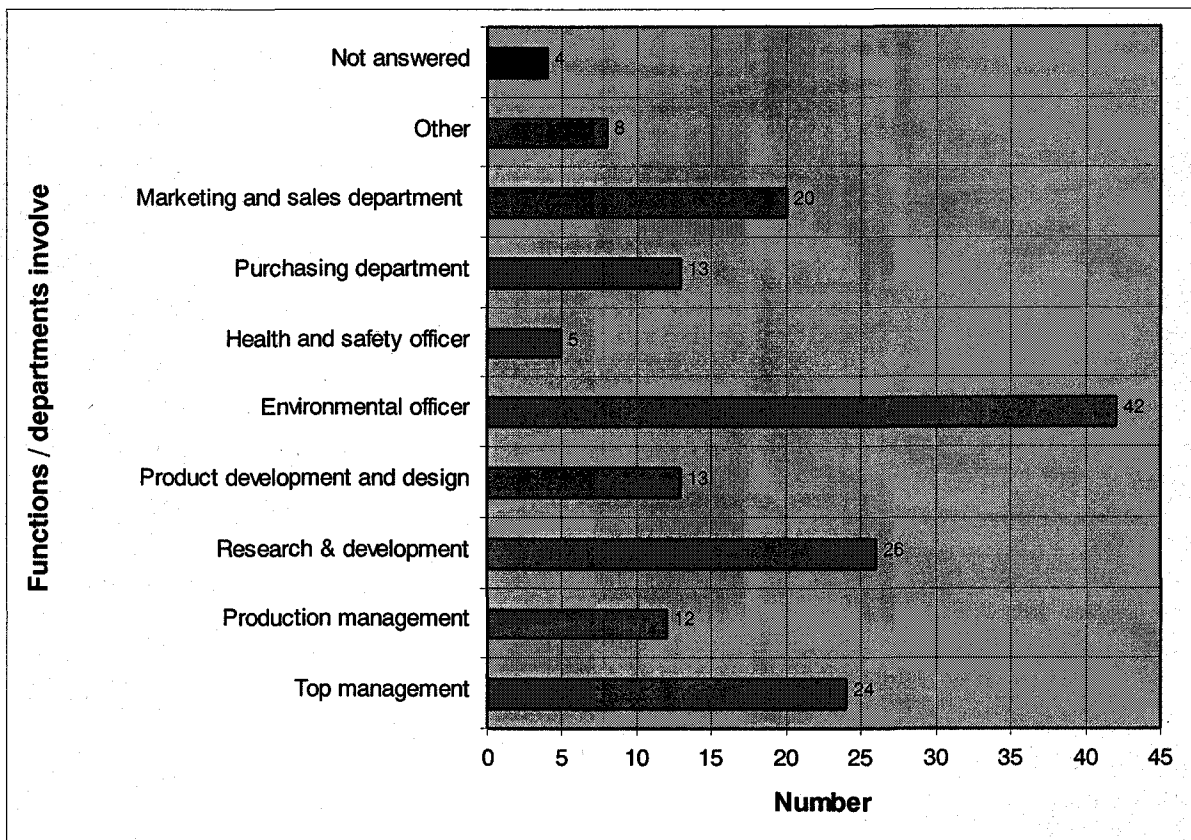


Figure 6.1: Functions involved of companies [absolute number]
(N=62; 4 refusals)

6.2 Performer of LCA's

Companies were asked to identify the performer of LCA studies²¹. LCA-studies are carried out often completely within an enterprise. However, external consultants and/or research institutions are also often involved. Joint performance with other companies and/or industrial associations occur sometimes.

²¹ Several answers were possible.

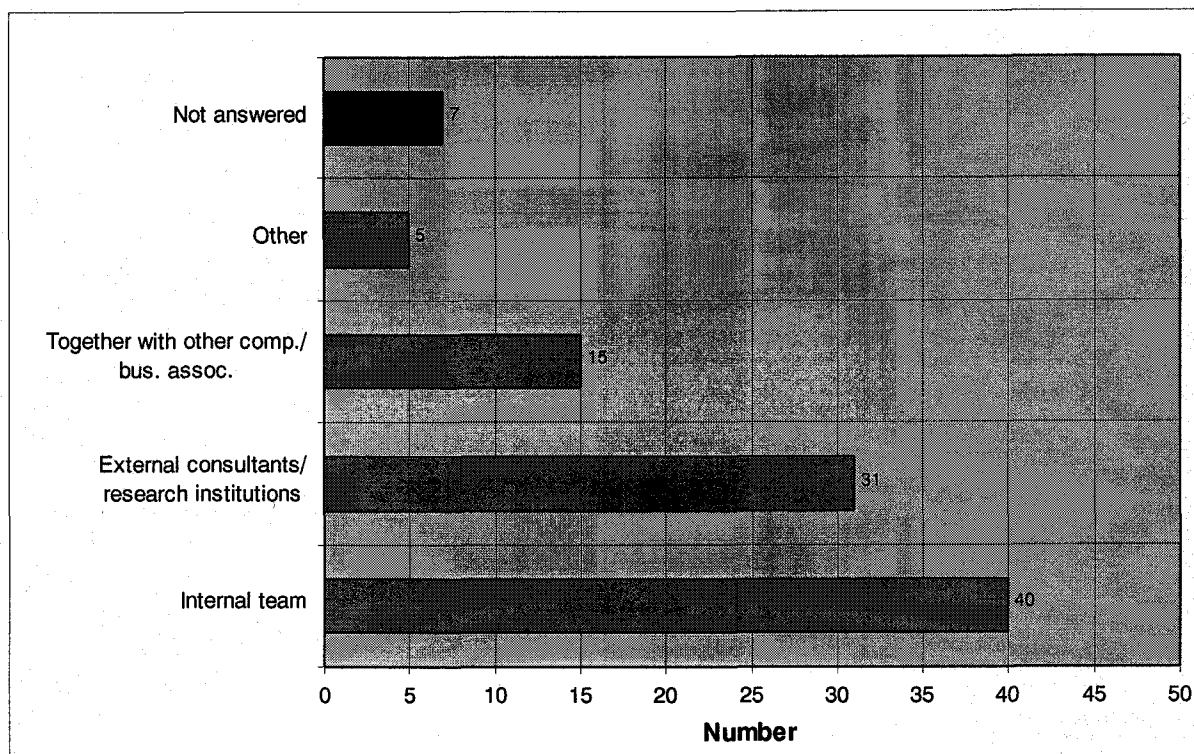


Figure 6.2: Performer of LCA's [absolute numbers]
(N=62; 7 refusals)

Five companies stated the following: „in co-operation with external consultants“, „nobody in our company“, „environmental officer“, „students“ and „we use secondary literature“.

6.3 Problems

What are the main methodological difficulties companies have met in implementing LCA's?²² The main methodological difficulty is the collection and quality of data in the inventory phase. The next listed problems are cost of resources involved, the complexity of the method, the definition of system boundaries and the difficulties in the assessment and interpretation phase.

²² Several answers to this question were possible.

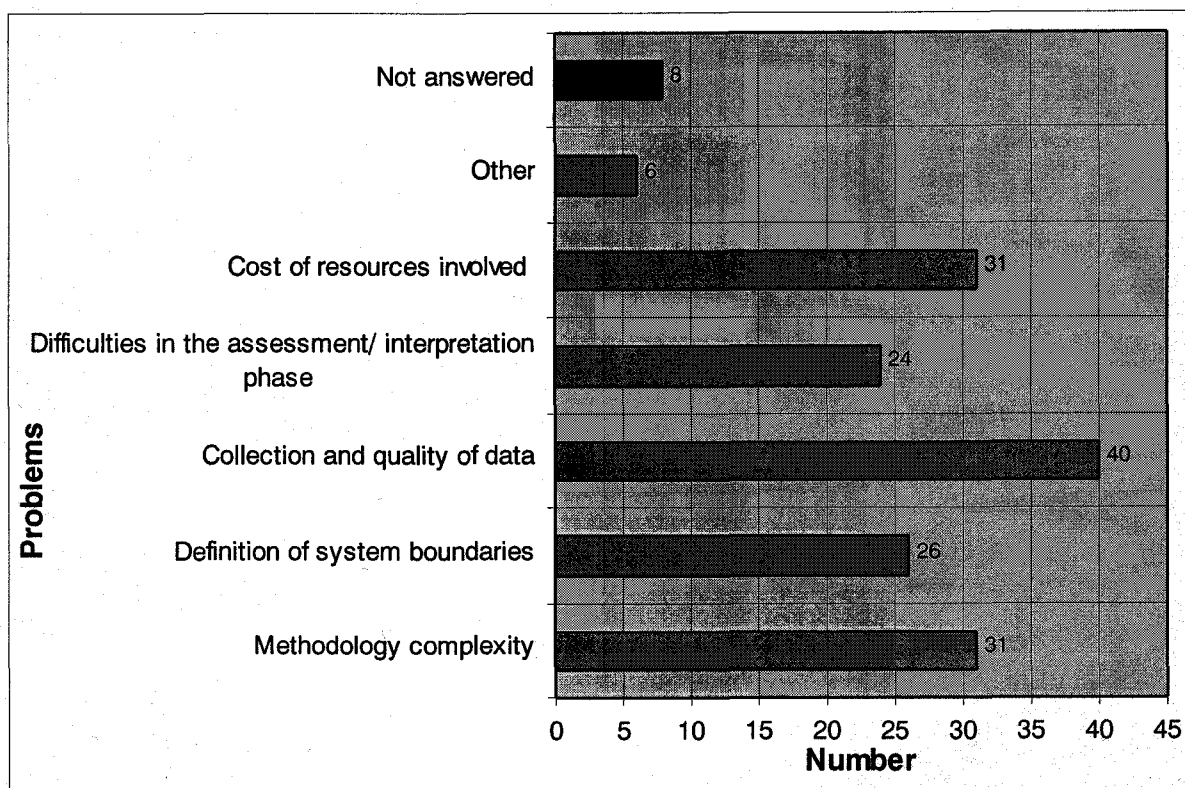


Figure 6.3: Ranking of difficulties [absolute numbers]
(N=62; 8 refusals)

Other mentioned problems are complexity of the product, low acceptance of the results by the management due to methodological problems, valuation of the inventory, intensive personal and temporal resources, requirements due to high degree of details.

Surprisingly, the interpretation problem is listed very low. This might be a result from the fact that companies often do LCI (Inventories) instead of a complete LCA.

7 Outlook

This part reports on the expectations that companies have about the future use of LCA in business. A wider use of this tool depends on the obstacles (see section 6.1), on the trade-off between costs and expected benefits (see section 6.2), and on the experience accumulated (including surprising results) (see sections 6.3 and 6.4).

7.1 Obstacles

Companies were asked for the main obstacles which hinder the wider use of LCA's within their companies²³.

²³ Several answers to this question were possible.

The main obstacles for a wider use of LCA in the company are disputable results, general methodological difficulties and the costs of LCA. This ranking of the disputable results is - a little bit - in contrast the ranking of the interpretation of the results. The problem of communication of the results to the top management is ranked very modest as well as the costs of implementation of measures suggested by LCA findings.

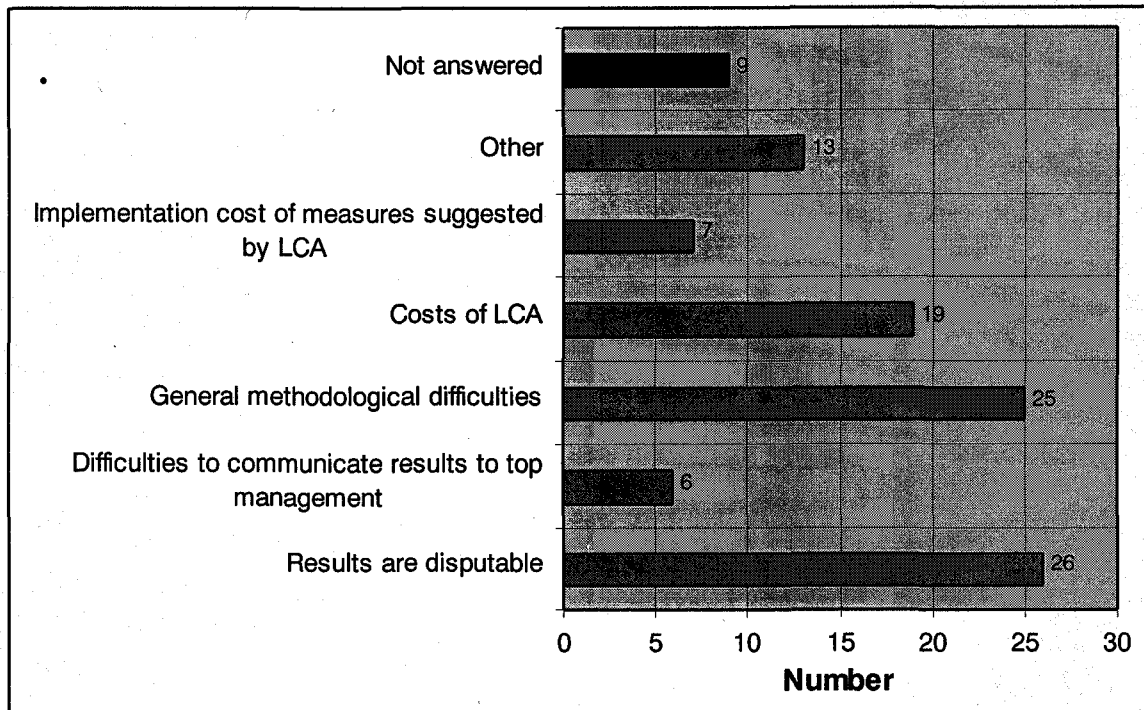


Figure 7.1: Ranking of obstacles [absolute numbers]
(N=62; 9 refusals)

Other obstacles mentioned were difficulties in communication with consumers, comparability of local, national and global environmental problems, missing comparability with competitors, missing external data basis.

7.2 Balance between costs and benefits

Companies have been asked for the balance between costs and benefits of LCA²⁴.

The dominant opinion is that LCA's benefits are long term ones. Only seven companies think that LCA-studies provide them with results which can be immediately applied. Some companies believe that benefits depend upon the possibility of diffusing results externally. This opinion is supported by the ranking of marketing.

²⁴ Several answers to this question were possible.

