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The “state of play” in life cycle assessments: a survey on how Italian companies perform life-cycle assessments and product footprints

Abstract

The paper reports the results of a survey on life cycle assessment (LCA) implementation in Italy. LCA is a methodology to assess the environmental impacts associated with all the stages of a product's life (i.e., from raw material extraction through material's processing, manufacturing, distribution, use, repair and maintenance, as well as disposal or recycling). The survey involved approximately 90 companies and was carried out within the PREFER project, financed by the Life plus Programme of the European Commission. The results emerged from the survey describing the difficulties and the barriers faced by companies, especially small and medium, when implementing the LCA methodology.

Keywords: product environmental footprint, life cycle assessment, companies, environment, sustainability.

JEL Classification: Q5.

Introduction

Current production and consumption patterns are generating a continuous growth of the global economy impact on the environment. Humanity footprint has doubled in the last 50 years, and in 2007 has exceeded the Earth's footprint by 50 per cent. This means that, at this level of consumption and production, we would need one planet and half to be sustainable.

For some categories of impacts, Europe is moving in the right direction, although in some cases slowly; for example, direct air emissions have shown absolute decoupling from economic growth, while greenhouse gas emissions have been stabilized. The emissions from EEA countries have been reduced by 17% since 1990 and appear to be steadily decreasing, although they are still 5 times higher than the 2050 target for a sustainable level of GHG emissions from Europe.

Direct emissions of acidifying gases and ground-level precursors related to European production saw an absolute decoupling from economic growth during the period 1995-2006 (they decreased by 27% and 13% respectively, despite an increase in economic output of 40%).

Overall, the challenge is to create a virtuous circle: improving the environmental performance of pro-

ducts throughout their life-cycle, promoting and stimulating the demand of better products and production technologies and helping consumers to make better informed choices. For these reasons, the Institute of Management at Sant'Anna Advanced School, launched the PREFER project, to carry out actions at the microeconomic level that directly affect individual economic actors and both institutional and private consumers. “PREFER – PProduct Environmental Footprint Enhanced by Regions” is a project co-financed by the European Commission's LIFE Plus Programme. The PREFER Project (1.500.000 Euros in funding) started in October 2013 and is scheduled to last 42 months. Together with the Institute of Management, the following national agencies are involved: CENTROCOT (Busto Arsizio), Asti Consortium (Asti), ERVET (Bologna), District of Nocera Gragnano (Salerno) and the Lombardy region.

The Project is testing a new EC method to assess the environmental footprint of products and services. The “PEF – Product Environmental Footprint” is a Life Cycle Assessment-based method developed by the European Commission, which is being tested in the PREFER project to assess the environmental impacts of 8 products selected from 8 clusters. PREFER is particularly focused on the so-called “cluster approach”. A cluster was defined by Porter in 1990 as being composed of companies and industries linked by vertical (buyer/supplier) and/or horizontal (common customers, technology, etc.) relationships with the main players located in a single nation/state. Many others suggested that the cluster approach can effectively support companies improving their environmental performances (Nassimbeni, 2000; Birkin, 1997b; Iraldo and Frey, 2007; Florida 1996; Daddi et al., 2010).

In the preliminary phase of the PREFER project a questionnaire survey has been carried out among

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Italian companies. The companies involved in the survey have been identified on the bases of their high level of awareness and sensitivity towards environmental management-related issues: some of them implemented an LCA or a carbon footprint on their products or services, others obtained an ISO type III (e.g.: the EPD[®] certification) or an ISO Type I label (such as the EU Ecolabel or the FSC certification) and others preferred different management tools to improve their environmental performances (e.g.: EMAS), but they can all be identified as “front runners” in this area.

This paper illustrates the results achieved by the questionnaire survey. The section about results introduces the achieved results and describes the feedbacks obtained from 94 Italian companies. The research is based on a questionnaire survey. The survey aims to investigate impacts connected with the LCA adoption and with the expectations concerning this methodology. LCA is a tool for environmental impact measurement. For this reason the survey collects the feedback by companies interesting on environmental topics and on LCA.

The first phase aimed to identify the statistical reference population by analyzing the database of main important tools for product environmental quality for instance EPD database, ISPRA database and others. The second step focused on the questions’ design. The questionnaire was designed to investigate the drivers and barriers to environmental footprint. It is composed by different sections and one of these only referred to product lifecycle and/or carbon (or water) footprint analysis. The questionnaire structure allowed comparing the feedback received by companies realizing the LCA and other companies. The data collection lasted two months.

The section conclusion describes the main differences among companies implementing LCA or not.

2. Results and discussion

The questionnaire, administered to 94 companies from January to March 2014, was designed to investigate the drivers and barriers to the development of a Product Environmental Footprint. A specific section of the questionnaire was devoted to product lifecycle and/or carbon (or water) footprints and therefore aimed only at those companies that had performed or were performing LCA (or any other environmental footprint analysis) on at least one of their products at the time of the survey administration. Overall, 34 companies responded to the questionnaire. The survey results are presented in the following paragraphs.

In order to take into account possible differences that may arise due to different companies’ size, the

34 responding companies have been broken down into 2 subsamples:

- ◆ 15 large companies with more than 250 employees;
- ◆ 19 small and medium-sized companies with a maximum of 250 employees.