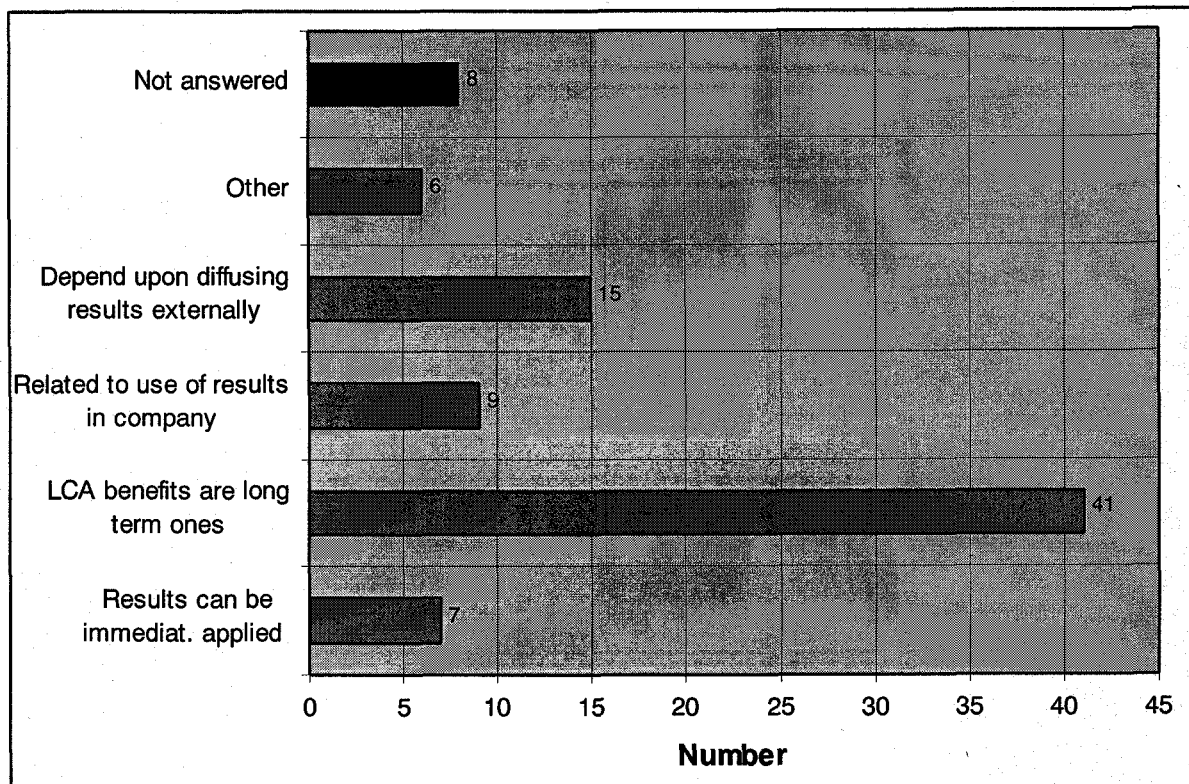


Figure 7.2: Balance between costs and benefits [absolute number]
(N=62; 8 refusals)

Other obstacles mentioned were lack of perceivable benefit, no direct business related benefit, „benefits are environmental ones“, „LCA's support decision-making“.

7.3 Surprises

Companies were asked if LCA produced any surprises²⁵. Half of the companies using LCA-studies were surprised by the results of the LCA-study, half not. Some indicated that

- the usage step is dominant
- process optimisation
- energy consumption in general
- energy consumption of materials and transport
- the importance of solvents
- CO₂ emissions
- non compliance with legislation
- influence of weight of products

²⁵ One answer to this question were possible.

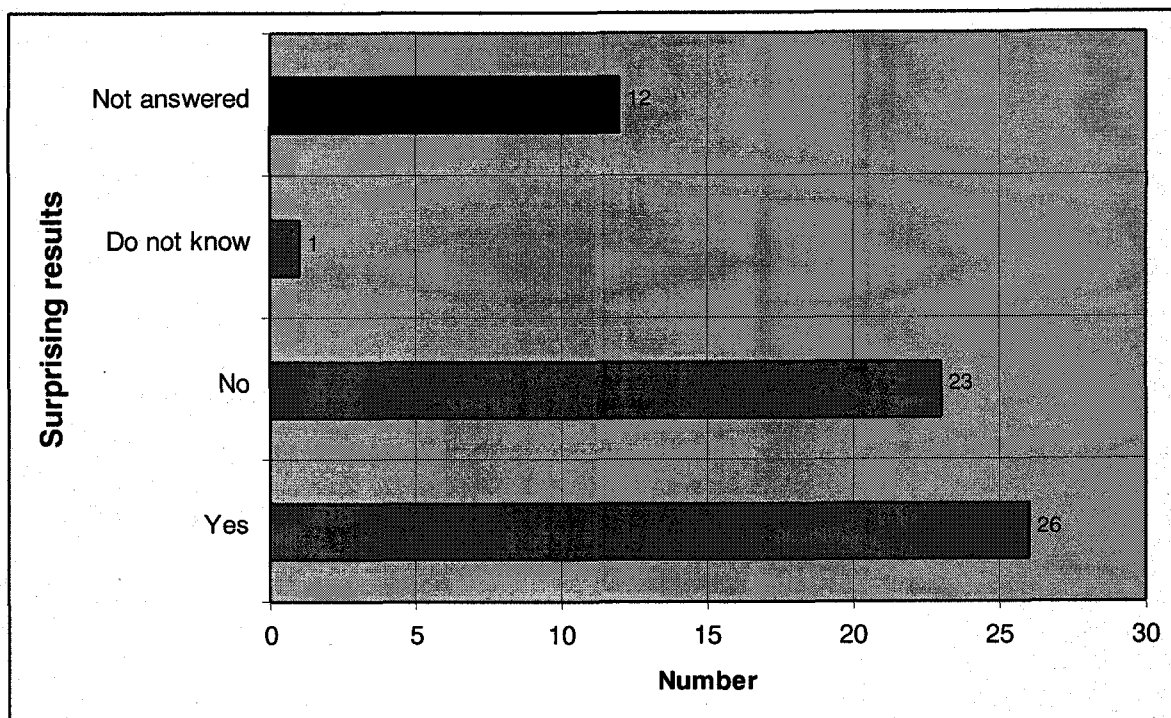


Figure 7.3: Surprises through LCA's [absolute numbers]
(N=62; 12 refusals)

However, 12 companies did not answer this question.

7.4 Increase of LCA-studies

Companies were asked if they think that the use of LCA will increase in the future in their companies²⁶. An increased future use of LCA was estimated generally positive. 28 answers were that this statement would be valid if LCA were used together with other instruments.

Only six companies claimed LCA-use will decrease in the future.

²⁶ Several answers to this question were possible.

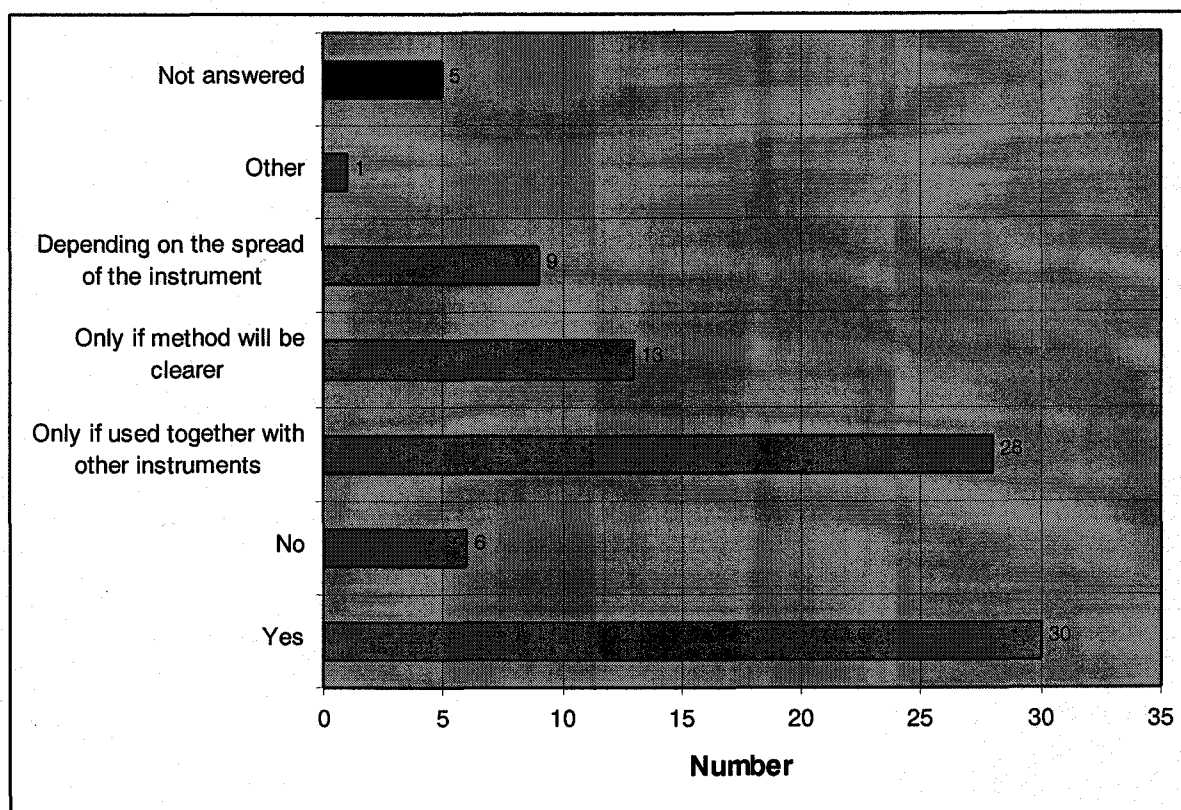


Figure 7.4: Future development in the use of LCA's [absolute numbers]
(N=62; 5 refusals)

8 Product innovation and LCA

This part tries to give an answer to the question whether there is a connection between the use of LCA and (environmental) product innovation in companies. The first two sections (8.1 and 8.2) show at which level of the company product innovation is defined and which are the main drivers for change. The next two sections (8.3 and 8.4) analyse which functions in general, and to which extent environmental officers/departments in particular, are involved in the process of (environmental) product innovation. Finally, section 8.5. shows the most used management tools (including LCA) that are used in the context of environmental product innovation.

8.1 Definition level of product innovation

The companies were asked for the stages in which product innovation policy is defined²⁷. For all answering companies (LCA using and not using companies), the result is that the definition of product innovation policy is nearly equally regarded as tasks both of corporate strategy (strategic dimension) and of research & development (operative dimension). Marketing is rated more modestly. Five companies did not answer this question.

²⁷ Several answers to this question were possible.

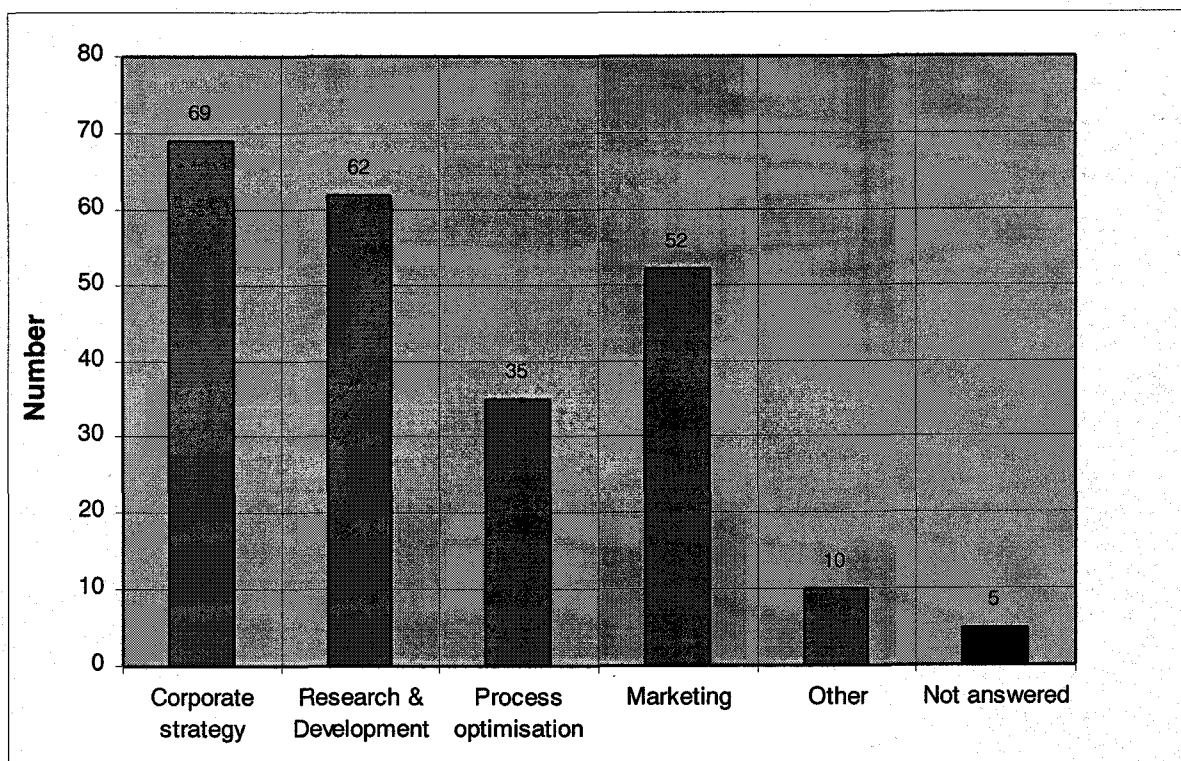


Figure 8.1: Involvement of different groups within product innovation programmes
(N=101, 5 refusals)

Considerable differences between both groups of companies do not seem to exist.

Table 8.1: Involvement of different groups within product innovation programmes and LCA
[absolute numbers]
(N=101; 5 refusals)

	Use LCA	Do not use LCA	Total:
Corporate strategy	42	27	69
Research & Development	40	22	62
Process optimisation	19	16	35
Marketing	34	18	52
Other	7	3	10
Not answered	4	1	5
Marketing and sales department management	51	24	75
Other departments	6	4	10
Not answered	2	1	3

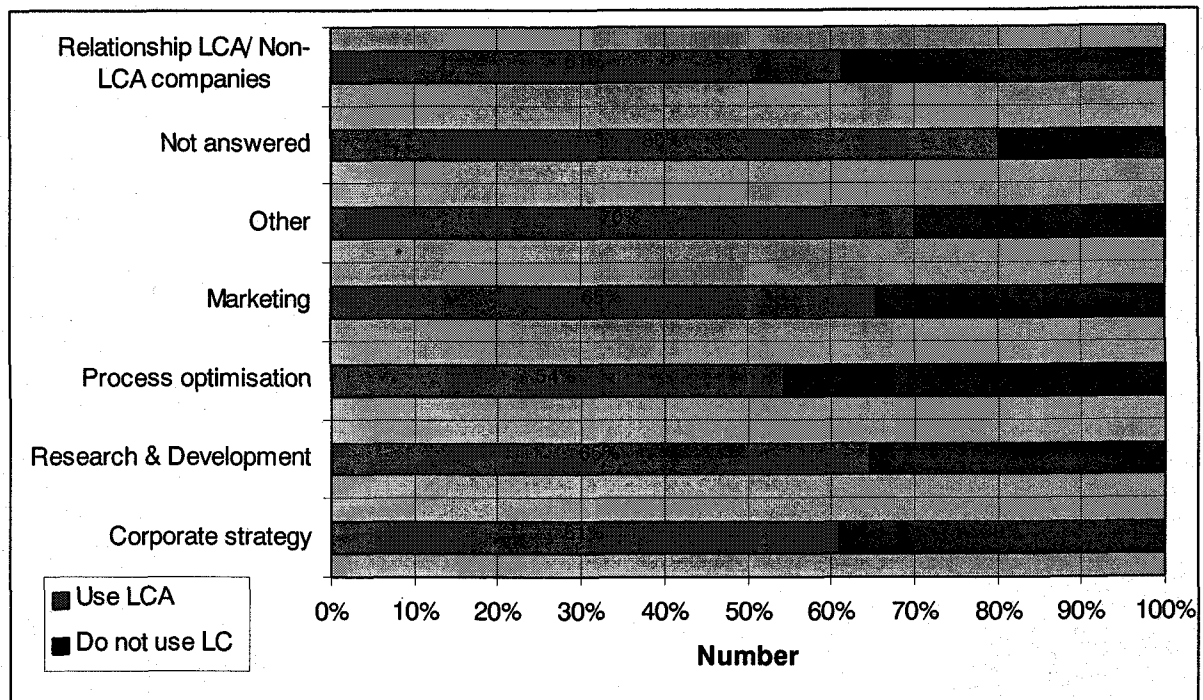


Figure 8.2: Involvement of different groups within product innovation programmes and LCA activities [relative shares in %]
(N=101; 5 refusals)

8.2 Drivers for product innovation

Product innovations can be stimulated by different drivers. In the following figure, we present the results on the ranking²⁸ of drivers according to the two groups. Very small and therefore not important differences exist for the importance of competition and costs which are ranked as important drivers. However, the importance of marketing is higher for companies which use LCA (3.86 points) against companies which do not use LCA (3.57 points). In addition to that, environmental opportunities are also ranked higher by the LCA-using companies (3.53 points against 3.18 points).

²⁸

Method of weighting: allocation points to the different answer possibilities (none=1 point, low=2 points, medium=3 points, influential=4 points, crucial=5 points) and calculating arithmetical means.

The refusals are excluded from the calculation. A comparison revealed modest differences.

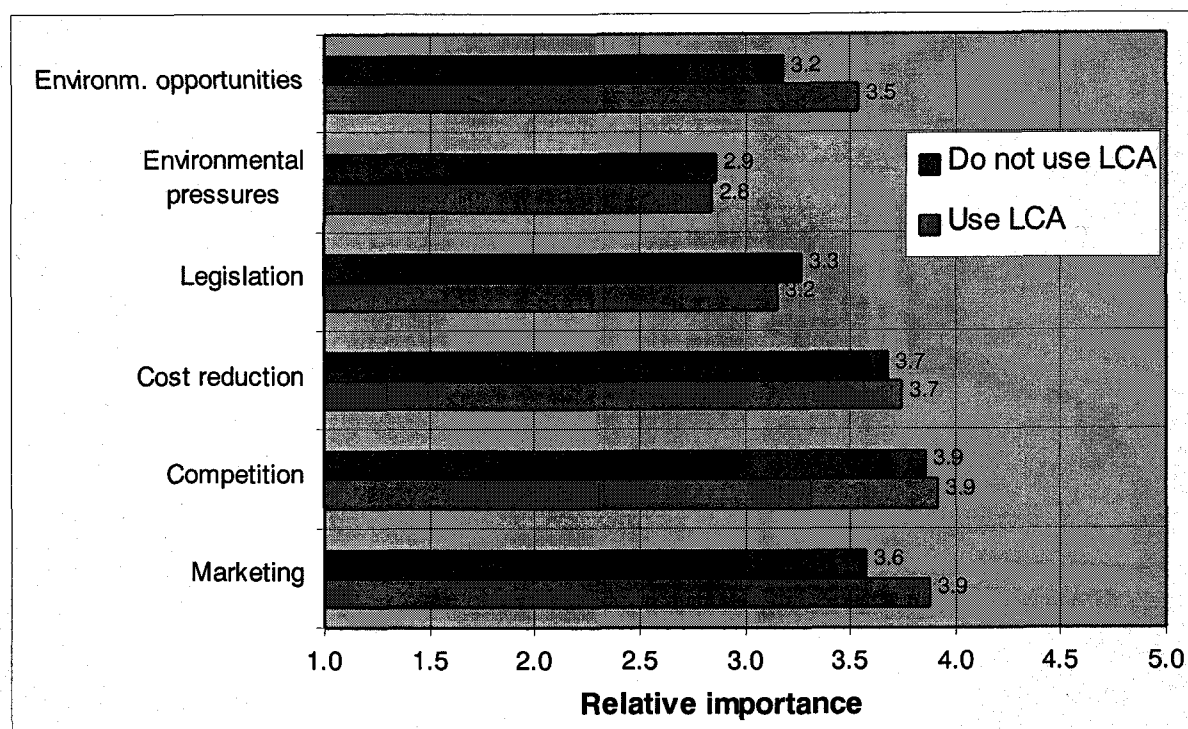


Figure 8.3: Drivers for product innovations - relative importance [absolute numbers]
(N=101; 5-8 refusals)

One can conclude, that companies that use LCA are also more externally oriented than the other ones. Environmental opportunities should be illustrated and demonstrated by LCA's and reported also within marketing.

8.3 Functions

We asked for the functions normally involved in definition of product innovation programmes²⁹. In general, the involvement in product innovation processes is concentrated in top management, marketing/sales departments and - with some limitations - at the R&D.

Table 8.2: Involved functions in product innovation [absolute numbers]
(N=101; 3 refusals)

	Use LCA	Do not use LCA	Total:
Top management	51	28	79
Production management	29	11	40
R&D management	41	19	60
Product development and design management	31	17	48
Environmental officer or department	30	14	44
Health and safety officer or department	10	5	15
Marketing and sales department management	51	24	75
Other departments	6	4	10
Not answered	2	1	3

²⁹

Several answers to this question were possible.

The differences between companies using and not using LCA's are not large; therefore, we conclude that the existence of an LCA does not influence the involvement of different functions within a company in the context of a product innovation.

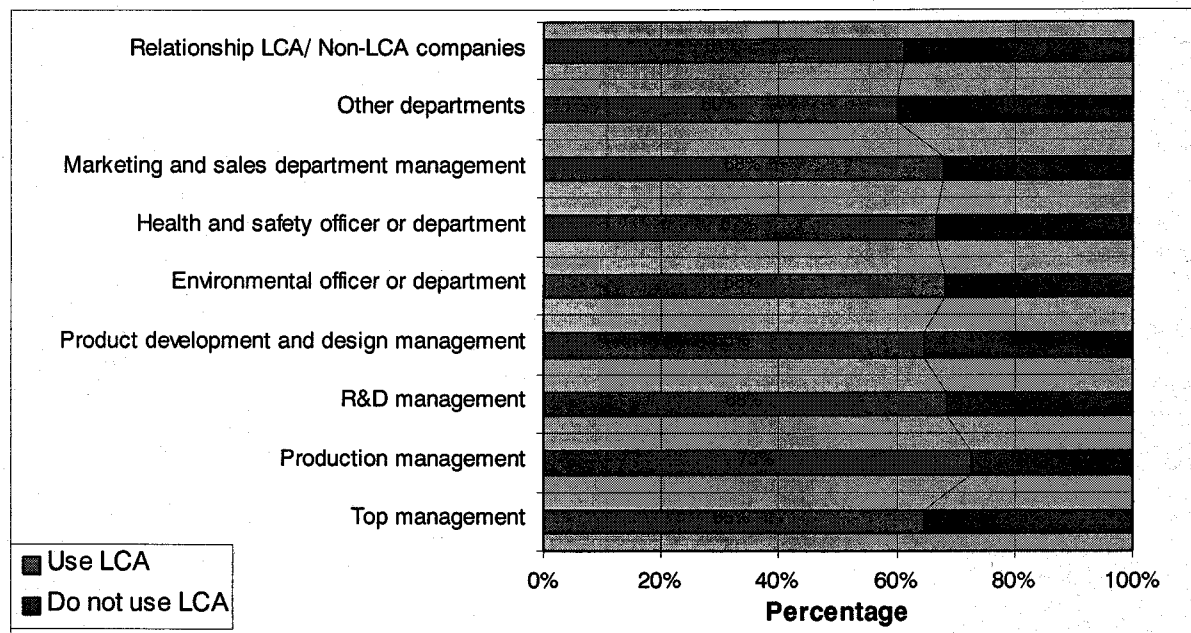


Figure 8.4: Involved functions in product innovation and LCA activities [relative shares in %]
(N=101; 3 refusals)

8.4 Roles of environmental and health/safety departments

Another question was dedicated to the role of the environmental officer and/or environment, health and safety department in the product innovation process³⁰.

For both groups of companies together, the role of the environmental officer and/or the environment, health and safety department in product innovation process was primarily as occasional consultant, but also active participation in most cases. However, an active role as initiator was very seldom the case.

³⁰ Up to two answers to this question were possible.

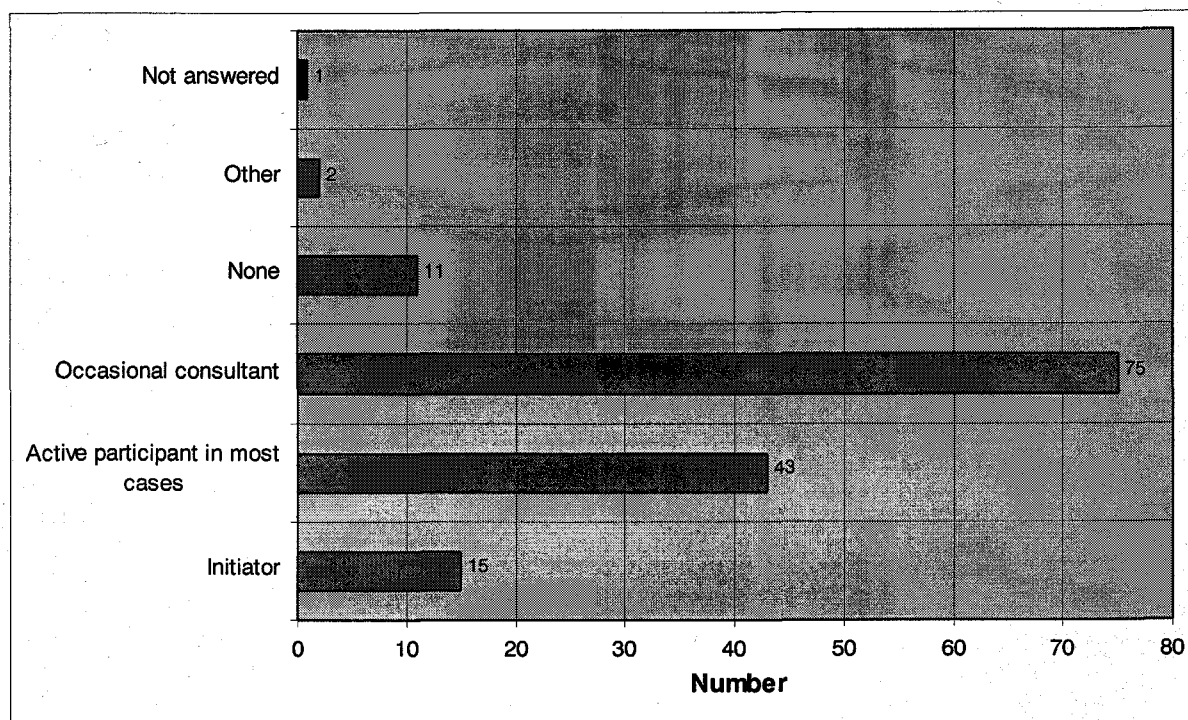


Figure 8.5: Role of environmental/health departments within product innovation processes
(N=101; 1 refusal)

If one compares companies using LCA and not using LCA, one recognises some differences: environmental departments of LCA-companies seem to be less initiating product innovations than companies not using LCA. However, they participate in more cases at product innovation processes than in companies not using LCA.

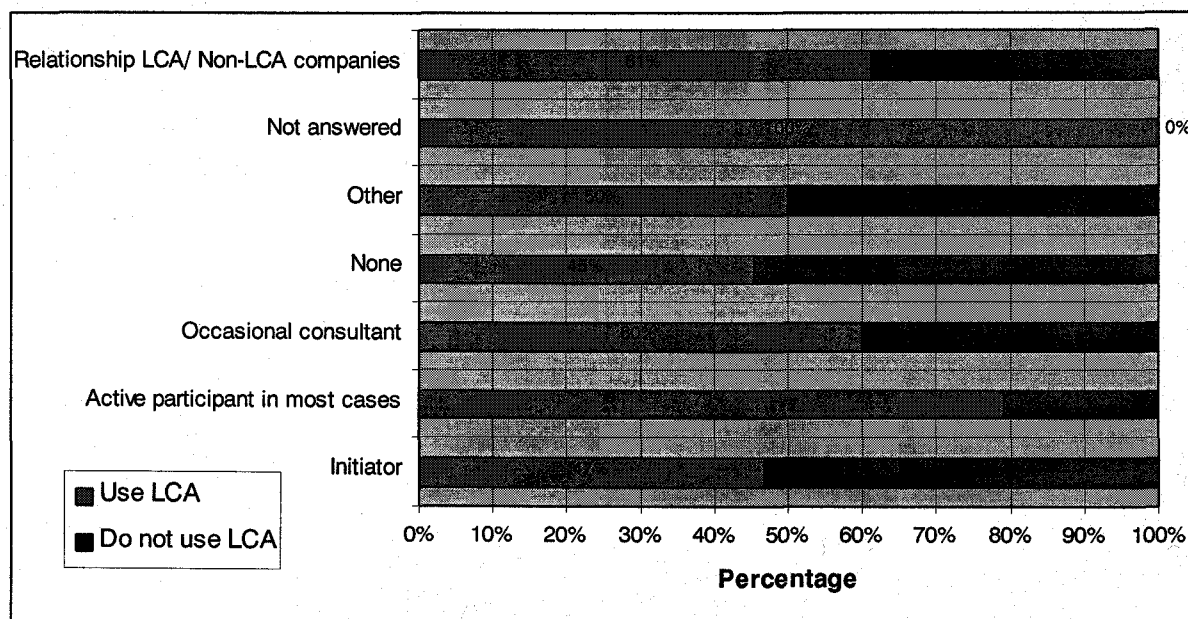


Figure 8.6: Role of environmental/health departments within product innovation processes and LCA-activities
(N=101; 1 refusal)

8.5 Tools for environmental product innovation

We asked for the tools used in the context of the improvement of the environmental aspects of products³¹. For both groups of companies together, the most often used tools with regard to product environmental improvements were risk assessments, checklists and compliance/gap analysis with legislation. LCA's, material balances and energy efficiency analysis and energy balances follow. That means that quite a lot of different tools were used („case-by-case-approach“).

Other listed tools were „Integrated balancing“, „eco-audit/ internal audit“, „requirements profiles“, „lists for suppliers“, „checks within own laboratory“, „performance specifications“, „security data sheets“.