Furthermore, for the sake of comparison, some of the section’s questions were also administered to additional 60 companies, and these too have been broken down according to their size. It must be noted that the second group of 60 companies had, in any case, a “high” sustainability management performance because they were interested in LCA or in carbon footprinting, even if they had not yet adopted these tools for various reasons. Indeed, as we have already mentioned, the companies belonging to the second group had either EMAS or an ISO type I environmental label. To better specify, the aims of taking the 60 companies on board for the research were to obtain a “control” group that would verify if the views of the companies that actually used LCA were also shared by the other companies (that were just interested in environmental management issues, but not LCA adopters), and to find out what the differences were, especially to determine the criticalities and obstacles caused by the lack of direct expertise in applying LCA.

We can start by describing the results concerning the first group of 34 companies who are “actual” LCA adopters. For the sake of simplicity, the survey questions were on LCA application, with no distinction on the specific “context” in which this tool was adopted (e.g.: as a basis for a type III label, to determine a carbon footprint, etc.).

Before framing the survey results, it was important to know at what stage of the LCA study the 34 companies were and what decisions had been made. 73.5% of the companies declared that they had already completed their first LCA study and only 26% declared that their LCA study was still being carried out. The following graph shows that the sample of 34 companies (even if it is a limited number) shows different LCA “maturity” stages.

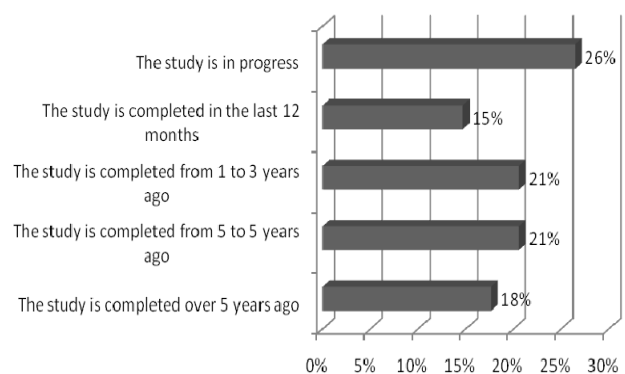


Fig. 1. Is the LCA study completed or in progress?

The range of different product categories involved in our study was quite interesting. Contrary to our expectations, companies tended to include several (similar) products in their LCA studies. In particular, companies that had been carrying out LCA for some time wanted to apply it to a wide range of products. In fact, 70% of the companies had conducted or were performing an LCA on more than one product and, significantly, one third of the sample had decided to perform LCA on more than five products. This shows that firms tend not to differentiate among products in the same production range in order to perform an LCA. In this sense, by including many products which are “served” by the same production or supply chain in an LCA study from the start, companies obtain many synergies and economies of scale when gathering, calculating and, especially, allocating environmental impacts.

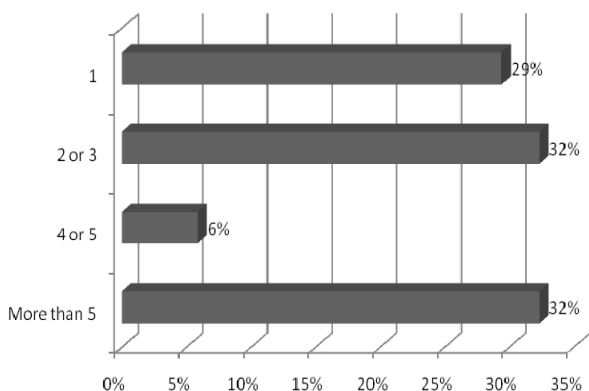


Fig. 2. Number of products which underwent LCA

As expected, one of the results emerging from our survey highlighted the importance and the “relative weight” of the product that a company chooses for LCA among the overall range of its products. For a relative majority of the responding companies (33%), the share of the product or products that underwent LCA was less than 5%.

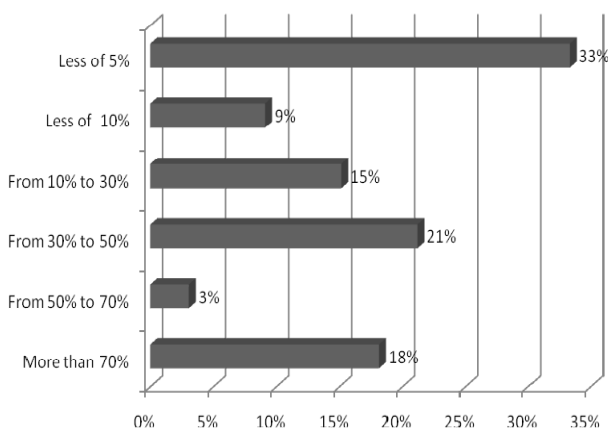


Fig. 3. The turnover of the products chosen for LCA

Nevertheless, the survey results show a significant difference between larger firms and SMEs. Indeed, for more than 50% of the large firms, the turnover

of the products chosen for LCA was less than 5%, while for the small and medium-sized firms (which normally have a limited products range) the percentage was quite different: only 21% of the SMEs had conducted LCA on a product from one of their “smaller” ranges (less than 5% turnover) while many SMEs had conducted LCA on products that had more than 70% of their turnover.

An interesting aspect regarding the costs and problems of an LCA study is the software tool. The software needed to perform the LCA can be one of the highest costs companies incur when they decide to adopt and carry out an LCA, regardless of the software being purchased or provided within the consultancy service by a consulting firm.

The data from our survey indirectly confirmed that the companies had to pay to use market software to carry out their LCA study (Figure 4). Indeed, 59% of the responding companies chose this option. In more detail, the majority of the responding SMEs (74%) declared that they had paid to use the software compared with 40% of the large firms. Only a few firms responded that they have either developed their own software or used spreadsheets developed by experts or, still, used the so-called “freeware” available on the internet.