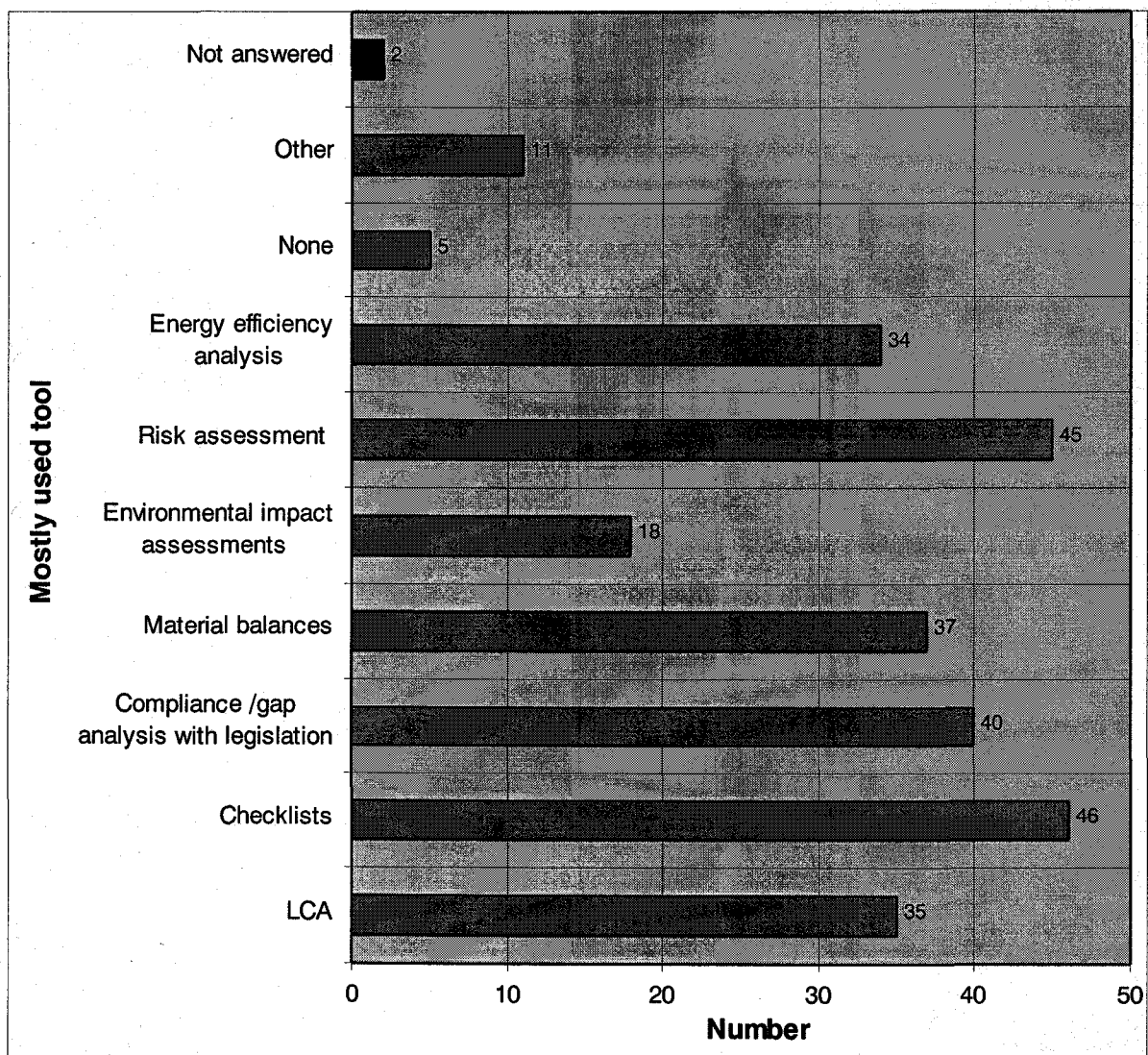


Figure 8.7: Tools used for environmental product improvements
(N=101; 2 refusals)

³¹ Several answers to this question were possible.

LCA's are one tool of environmental assessment of products. A lot of other instruments might be used. The results for companies using and not using LCA's are presented in the following table and figures. In general, companies of both groups use a lot of different tools for assessing the environmental characteristics of their products.

Table 8.3: Mostly used tools for environmental improvements of products [absolute numbers]
(N=101; 2 refusals)

	Use LCA	Do not use LCA	Total:
Life cycle assessment (LCA)	33	2	35
Checklists	29	17	46
Compliance/gap analysis with legislation	22	18	40
Material balances	29	8	37
Environmental impact assessments	10	8	18
Risk assessment	29	16	45
Energy efficiency analysis and energy balances	23	11	34
Other tools	2	3	5
None	7	4	11
Not answered	1	1	2
Total:	177	78	

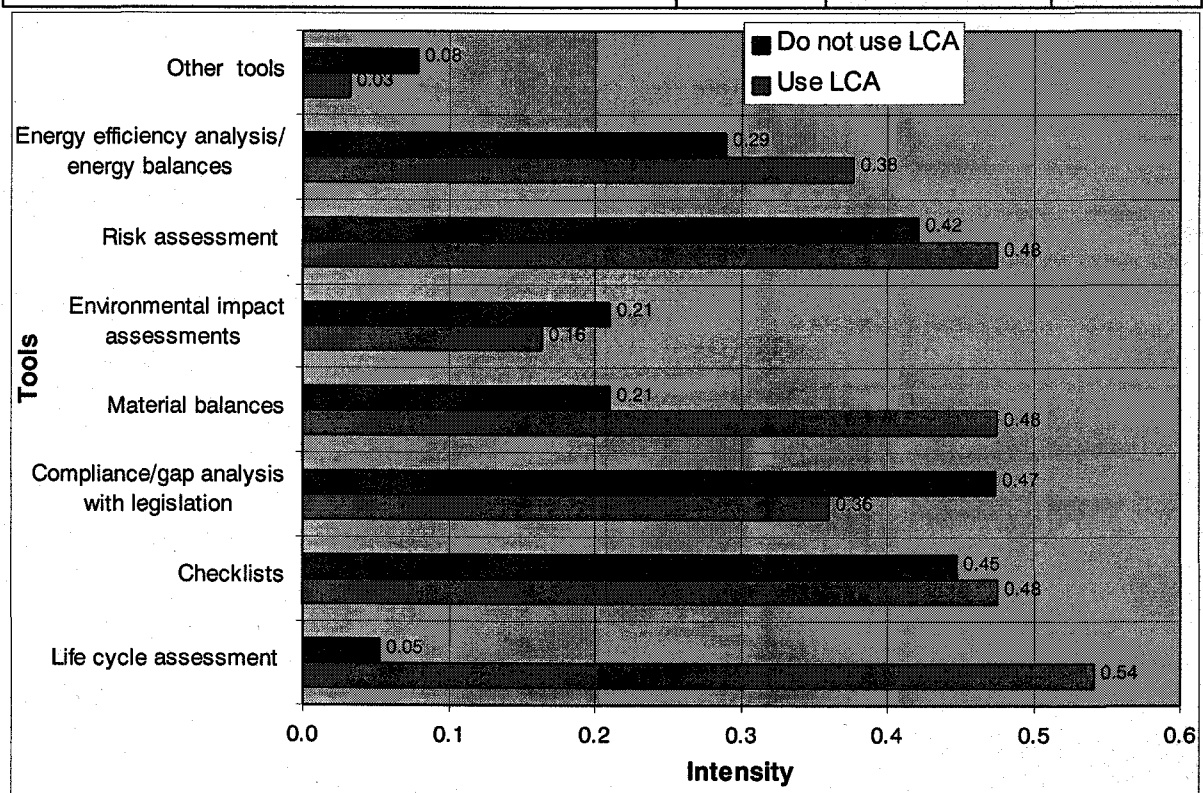


Figure 8.8: Intensity of used tools for environmental improvements of products and LCA activities
(relative shares per company)
(N=101; 2 refusals)

However, there are considerable differences between the two groups of companies examined. Companies who indicated they use LCA's explicitly tend to use more instruments than the companies of the

other group: average answer rate: 2.9 instruments/company against 2.2 instruments/company. Relatively more preferred are LCA's and material balances (see Figure 8.8).

A similar result is shown by Figure 8.9. Once more, companies of the first group use more LCA's and material balances for the environmental assessment of product innovations. Companies of the second group indicated to use more EIA and compliance analyses with legislation.

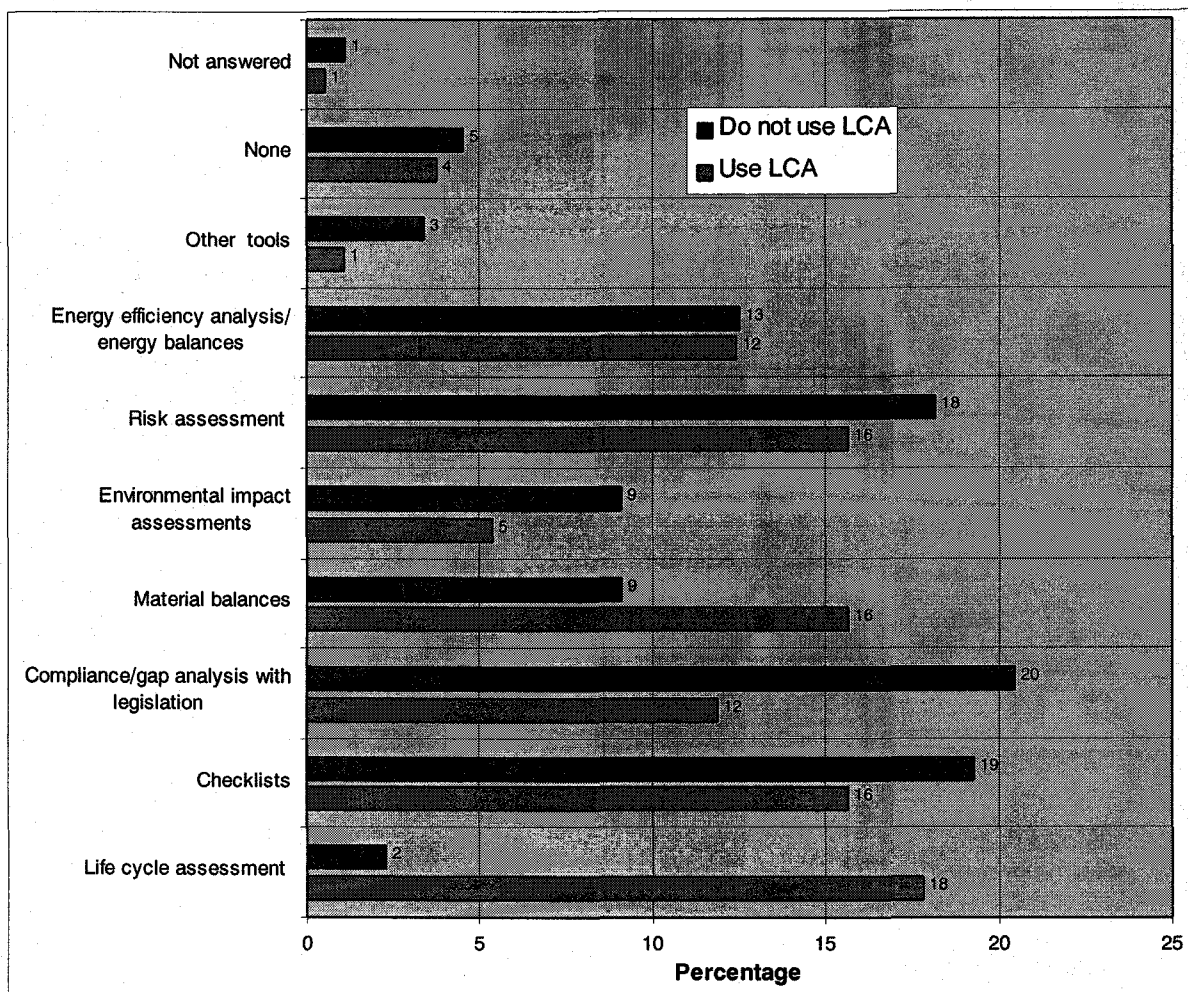


Figure 8.9: Tools for environmental improvements of products [relative shares in %]
(N=101; 2 refusals)

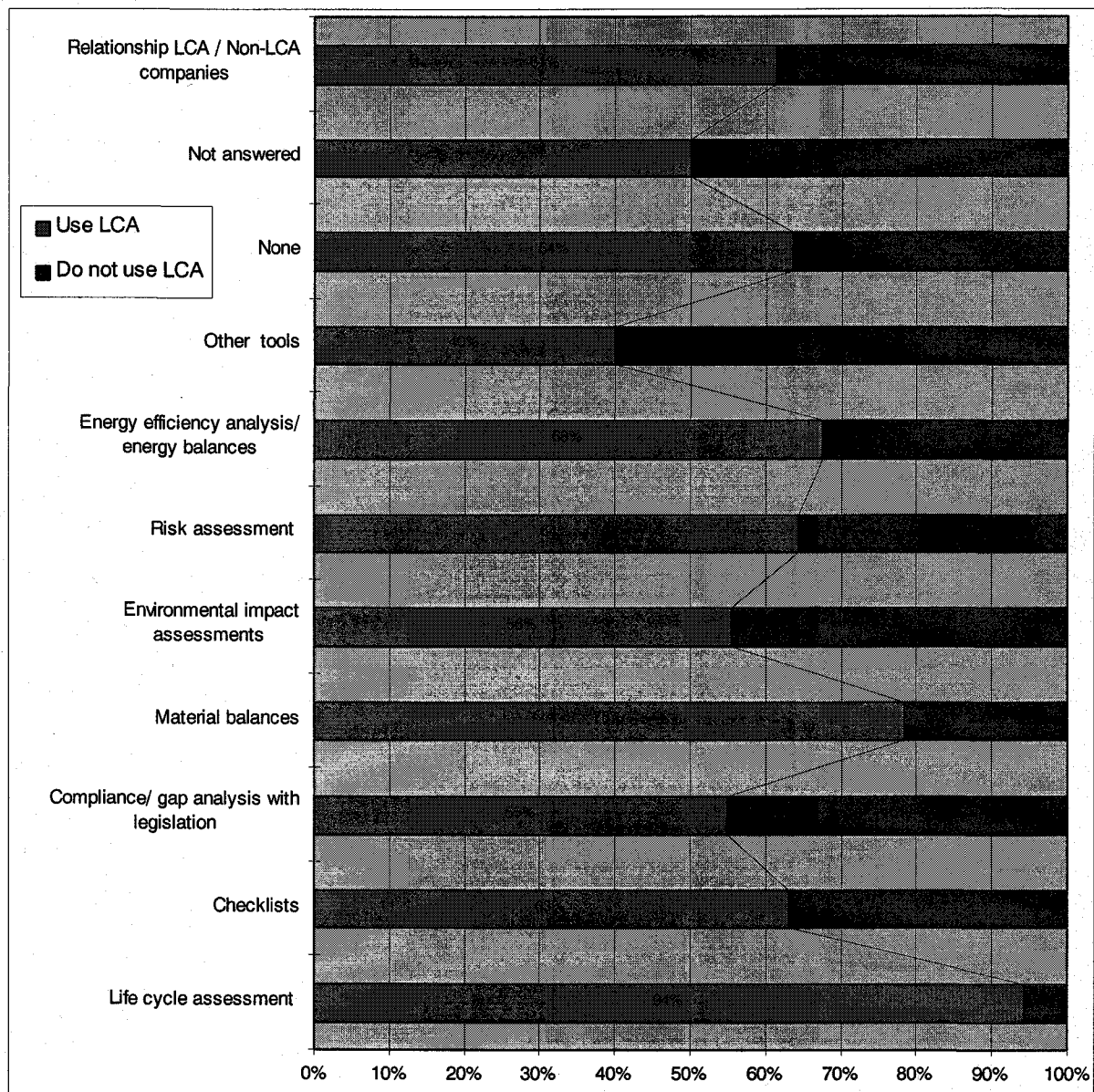


Figure 8.10: Tools for environmental improvements of products [relative shares in %]
(N=101; 2 refusals)

One might conclude that LCA-using companies in general use more instruments. These instruments tend to be more proactive than the preferred instruments of the second group that use more prescribed and reactive instruments.

8.6 Which tools are used instead of LCA?

Previous chapters have focused on the application patterns of LCA's within companies. In this section, we refer to the companies which said that they did not apply LCA's. We look for the alternatives to LCA.

The companies that indicated that they did not use LCA's apply a lot of other tools for environmental assessment of products. Checklists, risk assessments and compliance/gap analyses with legislation are the preferred tools. Twice also LCA's have been indicated; this might be interpreted as a qualitative

loss of the interpretation of the survey. However, we think that companies might use LCA's as an information source which has been presented externally.

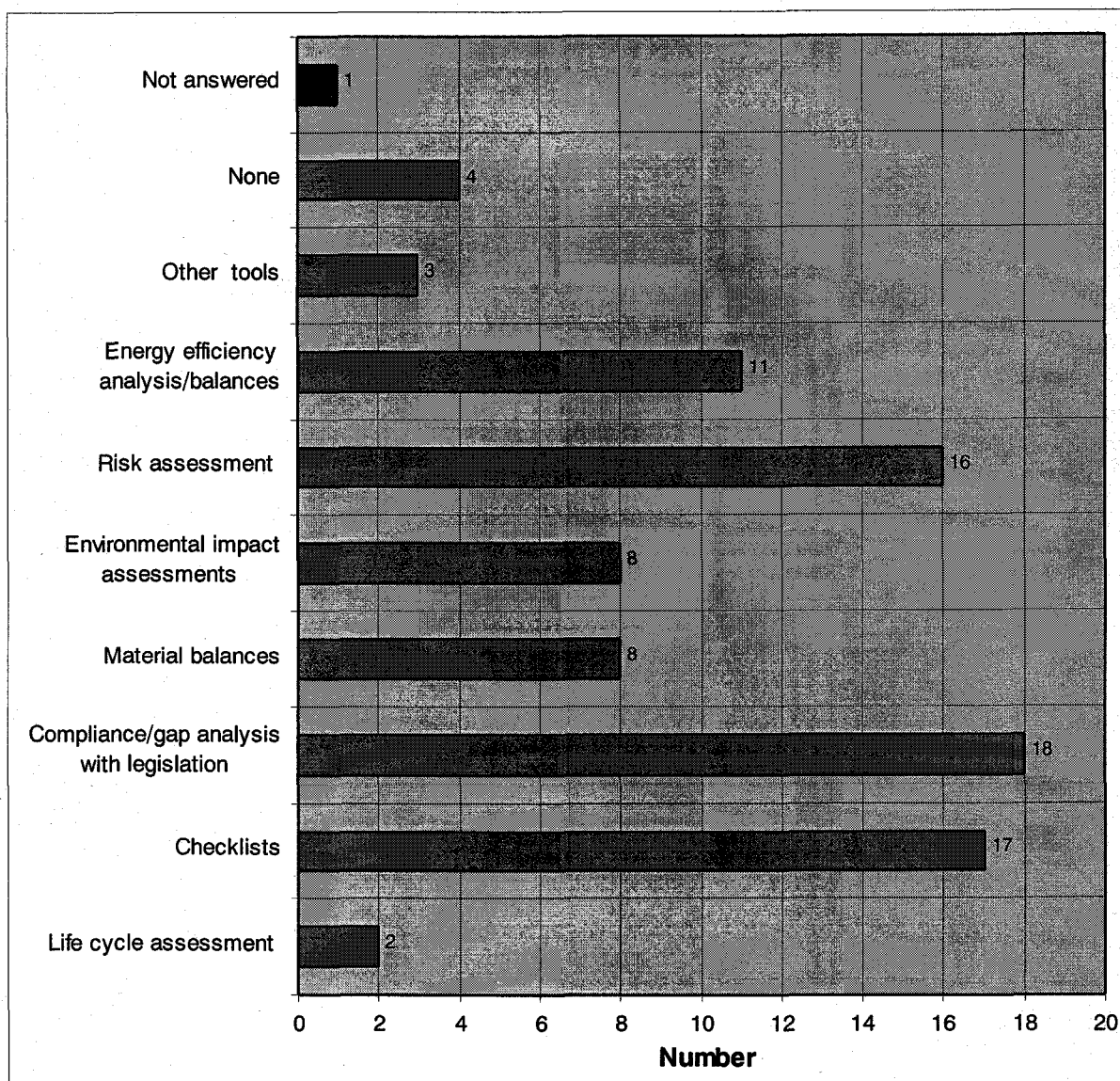


Figure 8.11: Tools used by companies not using LCA's [absolute numbers]
(N=39; 1 refusal)

9 Policy

In this chapter, we describe the policy expectations of business. In section 9.1 we present the influences of present governmental environmental policy; section 9.2 looks forward in the future and, in section 9.3, we asked whether European or national measures are preferred. Section 9.4 is dedicated towards the preferences of business for voluntary and/or mandatory measures.

9.1 Influences of governmental environmental policy

We asked for the influences of present governmental policy actions on business according to a five step scale³². In the questionnaire, a lot of different policy actions were listed³³. Eco-audit, covenants/sector codes of practice, product standards, certification schemes and product/packaging take-back systems are ranked the highest. Process standards follow. Other measures are estimated as of low influence (\emptyset between 2.0 and 2.3). Green public investment funds and LCA based tax schemes are ranked the lowest.

Comparing the results for both groups of companies, one recognises that some measures are ranked differently between the companies, but the differences are modest except for covenants.

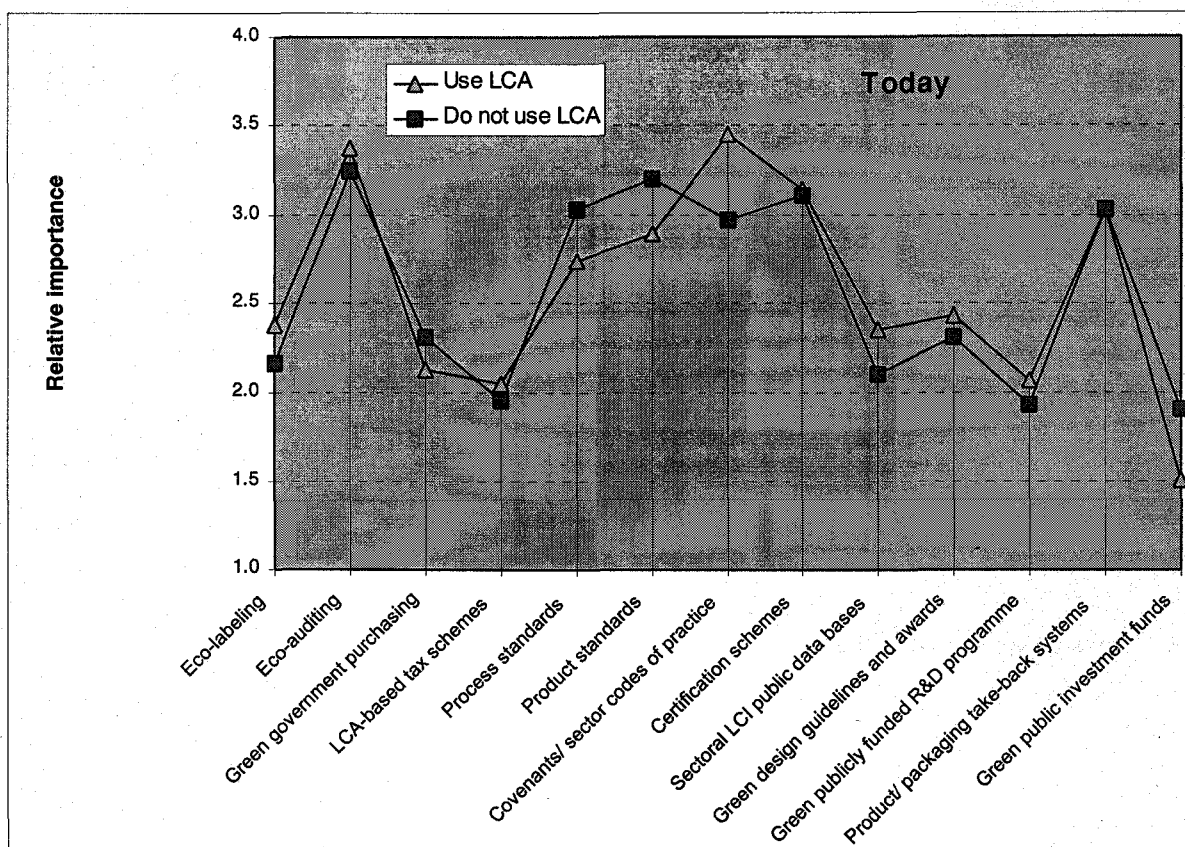


Figure 9.1: Present policy action and relative importance for the company [excluding refusals] (N=101; 0-11 refusals)

9.2 Future environmental policy measures

The future environmental policy was the topic of the next question.

³² Several answers to this question were possible.

³³ Method of weighting: allocation points to the different answer possibilities (non= 1 point, low=2 points, medium=3 points, influential=4 points, crucial=5 points) and calculating averages.

The refusals are excluded from the calculation. A comparison revealed modest differences for the present influence (between 0.09 and 0.38 points); herewith, all numbers are reduced.

The results³⁴ for the future (that is within 5 years) is that both groups of companies together think that all actions have a higher influence in the future than at present. Certification schemes, covenants and eco-auditing are regarded in a similar way. Product standards and take-back systems are rated a little bit lower. The other measures are rated between \emptyset 2.5 and 3.0 - except of green public investment funds.

Looking on the relative importance, the differences between companies using and not using LCA are not huge - with one exception: covenants/sectors code of practises are ranked by 0.5 point higher by LCA-using companies than by the other ones.

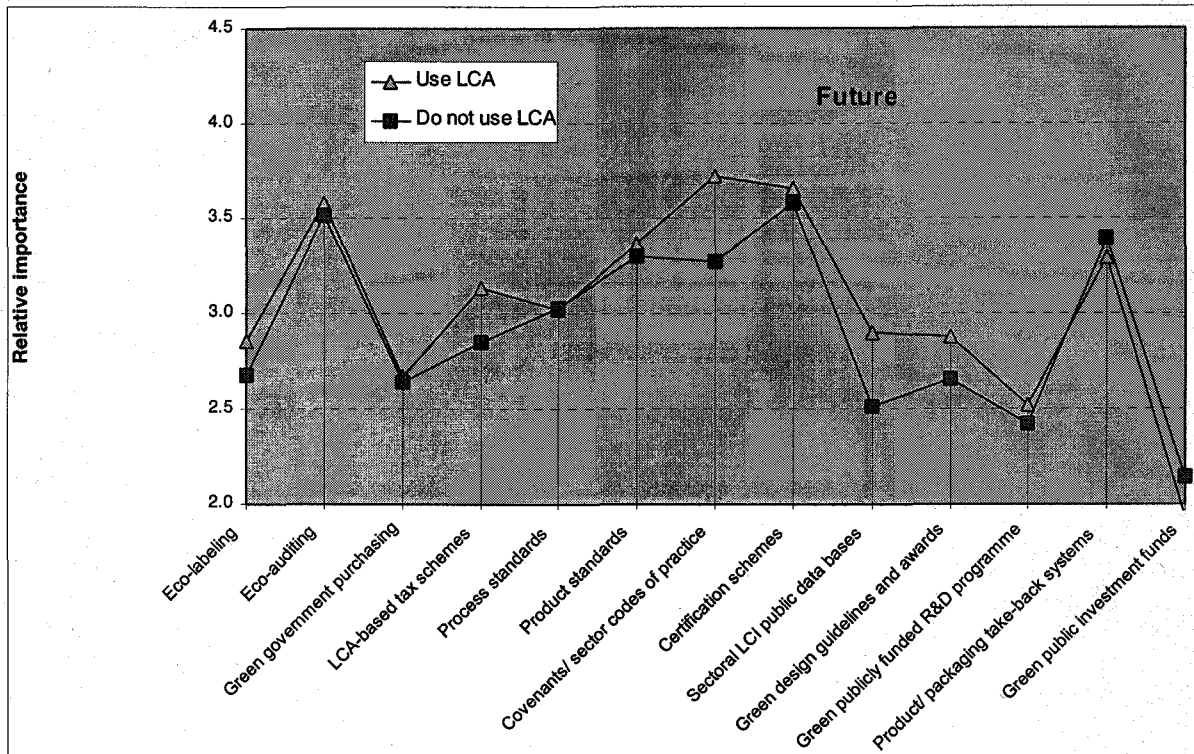


Figure 9.2: Future policy action and relative importance for the company [excluding refusals] (N=101; 4-14 refusals)

9.3 European or German measure?

We also asked whether action will take place on a European or national level³⁵. The answers estimated that action would be taken on a European level (high degree significance: eco-audit, certification schemes and eco-label; modest degree: process and product-related standards, green design guidelines and awards and green publicly funded R&D programme). On a national level it was estimated that procurement and tax actions will take place.

³⁴ Method of weighting: allocation points to the different answer possibilities (none= 1 point, low=2 points, medium=3 points, influential=4 points, crucial=5 points) and calculating averages.

The refusals are excluded from the calculation. A comparison revealed differences (between 0.31 and 0.63 points) which do, however not influence the results and their order dramatically.

³⁵ Several answers to every part this question were possible.

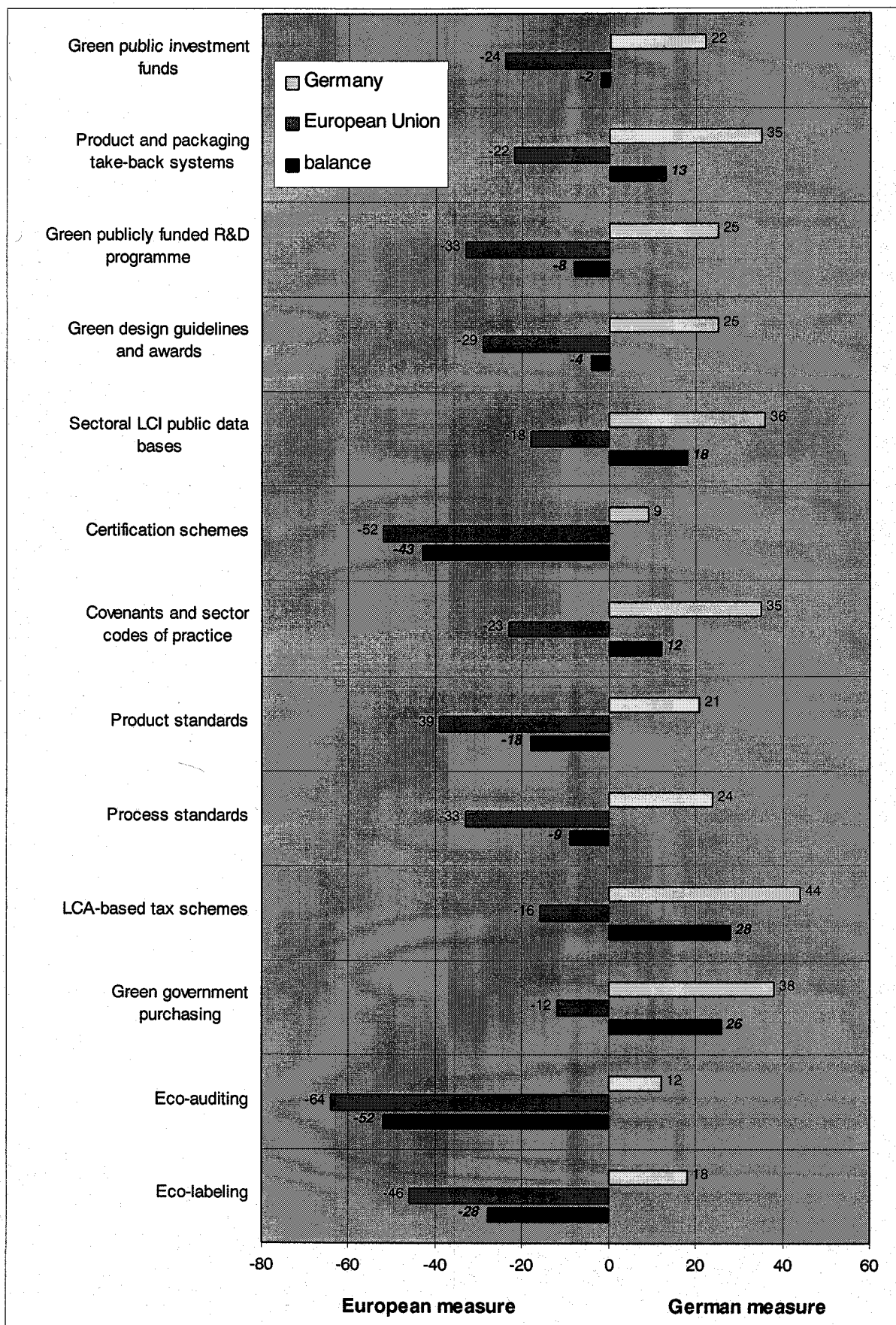


Figure 9.3: Preferences for place of policy measure [absolute numbers]
(N=101; 25-54 refusals)

However, between 25 and 50% of the companies did not answer this question.