Finally, 18% of the surveyed firms (33% large ones and only 5% SMEs) responded that they had used other software solutions for their impact calculations such as those from the Ministry of the Environment or universities. It is important to note that this happens because universities often develop and provide software for free, especially for groups of firms that take part in projects.

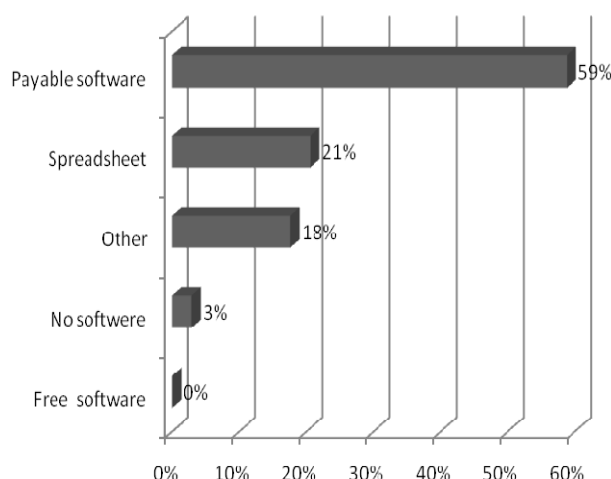


Fig. 4. Software for product environmental footprint assessment

A firm must strategically choose the type of product it wants to assess, before it decides to carry out an LCA study. Naturally, firms focus on the product range that may have the best environmental per-

formance. We could not obviously find one predominant product characteristic in our survey because there were too many different products that had undergone LCA by the 34 companies. However, we can point out some aspects concerning the environmental performances that were considered to have long-term value for environmental footprint. Firms mainly aimed for a high percentage of recyclable/recoverable materials and for a “dematerialization” in the use of packaging (preferred by 50% and 47% of the firms, respectively). Evidently, many firms consider the use of secondary raw material as a guarantee of minimum environmental impact, especially when it is compared to “primary” material use. LCA often confirms this, but sometimes the results of the environmental footprint show that this is not always the case. For example, after recyclable waste is transformed, processed, prepared and transported to the production site, there may be many environmental impacts that outweigh the benefits of recycling.

21% of the respondents considered “product durability” as important. It was surprising to find out that such a significant percentage of respondents perceived the environmental benefits (and the connected long-term value) of durability rather than the other alternatives. This aspect is a current issue with the European Commission that has recently called upon a consortium of consultants, including the Sant’Anna School of Advanced Studies, Pisa, to evaluate the advantages of *product durability* using comparative LCA studies.

The first two options were closely followed by resource saving during production (such as *energy* or *water saving*) and using a high percentage of recyclable materials (44% and 41%, respectively). It is interesting to note that for these options to have a long-term value in an LCA study, they must undergo rigid analysis so that their impacts can be measured and evaluated (and possibly compared with other options) during product use and end-of-life (i.e. using the “cradle to grave” approach).

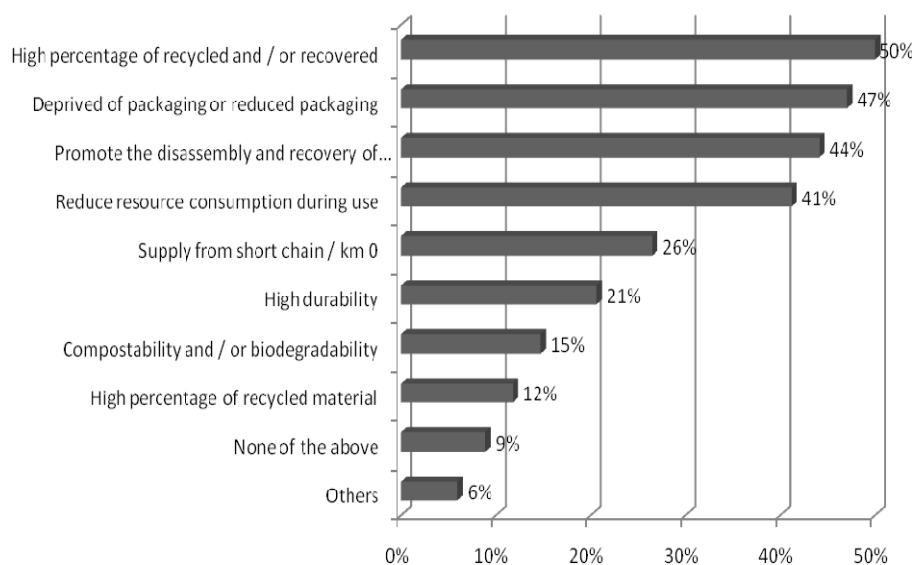


Fig. 5. Features of products in LCA studies

Some of the biggest barriers companies, especially SMEs, face when trying to guarantee an effective and efficient LCA study are the needs to fully understand the supply chain and to obtain data and information from all their suppliers whose activities can cause significant environmental impacts. The quality of their data must be assured because it explains a significant part of the product environmental footprint (i.e.: they are the major contributors of the different impact categories). Our PREFER survey confirmed that, according to the majority of the firms in the study, the upstream supply chain is the biggest and most important source of environmental impact. The “upstream” phases of a product’s lifecycle, especially the extraction/production and supply of raw materials were de-

clared by 47% and 41% of the firms, respectively, as the biggest contributors to their environmental footprint (Figure 6). Because the accuracy of the data for these phases must be guaranteed, all the firms, especially the smaller ones, find it often almost impossible to obtain accurate and reliable information from their suppliers. For example, it is very difficult for food processing companies to obtain data on the cultivation of raw materials which are often purchased from international markets. This forces firms to use secondary data which must be guaranteed as well and this means that the firms must research the sources and obtain and process the data to make it suitable for analysis (e.g.: the emissions factors). 35% of the firms responded that their production phases also significantly contribute to

their environmental impacts. However, they considered the “downstream” phases, that is the distribution, use and end-of-life phases less significant. Obviously, these results must take into account both

the lack of similarities in the product categories and that often firms carried out LCA studies from “cradle to gate”, under-evaluating the downstream phases (the distribution, use and end-of-life phases).

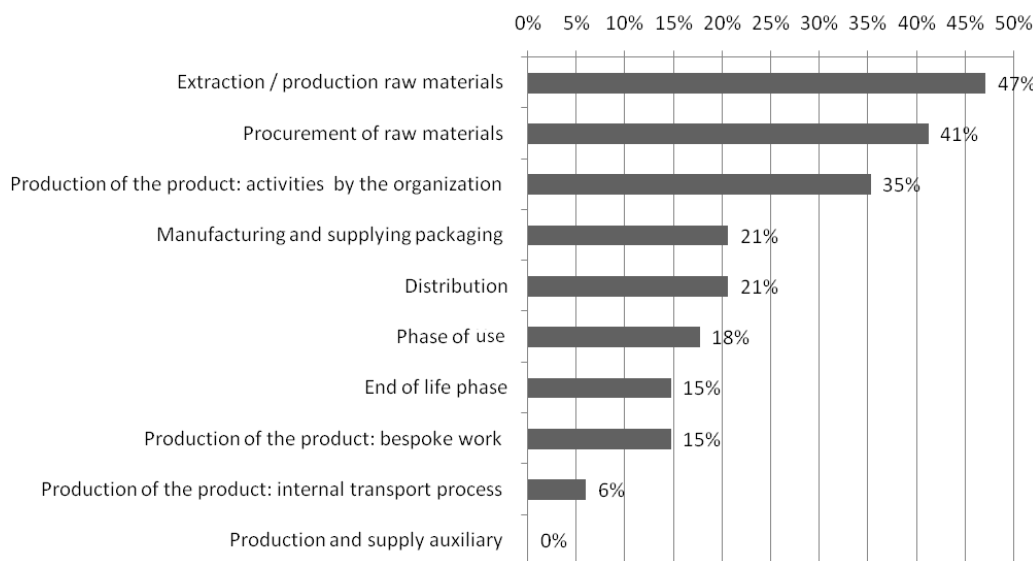


Fig. 6. Impacts of the product lifecycle phases

As evidence, we here describe the answers that were given to the survey question which asked to specify the main barriers to LCA studies. The respondents explicitly confirmed what was aforesaid and provided information on the criticalities in environmental footprint.

Again, as Figure 7 shows, the respondents confirmed that the gathering of data and information from suppliers was the most difficult phase of the LCA study. 47% of the firms responded “very difficult”, but the number increases to 76% if we sum the “difficult” and the “very difficult” responses.

To a lesser degree, but equally important, was the difficulty of using and giving long-term value to the results of an LCA study (rather than actually carrying it out). Specifically:

- ◆ communicating the results (56% of the firms said this was “difficult” to “very difficult”);
- ◆ identifying the strategies needed to improve the product environmental footprint (50% of the firms said this was “difficult” to “very difficult”).

Communicating product environmental performance is today perceived as a priority by the firms that use the LCA. The need to find a balance between accurate and scientifically rigorous data (and their complexity) and easily understood labels is confirmed as the key for a successful environmental footprint and its future development. Without a doubt, LCA is an efficient tool for providing reliable data to the market and stakeholders and for avoiding *green-*

washing, but firms must be able to easily communicate LCA numbers and indicators.

On the other hand, our survey has shown that the stakeholders in the company also have to give LCA “spendable” power as a decisional support tool. In this sense, we must interpret the survey results that indicated the problems encountered when LCA results had to be transformed into guidelines for management (especially for planning and setting up environmental performance improvements). These problems are exasperated, above all, by the fact that LCA is often commissioned today by functional units that are not directly responsible for environmental issues or company sustainability. They need feedback from the LCA study which is easy to understand by the “non experts” and can be used for their functions (e.g.: design, logistics, sales). Moreover, an LCA study needs data and information that are all very different but all equally coessential: not only environmental parameters but also production, sales, logistics, purchases, R&D, distribution... even parameters for how a product is used by intermediary and final clients (for example, how a paint is applied). This means that the results must be given back in a “user-friendly” way to all the organisational units of the company by “disaggregating” the information and explaining that their contribution is fundamental to the success of the study. The results of an LCA study have to be “suitable” and usable by all the company functions which need them in different ways for different objectives. Take, for example, the trivial but frequent case

when a firm’s Top Management unit wants the results of the total environmental footprint, but the Purchasing unit wants the results disaggregated by the product/service it needs or by supplier (the supplier’s specific environmental impacts, its location, etc.); the Production unit needs the results disaggregated by site, department or production line; and the R&D function needs the results disaggregated by

product component, product ingredient or by different scenarios according to different design options (for example, substituting an ingredient), etc. In light of this, we believe that it is important for the users of the results to be “on board” the LCA project from the very beginning so that the tools and the reports are effectively designed and the results easily available.