9.4 Necessary actions and measures

We also asked which policy measures would become compulsory in the opinion of the companies³⁶.

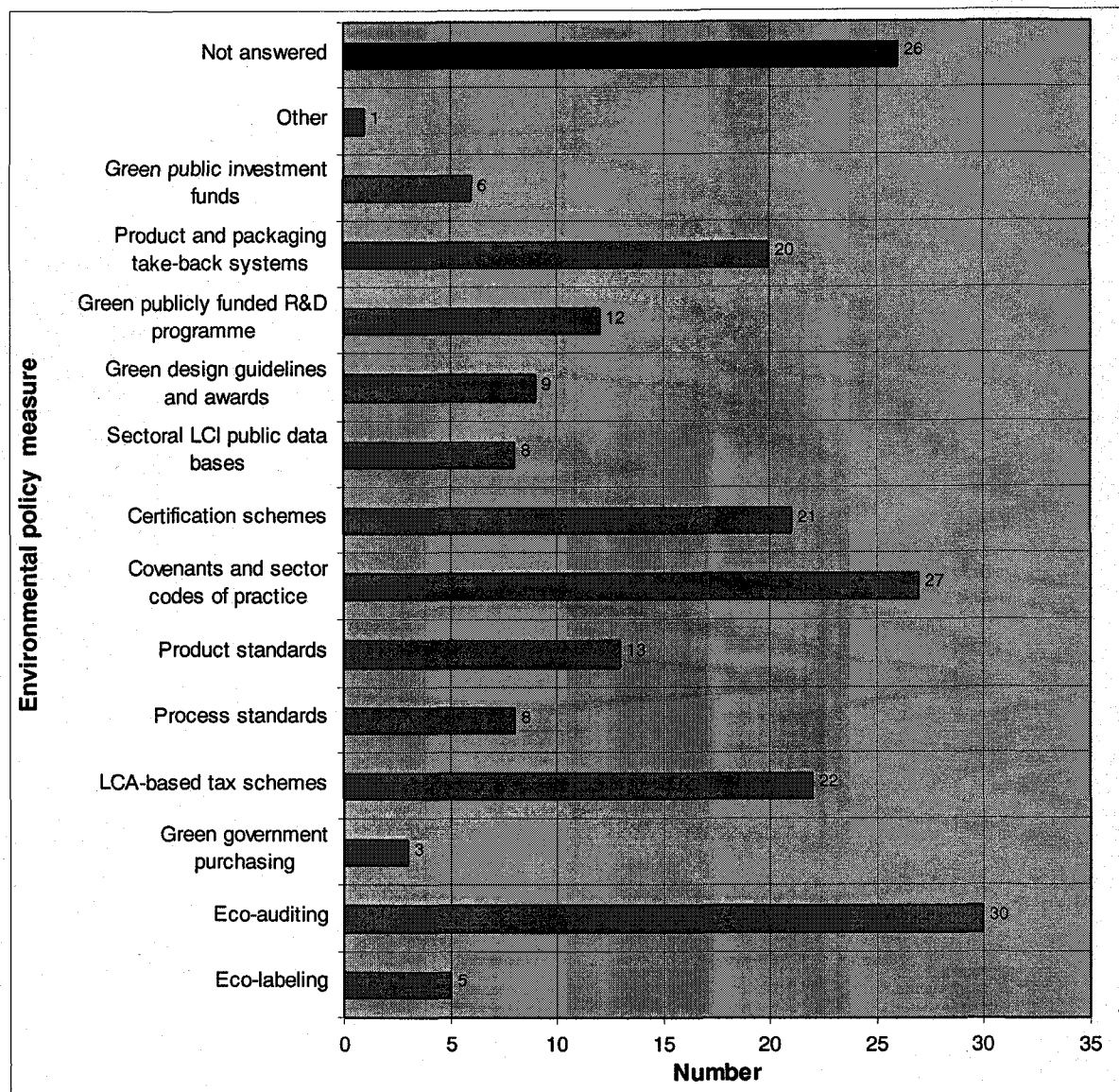


Figure 9.4: Necessary policy actions [absolute numbers]
(N=101, 5 refusals)

The responding companies thought it very important to strengthen five measures: eco-auditing, covenants/sector codes, LCA-based tax-schemes, certification schemes and take-back-systems. This list is a mixture of voluntary measures and of very strong governmental measures. All other actions have no such an importance.

³⁶ Several answers to this question were possible.

However, one has to doubt that the respondents considered the relationship between eco-taxes and LCA-results; we suppose that they refer to eco-taxes in general and not to LCA based tax measures.

10 Conclusions

In the previous chapters, we have reported on the survey on the application of LCA's within German companies. The chapter is subdivided into various sections, each dealing with one interesting aspect of the report.

10.1 The sample

The sample of companies to which the questionnaires have been sent consists of two different groups: environmentally oriented and large companies. Of the 410 companies that received questionnaires, 101 (that is 25%) sent back a completed questionnaire. This return quota corresponds to the „normal“ average quota for surveys within German companies. 62 companies indicated they use LCA's, whereas 39 wrote that they did not use this instrument.

Any grouping of the respondents according to large and environmental companies has been regarded as not helpful because the boundary between the two groups could not be drawn clearly. The companies have been assigned to business sectors in accordance with the NACE classification. In order to diminish the amount of sectors, we further combined the branches.

We have subdivided the companies into two groups: a first group to which companies belong that use LCA-studies and a second group to which companies belong which do not use LCA-studies.

10.2 Business' environmental policy

Most of the responding companies are very active in the area of environmental management (and also of quality management and risk/health management).

The self-perception of companies is - from an environmental point of view - very positive: 1/3 of the companies claimed to be eco-pioneers and 1/2 to be proactive. However, we have not been able to check this information, therefore, it should be treated very carefully. Also 50% of the companies regard their environmental actions as sufficient; 10% of the companies described their activities as not sufficient and 1/3 as partly sufficient.

10.3 Motivations and LCA

In general, environmental consciousness seems to be a necessary, but not sufficient condition for starting LCA; this thesis is underlined by their higher perception of environmental problems along a life-cycle in contrast to companies not using LCA. In general, companies using LCA tend to rank all environmental concerns higher than companies not using LCA. Additionally, a hierarchy in the concerns exists: process related issues are ranked the highest, followed by suppliers-related. The last position in the ranking is given to use and disposal related concerns. That means that the application of LCA's appears to be more „upstream“ than „downstream“ stimulated.

Also the existence of an environmental management systems seems to be another supporting factor for carrying-out LCA-activities.

A company's environment related activities might be influenced by different business-external stakeholders. According to our survey, the most important ones are consumers/ business clients (that is the market) and regulators (that is policy). The future influence of all stakeholders is rated higher than their present one. However, their (relative) importance does not change dramatically. LCA-using companies tend to rank some stakeholders (especially NGO's) higher than the non-LCA-using companies. Looking to the future, both groups think that the influence of all stakeholders will be (a little bit) higher than in the present.

The most important pushing factors for carrying out LCA's are cost saving opportunities and - with a slightly less importance - management decisions, collaborative LCA-studies, emerging green markets and perceived environmental discussions. These factors are not independent of each other, but might favour each other. Less important factors are encouragement from the mother company and start of LCA activities of competitors.

10.4 Application patterns of LCA

The following conclusions regarding the experiences and application patterns are exclusively based on the answers of the companies that use LCA's.

The most frequent **current** applications of LCA are the identification of bottlenecks/weak spots and the information/education of consumers and stakeholders. That means that on one side internal purposes of improving processes/products and on the other side external communication are the main topics. A strong relationship between application patterns and business sectors does not exist. Only the food, pulp/paper, chemical and electrical sector revealed certain „specialities“. The application areas which the companies regard as **promising** are nearly the same as the current ones. Comparing these both application patterns, the only (modest) difference is that LCA might be used more often to assess important changes in products life cycle. This is a (modest) hint for a more anticipative application of LCA's within product innovation processes. LCA is (very) seldom used for the two „strategic“ applications, namely for „radical changes in the product life cycle“ and „shift from product to service“.

LCA-studies are far away from being used in a routine way for all product innovation processes. According to our survey, they are mainly used for the examination of **some** existing products. A deep and complete use for **all** new products cannot be observed. But nevertheless, some companies indicated that they apply LCA's to **all** existing products. We conclude that LCA's are used rather in a retrospective than a prospective way. Again, neither business sector nor company size were significantly interrelated with the kind of product subjected to LCA

10.5 LCA-technique and outlook

The company unit most involved in LCA is the environmental officer/department. Top management, R&D and marketing and sales departments are often involved as well. Production management, product development/design function and purchasing departments seldom deal with LCA. One might conclude that the introduction of LCA within companies is partly motivated „top down“ and partly „Bottom up“.

Performers of LCA's are mostly internal teams, followed by external consultants. A clear performer pattern is not recognisable.

The most important problems refer to data problems (the inventory phase) followed by the complexity of the LCA method and costs. The main obstacles for a wider use of LCA in the company are disputable results, general methodological difficulties and the costs of LCA.

The companies that have carried out LCA-studies have often been surprised by some of the results of an LCA-study. This suggests that LCA studies consider more than „known areas“ and inform companies on a lot of aspects they are not really aware of.

In general, the answering companies think that the use of LCA will increase in the future. But, a lot of companies have connected this statement with the condition of using LCA together with other instruments. Benefits from LCA's are expected only in the long term.

10.6 Product innovations

We think that LCA-studies should not be used only as reactive and retrospective tools which serve to document the successes and failures of products. On the contrary, they should be integrated in „traditional“ product innovation processes as tools for a continuous product improvement process. That means that LCA-studies should come „down to earth“ and accompany product innovation processes as a routine check.

In our survey, the definition of product innovations is treated both as a corporate strategy and as part of research and development. Product innovations are - in general - driven by costs and competition. Environmental pressures is regarded as the least important driver for product innovation. The definition of product innovation programmes is carried out by several departments. However, the importance of the environmental departments within product innovation processes is restricted: they take part in these processes only occasionally and not regularly. Therefore, they are not the promoters of product innovations, but they are at the „periphery“ of these processes. Their role might be more dedicated to the area of processes and process-related environmental improvements instead to that of products.

Companies indicated that they use quite a plethora of instruments in order to assess environmental aspects of products. In addition to LCA, they use material balances, energy balances, risk assessments, checklists and compliance/gap analyses with legislation.

Looking at the companies in the first group which uses LCA-studies and the second group which does not use LCA-studies, it is interesting to notice that LCA using companies regard marketing, competition and cost reduction as the most important drivers for product innovations. Also environmental opportunities are ranked high. Companies that do not use LCA place minor importance on marketing and environmental opportunities. Therefore, LCA-using companies regard the market both, as motive for innovation and reorientation and as an opportunity for environmental pioneers to realise additional pioneer profits.

However, LCA-using companies tend to apply a wider mix of tools/instruments for the environmental assessment of products than companies of the second group. They prefer especially LCA and material balances; in contrast, companies not using LCA's apply more often compliance/gap analyses with

legislation, risk assessments and checklists. Our thesis is that these application patterns of different tools support the above mentioned point that more environmental conscious companies do more (in this context: more instruments) and more active (in this context: more anticipative instruments).

39 companies taking part in the survey indicated that they did not use LCA-studies or parts thereof. How do they deal with environmental aspects (if at all). For the environmental assessment of products especially compliance/gap analyses with legislation, checklists and risk assessments are used.

10.7 Public environmental policy

Environmental policy restricts or enlarges the leeway of companies. It widens the framework and the conditions for companies to behave. We have considered different levels of interests, namely

- relationship governmental environmental policy and product innovations,
- relationship governmental environmental policy and business' application of LCA's and
- relationship governmental environmental policy and business activities.

Looking first at the importance of legislative pressure as a driver for **product innovations**, it could be said that it is not regarded as a main driver for product innovation. As mentioned above, other drivers are more important and legislation is seen as a driver of medium importance. But in general, legislation and regulators have for all companies (independent of their use or not use of LCA) the most important role as a (current and also future) stakeholder. Do these statements contradict each other? We do not think so. We believe that they are suggestive of a general perception of the importance of policy, but in the „heart“ of business activities (i.e. product innovation) within capitalistic economies they have a minor importance.

The question remains, if policy influences the **application of LCA**. Companies responding indicated that other factors (cost savings and competition) are more important. Also the specific instrument of eco-labelling does not push the development of LCA's considerably.

General business activities might be influenced by governmental environmental policy and their different measures. But how? The answers of all companies in our survey indicated that eco-auditing and covenants are the present policy measures which affect business most. But product standards, certification schemes, and product/packaging take-back systems and process standards also have an important influence. Looking to the future, companies expect eco-auditing and certification schemes (that is voluntary measures) to gain in importance. The influence of different measures in the future is ranked higher than at present ; however, considerable differences do not exist.

Companies expect that some actions (high degree of significance: eco-audit, certification schemes and eco-label; modest degree: process and product-related standards, green design guidelines and awards and green publicly funded R&D programme) will be taken on a European level). On a national level it is estimated that procurement and taxation activities will be undertaken.

Do LCA-using companies and companies that do not use LCA handle this subject differently? The influences of present policy measures on companies were ranked nearly the same by both groups: voluntary measures (eco-auditing and covenants) were ranked the highest (but LCA using companies rank covenants higher than companies of the second group) followed by process and product

standards and take back systems. Nearly the same ranking exists for the importance of future policy measures. Once more a higher ranking for covenants exists.

10.8 Outlook³⁷

Looking towards the future and the application of LCA's within the business world, we conclude that it is not too dark: a lot of companies are optimistic that the application will increase; but nevertheless, the degree of penetration of LCA's in the different application areas is not too high. The scientific circles involved in the development of the tool LCA should not ignore this point, because LCAs are one tool within the (long-term) process of sustainable development. For these purposes, LCA's must come from the discussion on the scientific clouds down to the earth of the real applications and their strengths and weaknesses.

11 Annexes

11.1 References

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State: 22.06.1998

³⁷

More detailed and elaborated proposals will be presented within the final report of the project which will be published in 1999.