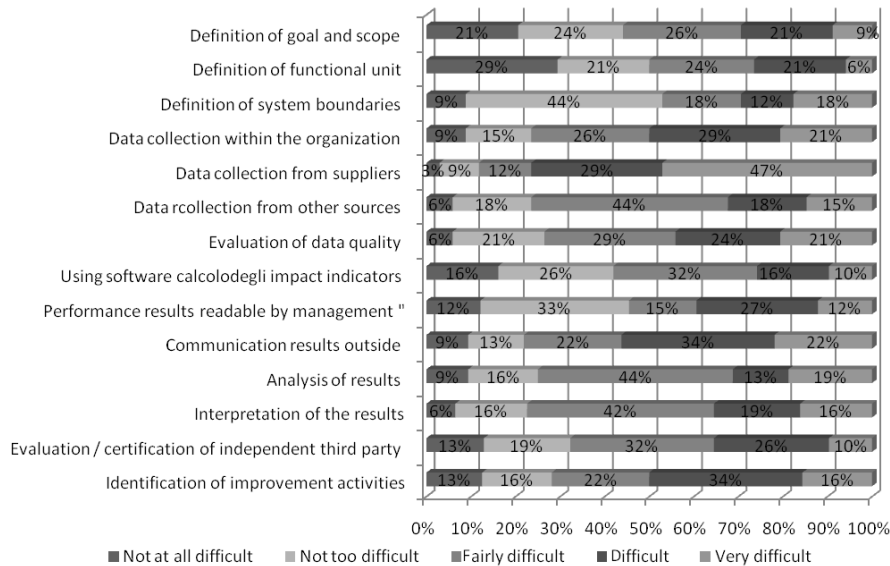


Fig. 7. Evaluation of the difficulty of each LCA study phase

We can compare the answers of the “control sample” with the firms that had never carried out LCA. It is interesting to note that the results coincide with the first barrier identified. Of all the LCA study phases, data gathering from suppliers is considered the most difficult by both “non-expert” and “expert” firms. To specify, 41% of the surveyed firms considered this phase “very difficult”, and if we sum the “difficult” with the “very difficult” responses, the percentage rises to 67%. For the “non-expert” firms, the biggest barriers were data gathering, processing and evaluating. Although to a lesser degree, the difficulty faced during the following phases was deemed by companies as being significantly important:

- ♦ obtaining data from different sources (57% of the firms responded “difficult” to “very difficult”);
- ♦ evaluating the reliability of the data (55% of the firms responded “difficult” to “very difficult”).

It must be pointed out that when the criticalities of each LCA study phases are not experienced “first-hand”, they are considered less important than the application phases.

The analysis of the factors that the survey respondents have identified as barriers and difficulties to the effective implementation of an LCA study, provides useful insights on the type of resources that companies need to perform an LCA for their environmental footprint.

The first set of resources needed are the human resources (in terms of know-how, competencies and inside support) that firms must activate to reach their objective (Figure 8). In companies’ view, indeed, employees and consultants are absolutely fundamental to carry out an LCA study: 85% and 68% of the firms, respectively indicated these two resources as being fundamental.

It is significant to note that if we sum the “few important” with the “very important” responses, 100% of the firms responded that it was imperative that their employees take part in an LCA study. Our questionnaire included a specific question on this issue.

Employees involvement in LCA studies was considered equally important by both the subsamples of our survey, the large companies and the SMEs. However, large firms didn’t consider consultants as being as important as the SMEs did: 84% of the surveyed SMEs responded that the support of consultants was crucial while only 47% of large firms responded so.

Coherently to what was aforesaid about the problem of obtaining data and information from suppliers, this latter was considered a “key” factor for an LCA study by 86% of the respondents (sum of “very important” and “few important”).

Subcontractors, category associations, public authorities and clients were considered less important by firms for an LCA study: 65%, 62%, 59% and

56%, respectively (Figure 9). In addition to the parties indicated in the questionnaire, 16% of the SMEs also identified the Ministry for the Envi-

ronment, specialized research centres (the so-called “experimental stations”) and software firms as being important to an LCA study.

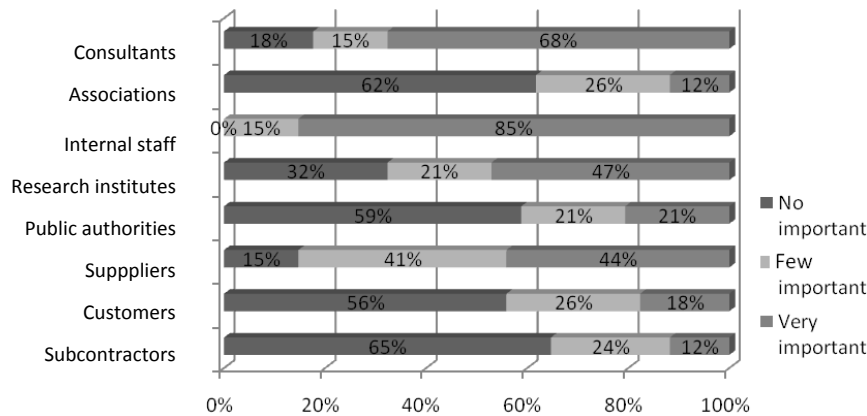


Fig. 8. Degree of involvement in an LCA study

As highlighted, the survey results show that companies deem their employees as being a fundamental resource in order to perform an LCA study. In more detail, the participation of the technical staff is considered to be “very important” by 79% of both large firms and SMEs (Figure 9).

As for the higher-ranking employees (directors and chief executive officers/board of directors), these

are considered as being less important for an LCA study, especially by large companies. Indeed, 50% of the surveyed large firms and 21% of the SMEs responded that the involvement of their chief executive officers was not important. Similarly, 27% of the responding large firms and 11% of the SMEs declared that the involvement of their managers wasn’t important.

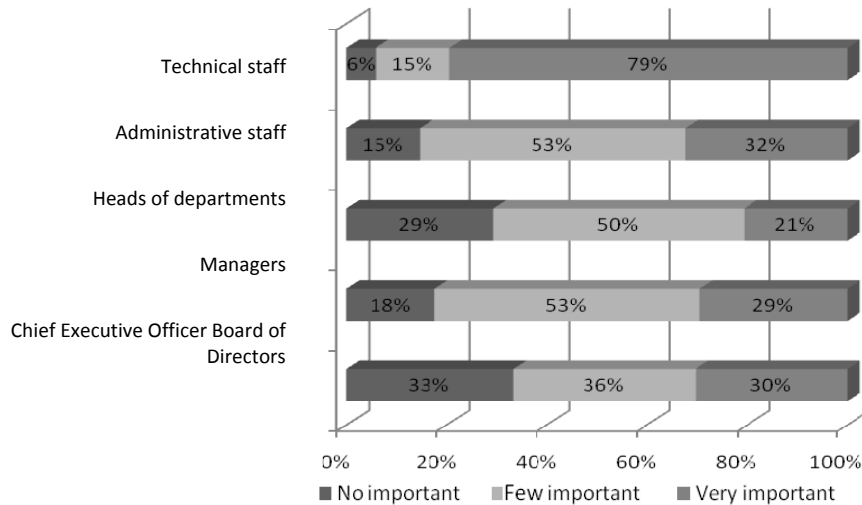


Fig. 9. Involvement of company employees in an LCA study

The immaterial resources that companies need to activate for the assessment of their environmental footprint are not limited to *know how* and competencies. The results of our survey explicitly show that some companies must make organizational changes or, more generally, set up or enhance management activities to assure that their environmental footprint (and their LCA study) will be an integral part of their strategies.

To see what organizational changes and strategic decisions a firm’s environmental management needs for an LCA study and its results, a question in the PREFER questionnaire asked the respondents to

indicate what company strategies were being planned, carried out or completed for their LCA study and its added value. For a start, we were surprised to find that there weren’t any particular differences between large firms and SMEs in this part of the survey.

First of all, there were some interesting data in the responses if we consider the three aforesaid phases in an aggregated way: what is planned, what is being carried out and what has been completed by the firm. In light of this, the planning process for new marketing strategies was considered fundamental by a total of 78% of our sample (Figure 10). Neverthe-

less, for many of the respondents, the long-term value of LCA, from a marketing perspective, was still being planned.

The second priority is an extremely operational process which is to monitor input data for the LCA model differently (i.e. more frequently and reliably) in order to guarantee reliability. Another closely

linked operational process is to improve environmental management by using LCA's environmental impact categories indicators.

Finally, the changes which firms considered less useful or less functional and less linked to an LCA study and its added value are adopting new technologies or increasing environmental investments.

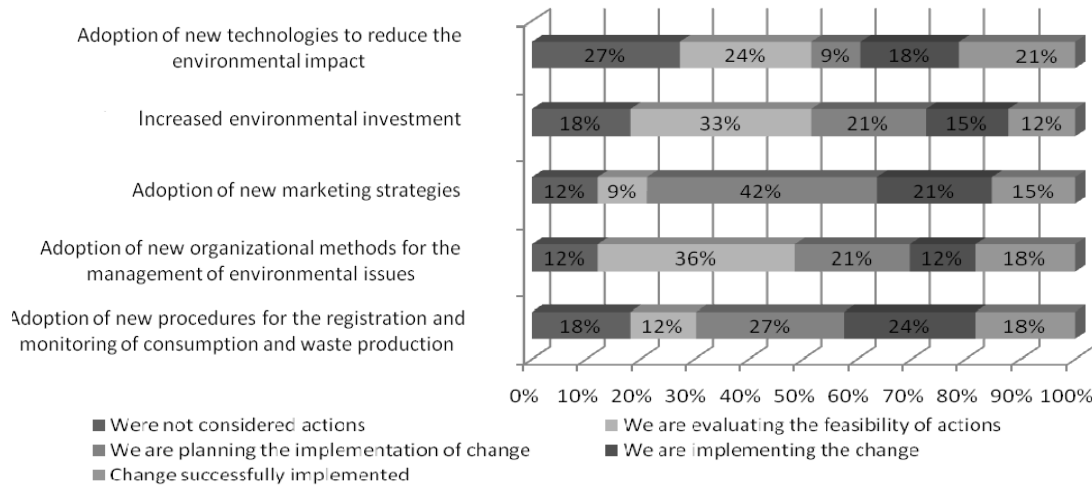


Fig. 10. Organizational changes after a firm's LCA study

Once again the PREFER survey allows us to compare the firms that had not tried to perform LCA with the firms that had. This time, the differences were quite obvious. The sample of "expert" firms that had carried out LCA thought that increasing environmental investments was less important than the "non expert" firms that thought it was a direct result of the decision to perform LCA. At the opposite end, the need to modify strategic marketing plans was considered not at all important. This is clearly in contrast with the previous response from the firms which had to change their marketing strategies after environmental footprint.

Perhaps this is one of the best explanations for the different attitudes towards LCA. Some firms believe that it is very useful because it gives them a competitive edge; others are more sceptical and are afraid of the technical resources they will need to guarantee an excellent environmental footprint performance.

Finally, an LCA study to measure a firm's environmental footprint needs the allocation of financial resources. Not only in terms of investments, but also in terms of direct costs for performing LCA and, if necessary, certifying it by a third party.