11.2 German version of the questionnaire

Institut für ökologische Wirtschaftsforschung gGmbH



FRAGEBOGEN

ANWENDUNG VON PRODUKT-ÖKOBILANZEN IN UNTERNEHMEN 1997

(THE USE OF LCA IN BUSINESS DECISION-MAKING PROCESSES - GERMANY)

FORSCHUNGSPROJEKT MIT UNTERSTÜTZUNG DER GENERALDIREKTION XII (WISSENSCHAFT, FORSCHUNG UND ENTWICKLUNG) DER EUROPÄISCHEN KOMMISSION

Beteiligte Projektpartner:

- Institut für ökologische Wirtschaftsforschung (IÖW) gGmbH, Berlin-Heidelberg (D)
- Istituto di Ricerche Ambiente Italia Srl, Mailand (I)
- Gothenburg Research Institute, Götheburg (S)
- Ökoscience Beratung AG, Zürich (CH)
- Institute for Prospective Technological Studies of the Joint Research Centre (IPTS), Sevilla (E)

Leitung des Gesamtprojektes und der deutschen Untersuchung:

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D - 69115 Heidelberg

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Fax. 06221 - 27060

Email: mailbox@ioew.hd.eunet.de

**Möchten Sie die Ergebnisse
der Umfrage kostenlos
zugeschickt bekommen?**

Ja

Nein

**Bitte senden Sie den Fragebogen bis spätestens 25. April 1997 zurück!
Vielen Dank.**

Ihre Angaben dienen rein wissenschaftlichen Zwecken und werden **streng vertraulich** behandelt.
Bei Veröffentlichung der Ergebnisse werden **keine Rückschlüsse** auf die
beteiligten Firmen möglich sein.

FRAGEBOGEN

TEIL 1: ALLGEMEINE INFORMATION

Der Fragebogen bezieht sich vorzugsweise auf Ihre Unternehmenstätigkeiten in Deutschland.

- 1.1 Ihr Name: _____
 Telefonnummer: _____
 Faxnummer: _____
 Straße: _____
 Ort: _____
 E-mail-Adresse: _____
 Ihre Funktion und Position: _____
- 1.2 Name Ihres Unternehmens: _____
- 1.3 Gehört Ihr Unternehmen zu:
 einer deutschen Unternehmensgruppe?
 einer internationalen Unternehmensgruppe?
- 1.4 Aus welcher Sicht beantworten Sie den Fragebogen?
 eines einzelnen Standortes, nämlich _____
 eines rechtlich selbständigen deutschen Unternehmens, nämlich _____
 einer deutschen Tochtergesellschaft, nämlich _____
 einer internationalen Unternehmensgruppe, nämlich _____
- 1.5 Hauptprodukte Ihres Unternehmens (gemessen am Umsatz):

- 1.6 Verkauft Ihr Unternehmen seine Produkte
 vor allem an andere Industrieunternehmen?
 vor allem an den Handel?
 vor allem an Endverbraucher?
- 1.7 Anzahl der Beschäftigten (*beziehen Sie sich bei Ihren Angaben auf Frage 1.4*):
 weniger als 50
 zwischen 51 und 250
 zwischen 251 und 500
 zwischen 501 und 5.000
 mehr als 5.000
- 1.8 Jahresumsatz (in Mio. DM)..... im Jahr 199.... (*Angaben bitte in
 bezug auf Frage 1.4 machen. Handelt es sich bei Ihrem Unternehmen um eine Bank
 oder Versicherung, dann gehen Sie bitte zur nächsten Frage über*)

TEIL 2: UMWELTBELANGE IHRES UNTERNEHMENS

- | | | |
|----------------------------|--|---|
| 2.1 Hat Ihr Unternehmen... | | |
| 2.1.1 | ein Umweltmanagementsystem (entsprechend den Normen EMAS, BS 7750, ISO 14000)? | |
| | nein | nein, aber es ist geplant, dieses einzuführen |
| 2.1.2 | ein Qualitätsmanagementsystem (entsprechend den Normen BS 5750, ISO 9000)? | |
| | nein | nein, aber es ist geplant, dieses einzuführen |
| 2.1.3 | ein Risiko- und/oder Arbeitssicherheitsmanagementsystem? | |
| | nein | nein, aber es ist geplant, dieses einzuführen |

2.2 Skizzieren Sie die Bedeutung von Umweltbelangen für Ihr Unternehmen Mithilfe der folgenden Skala (Mehrfachnennungen möglich):

[illegible]

2.3a In welchem Ausmaß beeinflussen die folgenden Gruppen zum heutigen Zeitpunkt die Strategien Ihres Unternehmens? (Bitte machen Sie ein Kreuz für jede Gruppe)

[illegible]

2.3b In welchem Ausmaß beeinflussen die folgenden Gruppen innerhalb der nächsten 5 Jahre die Strategien Ihres Unternehmens? (Bitte machen Sie ein Kreuz für jede Gruppe)

[illegible]

- Sonstige, nämlich: ☐ ☐ ☐ ☐ ☐ ☐

2.4 Was ist Ihrer Meinung nach die umweltpolitische Strategie Ihres Unternehmens? (Bitte nur ein Kreuz machen)

- Einhaltung der Gesetze
proaktives Handeln
Pionier und ökologischer Vorreiter

TEIL 3: PRODUKTINNOVATION UND UMWELT

3.1 Auf welcher Ebene wird die Produktinnovationspolitik innerhalb Ihrer Firma festgelegt? (Mehrfachnennungen möglich)

- Strategische Unternehmensplanung
Forschung & Entwicklung
Prozeßoptimierung
Marketing/Absatzwirtschaft
Sonstige, nämlich _____

3.2 Was sind die wichtigsten Einflußfaktoren für Produktinnovationen in Ihrem Unternehmen? (Mehrfachnennungen möglich)

Einflußfaktoren	Keine	Gering	Mittel	Groß	Entscheidend	Nicht bekannt
• Marketingstrategien	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Wettbewerbsstrategien	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Kostensenkungen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Gesetzliche Vorgaben.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Druck infolge Umweltsensibilisierung der Öffentlichkeit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Chancen durch ökologisch verbesserte Produkte	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• sonstige, nämlich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.3 Wer ist normalerweise an der Festlegung von Programmen zur Produktinnovationen beteiligt? (Mehrfachnennungen möglich)

- Führungskräfte des Unternehmens
die Produktionsleitung
das F&E Abteilung
die Produktentwicklung(sabteilung) und das Designmanagement
Verantwortliche oder Beauftragte für den Umweltschutz
Verantwortliche oder Beauftragte für den Bereich Arbeitssicherheit bzw. Risiko
die Marketing- und Vertriebsabteilung
andere, nämlich _____

3.4 Welche Rolle spielen die Verantwortlichen bzw. Beauftragten für Umweltschutz und/oder Arbeitssicherheit/Risiko in Produktinnovationsprozessen? (Bis zu zwei Nennungen möglich)

- die des Initiators
aktive Beteiligung (in den meisten Fällen)
beratende Funktion
keine
sonstige, nämlich _____

3.5 Welche Instrumente verwenden Sie am häufigsten, um Umweltverbesserungen durch Produkte zu erzielen? (Mehrfachnennungen möglich)

- Ökobilanzen von Produkten
Checklisten
Überprüfung der Rechtskonformität
Stoffbilanzen/Stoff- und Materialflußanalysen
Umweltverträglichkeitsprüfungen (UVP)
Risikoabschätzungen (auch bezüglich der Gesundheit)
Energieeffizienzanalyse und Energiebilanzen
keine

sonstiges, nämlich _____

TEIL 4: ÖKOBILANZEN VON PRODUKTEN (LIFE CYCLE ASSESSMENT)

4.1 Verwenden Sie Ökobilanzen oder Teile davon?

ja

nein (*weiter zu Teil 5*)

Bitte beantworten Sie nur dann die folgenden Fragen, wenn Sie Ökobilanzen von Produkten (englischer Ausdruck: Life Cycle Assessment - LCA) oder Teile davon verwenden oder verwendet haben, andernfalls gehen Sie direkt über zu Teil 5.

4.2 Welche der folgenden Faktoren hat Sie in den meisten Fällen dazu bewogen, Ökobilanzen in Ihrem Unternehmen zu verwenden? (Bitte machen Sie ein Kreuz für jeden Faktoren)

Faktoren	Keine	Gering	Mittel	Groß	Entscheidend	Nicht bekannt
• Produktbezogene Umweltprobleme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Anpassung an umweltorientierte Nachfrage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Teilnahme an gemeinschaftlichen Ökobilanz-Studien (z.B. Industrieverbände, Beratungsbüros, Forschungsinstitute)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Entscheidungen der Unternehmensleitung zur Untersuchung bestimmter Bereiche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Überprüfung der Erfüllung von Anforderungen von Umweltzeichensystemen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Anstöße durch die Muttergesellschaft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Nutzung von Ökobilanzen durch Konkurrenz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Wunsch nach Verwendung neuer Analysemethoden für F&E	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Weiterentwicklung der Umweltgesetzgebung, z.B. Verpackungsverordnung	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Identifizierung von Möglichkeiten der Kosteneinsparung/ Effizienzverbesserung	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Verringerung von Haftungsrisiken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Initiativen der F&E-Abteilung	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Anstöße durch umweltpolitische Diskussionen (z.B. Agenda 21)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Sonstige, nämlich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.3 Was sind die häufigsten Anwendungen von Ökobilanzen in Ihrem Unternehmen? (Bis zu 4 Nennungen möglich)

Grundlegende Veränderungen im Produktlebenszyklus

Identifikation von Schwachstellen

Überprüfung der Auswirkungen gesetzlicher Vorgaben

Forschung & Entwicklung und Design

Entwicklung von Kriterien für das Beschaffungswesen und für die Analyse von Lieferanten; Überprüfung der Produktverantwortung innerhalb

Produktlebenszykluses

Information/Aufklärung der Verbraucher und von anderen interessierten Gruppen

Zurechnung von Umweltkosten (Allokationsfragen)

Vergleich bereits existierender Produkte unseres Unternehmens mit denen der Konkurrenz

Vergleich existierender mit geplanten Produkten unseres Unternehmens

Beurteilung der Erfüllbarkeit von Anforderungen von Umweltzeichensystemen

Ermittlung der Auswirkungen einer Umstellung von Produkten auf

Dienstleistungen

Festlegen von Marketing- und Werbepolitik und Einhaltung von Umweltzeichen
betriebsinterne Information und Schulung

andere, nämlich _____

4.4 Für welche Zwecke setzen Sie Ökobilanzen ein? (bis zu 2 Nennungen möglich)

für einige in unserem Betrieb hergestellten bzw. verkauften Produkte
für alle bereits in unserem Betrieb hergestellten bzw. verkauften Produkte
nur für Produkte, die einer ökologischen Marktnische entsprechen sollen
für einige neue Produkte
für alle neuen Produkte
für andere Zwecke, nämlich _____

4.5 Welche Unternehmensbereiche befassen sich mit Ökobilanzen?

(Mehrfachnennungen möglich)

die Führungskräfte
die Produktionsleitung
die F&E-Abteilung
die Produktentwicklung und Designabteilung
der Umweltschutzbeauftragte
der Arbeitssicherheitsbeauftragte
das Beschaffungswesen bzw. die Einkaufsabteilung
die Marketing- und Vertriebsabteilung
sonstige, nämlich _____

4.6 Wer führt Ökobilanzen in Ihrem Unternehmen durch?

(betriebs)interne Arbeitsgruppen
externe Berater und/oder Forschungsinstitute
gemeinsame Durchführung mit anderen Unternehmen und Industrieverbänden
sonstige, nämlich _____

4.7 Mit welchen methodischen Problemen waren Sie bei der Durchführung von Ökobilanzen innerhalb Ihres Unternehmens konfrontiert? (Mehrfachnennungen möglich)

Komplexität der Methode
Festlegung der Systemgrenzen
Erhebung sowie Qualität der Daten (für die Sachbilanz)
Schwierigkeiten in der Bewertungs- und Auswertungsphase
personeller/finanzieller Aufwand
sonstige, nämlich _____

4.8 Was sind die wichtigsten Hemmnisse für die weitere Anwendung von Ökobilanzen in Ihrem Unternehmens? (Mehrfachnennungen möglich)

nicht eindeutige Ergebnisse
schwierige Kommunizierbarkeit der Ergebnisse von Ökobilanzen an die Führungskräfte
allgemeine methodische Schwierigkeiten
Kosten von Ökobilanzen
Kosten der Realisierung von vorgeschlagenen Maßnahmen einer Ökobilanz
sonstige, nämlich: _____

4.9 Wie beurteilen Sie das Aufwands-Ertrags-Verhältnis von Ökobilanzen in Ihrem Unternehmen?

Ökobilanzen liefern Ergebnisse, die sofort umgesetzt werden können.
Der Nutzen von Ökobilanzen ist eher langfristig.
Der Nutzen von Ökobilanzen hängt von der ausschließlichen Verwendung der Ergebnisse innerhalb unseres Unternehmens ab.
Der Nutzen von Ökobilanzen hängen von der Möglichkeit ab, die Ergebnisse außerhalb unseres Unternehmens zu verbreiten.
sonstiges, nämlich: _____

4.10 Haben die Ökobilanzen überraschende Ergebnisse gebracht?

ja, nämlich hinsichtlich _____

nein

weiß nicht

sonstiges, nämlich:

andere, nämlich

[illegible]

5.2 Mit welchen umweltpolitischen Maßnahmen rechnen Sie **innerhalb der nächsten 5 Jahre** und wie könnten diese Maßnahmen Ihr Unternehmen beeinflussen? (Bitte machen Sie ein Kreuz für jede Maßnahme und verwenden Sie dabei bitte die folgende Skala:

- Wahrscheinlichkeit des Eintretens (1 = keine; 2 = gering; 3 = mittel; 4 = groß; 5 = entscheidend; 0 = nicht bekannt)
- Auswirkung auf Ihr Unternehmen (1 = keine; 2 = gering; 3 = mittel; 4 = groß; 5 = entscheidend; 0 = nicht bekannt)
- und tragen Sie durch Ankreuzen auch bitte ein, wo Ihrer Erwartung nach die Maßnahme durchgeführt wird (europaweit oder im deutschen Rahmen)

Umweltpolitische Maßnahme	Wahrscheinlichkeit des Eintretens						Mögliche Auswirkungen auf Ihr Unternehmen						Europa- weite Maß- nahme	Deutsche Maß- nahme
A) Umweltzeichen	1	2	3	4	5	0	1	2	3	4	5	0		
B) Öko-Audit	1	2	3	4	5	0	1	2	3	4	5	0		
C) Öffentliches Beschaffungswesen	1	2	3	4	5	0	1	2	3	4	5	0		
D) Abgaben/Steuern, die auf Ergebnissen von Ökobilanzen aufbauen	1	2	3	4	5	0	1	2	3	4	5	0		
E) Prozeßbezogene Normen ...	1	2	3	4	5	0	1	2	3	4	5	0		
F) Produktbezogene Normen ..	1	2	3	4	5	0	1	2	3	4	5	0		
G) Selbstverpflichtungen	1	2	3	4	5	0	1	2	3	4	5	0		
H) Zertifizierungssysteme	1	2	3	4	5	0	1	2	3	4	5	0		
I) Erstellung branchenbezogener öffentlich zugänglicher Daten für Sachbilanzen	1	2	3	4	5	0	1	2	3	4	5	0		
J) ökologische Designrichtlinien und Auszeichnungen ..	1	2	3	4	5	0	1	2	3	4	5	0		
K) F&E - Zuschüsse zu ökologischen Innovationen ..	1	2	3	4	5	0	1	2	3	4	5	0		
L) Systeme zur Produkt und Verpackungsrücknahme	1	2	3	4	5	0	1	2	3	4	5	0		
M) Ökologische Investmentfonds	1	2	3	4	5	0	1	2	3	4	5	0		
N) Sonstige, nämlich	1	2	3	4	5	0	1	2	3	4	5	0		

5.3 Welche der oben erwähnten Maßnahmen (vgl. Frage 5.2) werden Ihrer Meinung nach unbedingt notwendig sein? (verwenden Sie bitte die Buchstaben der Frage 5.2) _____

5.4 Glauben Sie, daß die Maßnahmen, die Ihr Unternehmen bereits durchgeführt hat, ausreichend sind oder sehen Sie einen noch größeren Handlungsbedarf im Bereich des Umweltmanagements Ihres Unternehmens?

ja

nein

teilweise, bitte genauer erklären _____

11.3 German results of the survey

PART ONE

Question 1.1

Your position in the company

Clerk in charge	6
Project manager	1
Coordinator	4
Environmental officer	23
Spokesman for environmental matters	5
Head of department	24
Head of press department	2
Top management	6
Other	4
Only department name specified	11
<i>Not answered</i>	15
Total	101

Question 1.3

Is the organisation part of:

A national group	44
An international group	40
<i>Not answered</i>	17
Total	101

Question 1.6

Does the company...