Although the costs for performing an LCA study and for environmental footprint are extremely different for each product category, we can consider the sample of companies that had direct experience with the different cost categories.

The first obvious aspect is the extremely variable range of costs companies can have. First of all, this

variability is a sign of an extremely "new" market where there are many different "products" (i.e.: different environmental footprints) and "producers" (all those who offer support and consulting services). The cost of environmental footprint can greatly vary according to the methodology adopted (companies can choose a full LCA study conforming to ISO 14044 and EPD[®] specifications, or only a carbon footprint study conforming to PAS 2050 specifications, ISO 14067 or a national methodology) and to whether it is certified by a third party or not. Moreover, the costs can greatly vary according to the different pricing of consulting services. Initially, there were only a few qualified consulting agencies, especially in Italy, but there are now many new agencies and this is causing price diversification.

Nevertheless, the most interesting result is that the diversification of market prices and the costs a firm must incur do not depend on the size of the firm but rather on several factors of the production chain and lifecycle of the product. Specifically, the complexity of the product (e.g. number of components or ingredients), the processes (e.g.: number of production phases and diversification of production technologies) and the supply chain (e.g.: number of suppliers and supply chains, their sites, logistics management types, etc.) can change the costs much more than the size of the firm. As our survey demonstrates, large firms frequently have less costs than SMEs: in fact, 27% of our large firms incurred costs under 5000 euros compared to only 11% of our SMEs.

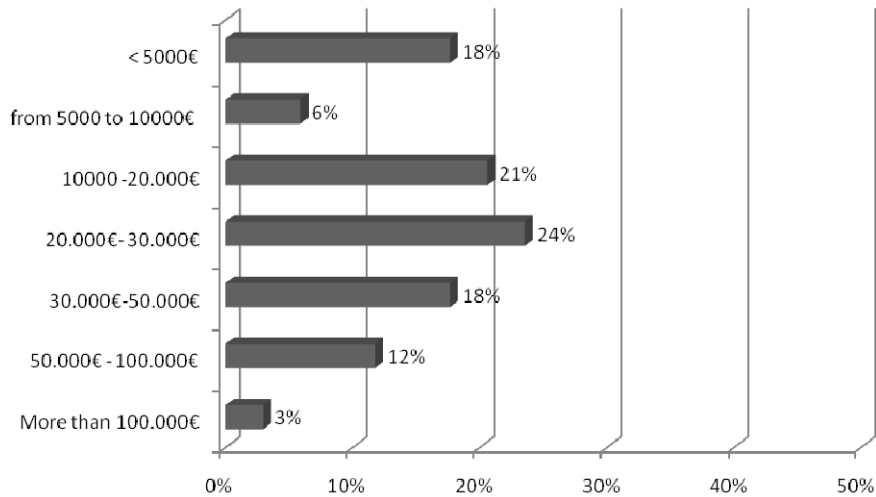


Fig. 11. Cost estimates for an LCA study

To face costs, support schemes and incentives, such as technical-operational support, funding and tax breaks, could be activated to help firms that decide to carry out an LCA study. Among the incentives and support schemes that the PREFER questionnaire suggested, those that provided direct financial help were preferred the most by the companies. The incentives that the firms thought would help them carry out an LCA study were national or regional funding and non-taxed costs, which are practically absent in Italy for environmental tools (excluding a considerable contribution from

the Ministry for the Environment). These incentives were closely followed by free databases and software which greatly reduce the costs and easier access to consulting services offered by the product/category associations. Technical *help desks* didn't seem to be particularly appreciated but there were differences in the classes of respondents: free *help desks* and free software and database use were considered by all the respondents to be not very effective for an LCA study, but 63% of the micro-enterprises thought they were of the utmost importance.

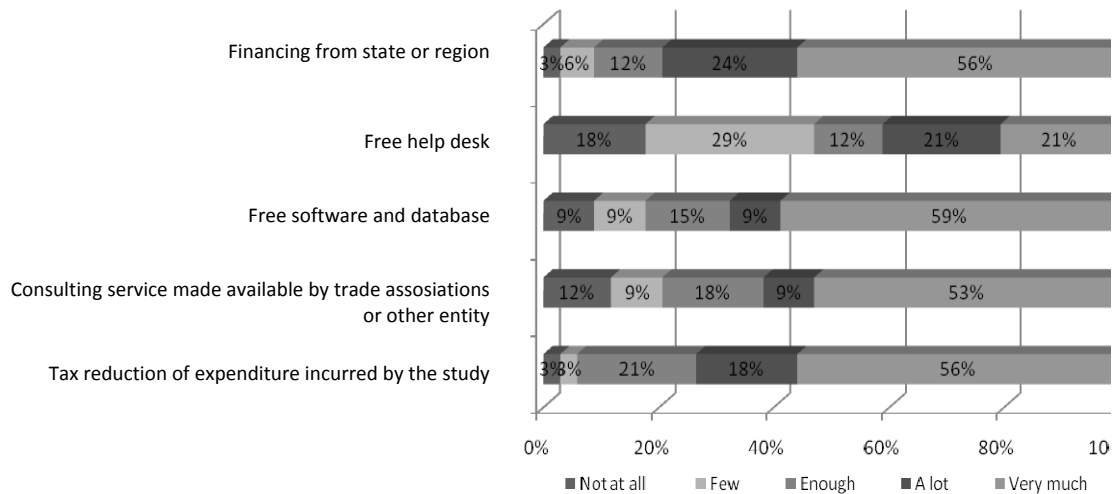


Fig. 12. Useful incentives for LCA studies

Once again, we can compare the firms that had applied an LCA study and those that had not; and show that their preferences coincided perfectly, proving that they had the same views on the incentives preferred.