Mainly sell its products to retail chains	33
Mainly sell its products to more than one client group	27
Mainly sell its products to other industrial companies	26
Mainly sell its products to end consumer	10
<i>Not answered</i>	5
Total	101

Question 1.7

Number of employees

More than 5,000	44
Between 501 and 5,000	33
Between 251 and 500	9
Between 51 and 250	8
Below 50	6
<i>Not answered</i>	1
Total	101

PART TWO

Question 2.1

Does the company have...**An Environmental Management System?**

(as defined by EMAS, BS7750, ISO 14000)

Yes	57
No, but planned	29
No	13
<i>Not answered</i>	2
Total	101

A Quality Management System? (as defined by BS7550, ISO 14000)

Yes	74
No, but planned	17
No	8
<i>Not answered</i>	2
Total	101

A risk and Occupational Health and Safety management system?

Yes	64
No, but planned	13
No	21
<i>Not answered</i>	2
Total	101

Question 2.2

Outline the importance of environmental concerns for your company according to this scale:
(Several answers possible) 1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial

	1	2	3	4	5	n.a.	mean
Related to the process (water discharges, wastes, air emissions, noise, energy consumption)	2	17	16	43	21	2	3.65
Related to suppliers' environmental performance		26	24	44	7		3.32
Related to the use and disposal of products	9	24	18	36	12	2	3.18

Question 2.3

What is the importance of the following stakeholders in terms of influence on strategies for your company in particular, currently and in the future (five years)? (Several answers possible)
Please mark for each of the following groups the level of influence, according to this scale:
1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial

	current importance						
	1	2	3	4	5	n.a.	mean
Environmental groups and consumer associations	4	41	35	18	1	2	2.71
Local communities	15	51	24	8		3	2.26
Regulators		7	28	40	24	2	3.82
Stockholders	33	17	13	17	15	6	2.62
Banks, insurance companies	21	30	29	10	1	10	2.34
Final consumers	5	11	21	34	26	4	3.67
Business clients	7	10	22	35	24	3	3.60
Suppliers	7	45	35	10	1	3	2.52
Media	2	32	38	23	2	4	2.91
Employees	2	18	47	32	2		3.14
Trade unions	19	47	26	3		6	2.14
Others			2	2	4	93	2.78

	importance within five years						
	1	2	3	4	5	<i>n.a.</i>	mean
Environmental groups and consumer associations	4	22	37	28	3	7	3.04
Local communities	13	41	32	7		8	2.35
Regulators	1	7	28	35	28	4	3.87
Stockholders	27	14	14	19	16	11	2.81
Banks, insurance companies	9	26	33	16	3	14	2.75
Final consumers	3	9	19	30	34	6	3.87
Business clients	4	11	14	38	28	6	3.79
Suppliers	5	32	42	10	4	8	2.74
Media	1	25	33	30	4	8	3.12
Employees	1	17	35	40	5	3	3.32
Trade unions	17	42	29	5		8	2.24
Others			3	3	2	93	3.88

Question 2.4

What is in your opinion the strategy of your company ?

Compliance	9
Proactive	51
Pioneering and eco-innovator	32
<i>Not answered</i>	9
Total:	101

PART THREE

Question 3.1

Which is the stage where product innovation policy is defined in your firm?
(Several answers possible)

Corporate strategy	69
Research and development	62
Process optimisation	35
Marketing	52
<i>Not answered</i>	5

Question 3.2

What are the most important drivers for product innovation in your company?

(Several answers possible) 1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial

	1	2	3	4	5	n.a.	mean
Marketing strategy	3	3	22	51	15	7	3.77
Competitors' strategy	2	3	18	50	20	8	3.89
Cost reduction	1	11	19	44	18	8	3.72
Legislation pressure	5	23	30	24	14	5	3.20
Environmental pressures	8	26	36	22	3	6	2.85
Environmental opportunities	3	15	31	35	12	5	3.40
Other drivers			1	1	4	95	4.50

Question 3.3

Who is normally involved in product innovation programmes definition?

(Several answers possible)

Top management	79
Production management	40
Research and development management	60
Product development and design management	48
Environmental officer	44
Health and safety officer	15
Marketing and sales department management	75
Others	10
<i>Not answered</i>	3

Question 3.4

What is the role of the environmental officer and health and safety department in the product innovation process? (Two answers possible)

Initiator	15
Active participant in most cases	43
Occasional consultant	75
None	11
Other	2
<i>Not answered</i>	1

Question 3.5

In the context of product environmental improvements what are the most used tools?

(Several answers possible)

Life cycle assessment	35
Checklists	46
Compliance / gap analysis with legislation	40
Material balances	37
Environmental impact assessments	18
Risk assessment (also for health)	45
Energy efficiency analysis and energy balances	34
None	5
Other	11
<i>Not answered</i>	<i>2</i>

PART FOUR

Question 4.1

Do you use LCA or parts of it?

Yes	62
No	39
<i>Not answered</i>	<i>0</i>
Total	101

Question 4.2

Which of the following factors pushed in most occasions forward the decision to start LCA in your company? (Several answers possible)

Please mark each of the following level of importance according to this scale:

1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial

	1	2	3	4	5	<i>n.a.</i>	mean
Product environmental problems	12	10	13	14	7	6	2.89
Willingness to respond to emerging green markets	6	11	19	14	4	8	2.98
Collaborative study with external organisations (ex. Industry associations, consultants, research institutes)	15	8	9	13	10	7	2.91
Decision expressed by the management to examine some areas	14	5	13	18	5	7	2.91
Meet eco label criteria	18	15	11	9	1	8	2.26
Encouragement from the parent company	31	5	3	5	3	15	1.81
Competitors who started to use it	27	11	10	6		8	1.91
Willingness to introduce new analysis instruments for R & D	21	16	10	6	1	8	2.07
Evolution of environmental legislation - ex. Packaging Directive -	9	15	19	11	3	5	2.72
Cost savings opportunities/efficiency	8	7	15	21	4	7	3.11
Cost avoidance due to future liabilities	18	15	10	8	2	9	2.26
Initiatives by research/technical departments	18	8	14	9	3	10	2.44
Perceived environmental discussions (Agenda 21, ...)	5	15	19	13	3	7	2.89
Other				3	1	58	4.25

Question 4.3

What are the most frequent applications of LCA? (tick up to 4 choices)

Radical changes in product life cycle	9
Bottlenecks identification	38
Anticipate and negotiate legislation	10
Research development and design	19
Procurement specifications, supplier screening, product co-Makership and stewardship	20
Information and education to consumer and stakeholders	37
Environmental cost allocation	7
Compare existing company products with products of competitors	20
Compare existing products with planned alternatives	18
Assess the gap from eco-label ecological criteria	8
Shift from product to service	2
Define marketing and advertising policies and join eco-labelling criteria	12
Internal (to the company) information and training	10
Other	4

Question 4.4

Do you use LCA... (tick up to two choices)

For some existing products	32
For all existing products	13
Only for green products	6
For some new products?	14
For all new products?	1
Other	10
<i>Not answered</i>	3
Total	63

Question 4.5

Which functions have been involved in LCA? (Several answers possible)

Top management	24
Production management	12
R&D function	26
Product development and design function	13
Environmental officer	42
Health and safety officer	5
Purchasing department	13
Marketing and sales department management	20
Other	8
<i>Not answered</i>	4
Total	63

Question 4.6

Who performs LCA studies in your company?

Internal team	41
External consultants and/or research institutions	31
Jointly performed with other companies and industry associations	15
Other	5
<i>Not answered</i>	7
Total	63

Question 4.7

Mark the main methodological difficulties the company has met in implementing LCA:
(Several answers possible)

Methodology complexity	31
Definition of system boundaries	26
Collection and quality of data (in the inventory phase)	40
Difficulties in the assessment and interpretation phase	24
Cost of resources involved	31
Other	6
<i>Not answered</i>	8
Total	63

Question 4.8**Mark the main obstacles, if any, to a wider use of LCA in the company:**

(Several answers possible)

Results are disputable	26
Results are difficult to be communicated by top management	6
General methodological difficulties	25
Costs of LCA	19
Cost of implementation of measures suggested by LCA findings	7
Other	13
<i>Not answered</i>	9
Total	63

Question 4.9**What is the balance between costs and benefits of LCA?**

LCA provides results that can be immediately applied	7
LCA benefits are long term ones	41
Benefits of LCA are strictly related to the use of results in the company	9
Benefits depend upon the possibility of diffusing results externally	15
Other	6
<i>Not answered</i>	8
Total	63

Question 4.10**Did LCA produce any surprise?**

Yes	26
No	24
Do not know	1
<i>Not answered</i>	12
Total	63

Question 4.11**Do you think the use of LCA will increase in the future in your company?**

Yes	30
No	6
Only if used together with other instruments	28
Only if methodology will be clearer	13
Depending on the spread of the instrument among companies	9
Other	1
<i>Not answered</i>	5
Total	63

Question 4.12**If yes (question 4.11) what are the most promising applications of LCA?**

(tick up to 4 choices)

Radical changes in product life cycle	11
Bottlenecks identification	25
Anticipate and negotiate legislation	8
Research development and design	10
Procurement specifications, supplier screening, product co-makership and stewardship	10
Information and education to consumer and stakeholders	20
Environmental cost allocation	9
Compare existing company products with products of competitors	12
Compare existing products with non existing alternatives	9
Assess the gap from eco-label ecological criteria	5
Shift from product to service	1
Define marketing and advertising policies and join eco-labelling criteria	7
Internal (to the company) information and training	8
Other	1
<i>Not answered</i>	23

PART FIVE

Question 5.1

In which way do *present* Government policy actions listed in the table are affecting your way to do business? (Several answers possible)

Please scale them: 1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial; 0 = don't know

	1	2	3	4	5	n.a.	mean
Eco-labelling	19	41	26	11		4	2.30
Eco-auditing	5	12	36	38	8	2	3.32
Green government purchasing	27	32	21	9	2	10	2.20
LCA based tax schemes	27	35	13	8		18	2.02
Process standards	11	23	32	21	5	9	2.85
Product standards	10	16	37	19	9	10	3.01
Covenants and sector codes of practice	4	14	34	38	5	6	3.27
Certification schemes	5	22	29	30	7	8	3.13
Sectoral LCI public data bases	23	28	22	9	2	17	2.27
Green design guidelines and awards	18	37	18	16	1	11	2.39
Green publicly funded R&D programme	33	28	19	8		13	2.02
Product and packaging take-back systems	8	18	36	25	6	8	3.03
Green public investment funds	43	31	10	2		15	1.66
other	1		2			98	2.33

Question 5.2 a

What do you expect to be the *future* (within five years) policy actions related to LCA and affecting your way to do business? (Several answers possible)

Please scale them: 1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial; 0 = don't know

	Likelihood to occur						mean
	1	2	3	4	5	n.a.	
Eco-labelling	8	26	18	30	10	9	3.09
Eco-auditing		6	15	37	34	9	4.08
Green government purchasing	7	30	20	13	6	25	2.75
LCA based tax schemes	10	43	20	15	1	12	2.48
Process standards	4	18	30	22	2	24	2.96
Product standards	5	14	25	25	12	20	3.31
Covenants and sector codes of practice	3	9	21	40	16	12	3.64
Certification schemes		6	15	40	23	17	3.95
Sectoral LCI public data bases	6	39	22	12	3	19	2.60
Green design guidelines and awards	7	26	28	17	5	18	2.84
Green publicly funded R&D programme	8	30	30	12	2	19	2.63
Product and packaging take-back systems	2	10	16	43	15	15	3.69
Green public investment funds	13	25	23	12	4	24	2.60
Other						101	

Question 5.2 b

What do you expect to be the *future* (within five years) policy actions related to LCA and affecting your way to do business? (Several answers possible)

Please scale them: 1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial; 0 = don't know

	importance for your business						
	1	2	3	4	5	n.a.	mean
Eco-labelling	10	29	28	16	7	11	2.79
Eco-auditing	1	8	37	28	16	11	3.56
Green government purchasing	10	32	16	12	7	24	2.66
LCA based tax schemes	5	23	31	17	9	16	3.02
Process standards	6	17	30	23	3	22	3.00
Product standards	6	14	21	28	13	19	3.34
Covenants and sector codes of practice	3	9	32	27	19	11	3.56
Certification schemes		11	26	29	17	18	3.63
Sectoral LCI public data bases	10	25	24	17	4	21	2.75
Green design guidelines and awards	12	24	22	17	7	19	2.79
Green publicly funded R&D programme	19	25	21	11	5	20	2.48
Product and packaging take-back systems	6	16	22	29	14	14	3.33
Green public investment funds	27	27	17	4	1	25	2.01
Other						101	

Question 5.2 c

What do you expect to be the *future* (within five years) policy actions related to LCA and affecting your way to do business? (Several answers possible)

Please scale them: 1 = none; 2 = low; 3 = medium; 4 = influential; 5 = crucial; 0 = don't know

	area of action		
	<i>European action</i>	<i>National action</i>	<i>not answered</i>
Eco-labelling	46	18	37
Eco-auditing	64	12	25
Green government purchasing	12	38	51
LCA based tax schemes	16	44	41
Process standards	33	24	44
Product standards	39	21	41
Covenants and sector codes of practice	3	35	43
Certification schemes	52	9	40
Sectoral LCI public data bases	18	36	47
Green design guidelines and awards	29	25	47
Green publicly funded R&D programme	33	25	43
Product and packaging take-back systems	22	35	44
Green public investment funds	24	22	54
Other			101

Question 5.3

Which of the above mentioned (question 5.2) will be mandatory in your opinion?

Eco-labelling	5
Eco-auditing	30
Green government purchasing	3
LCA based tax schemes	22
Process standards	8
Product standards	13
Covenants and sector codes of practice	27
Certification schemes	21
Sectoral LCI public data bases	8
Green design guidelines and awards	9
Green publicly funded R&D programme	12
Product and packaging take-back systems	20
Green public investment funds	6
Other	1

Question 5.4

Do you think that actions undertaken by your company are sufficient to be ready or you will need to be more active in environmental management?

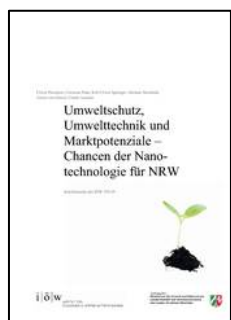
Yes	51
No	11
Partly	29
<i>Not answered</i>	10
Total	101

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Ausgabe 2/2010

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