After presenting the main difficulties and challenges that firms face when performing product environmental footprint and promoting its added value, we should examine the “other side of the coin” to identify the advantages and benefits. One of the most detailed

questions in the PREFER questionnaire was on the evaluation of LCA's contribution to a company's different goals. The question included all the possible uses of LCA by describing many scenarios and added values and the role LCA can play in supporting environmental management and company strategy.

The results, based on the respondents' experience with LCA and environmental footprint, allowed us to identify empirical evidence that is extremely interesting for our research.

First of all, our survey revealed an aspect which is often considered only technical and looked upon with scepticism by many. The main use of LCA and environmental footprint is to make competitive strategies stronger and more effective. The fact that all the firms, large firms and SMEs alike, responded that the benefits of environmental footprint are new marketing and business opportunities is very positive for all its supporters and for those who promote it in firms and firm *policies*. The evidence gathered from the PREFER survey shows, without a doubt, that the effective use of LCA can have a direct effect on competitive performances.

This is strongly confirmed by the second response, in order of preference, on the role of LCA in improving firm reputation. Very frequently, especially in Italy, LCA and environmental footprint have been used by firms to position themselves as innovators and market leaders, in the sense of “*first movers*”, to outdistance their competitors and create a competitive *gap*.

These two types of evidence, when integrated, support the hypothesis of those who claim that LCA can be used by decision makers as a marketing leverage, rather than just a mere information tool in environmental management. As further proof, we

must point out two more advantages for a firm’s competitive dynamics and performances:

- ◆ an increase in their competitive advantage (42% of the companies after adding the last two options);
- ◆ a higher customer satisfaction (38% of the companies after adding the last two options).

Contrary to the idea that larger companies are better able to use these tools for their competitive advantage, our PREFER survey has shown that these advantages were mostly reported by SMEs. For example, the effective contribution of an LCA study to a firm’s reputation is shared by 63% of the SMEs compared to 36% of the large firms.

The purely technical connotation of an LCA study was revealed in the third response (in order of preference) which is LCA’s contribution to supporting and guaranteeing the environmental performance of a firm and its supply chain.

As regards the other positive aspects, there was less improvement seen in relations with suppliers (although they have a crucial role in LCA studies) and in relations with company owners and the rest of the company groups when LCA is carried out in a company branch.

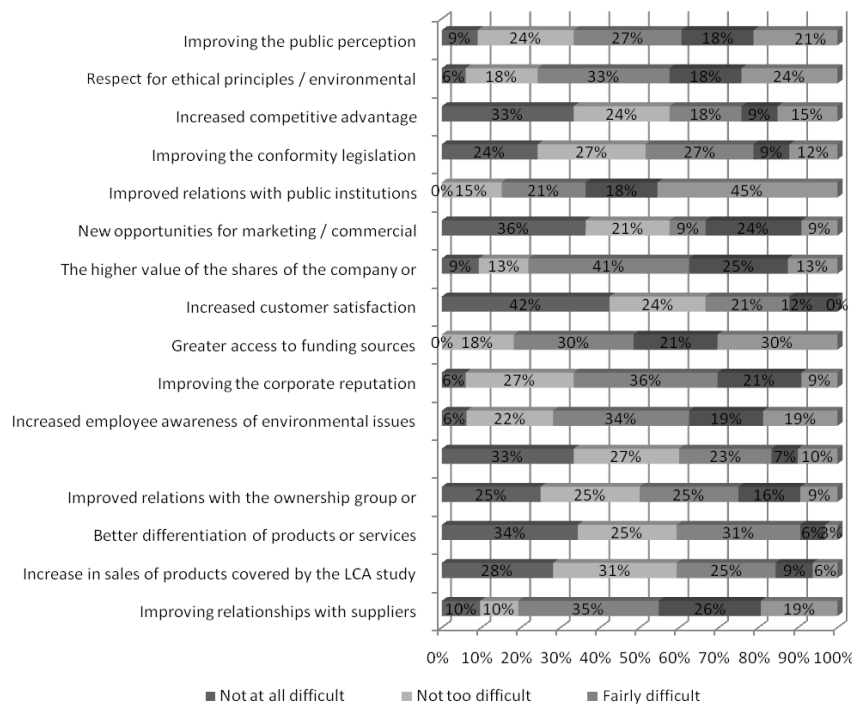


Fig. 13. LCA’s contribution to competitive advantage

Conclusive remarks

The outcomes of our survey mirror a “state of play” in the development of LCA in Italy which shows many different facets.

On the one hand, the results we obtained confirm that the process of carrying out an LCA implies considerable efforts by the companies, especially when we

consider the costs that have to be sustained by smaller companies. The same efforts, though, are a clear sign that Italian companies are using the LCA not merely as an assessment tool, but as a lever to support an effective environmental management, aimed at different strategic purposes: feeding the R&D and product design activities, managing the supply chain, aiding the marketing and communication actions, etc.

The choice of using LCA within a wider management strategy, implies that the adopters cannot underestimate the human and economic resources to be devoted to its implementation.

On the other hand, the survey helps in identifying the most critical areas in the application of LCA, providing evidence that confirm the anecdotal experience of many case studies: involving the suppliers, setting up a multifunctional team to deal with the study, making the results of the LCA available and “usable” for the different internal stakeholders are, at the same time, the key objectives of the process and the most difficult activities to perform.

This is true especially for SMEs, which are still suffering from a lack of technical, human and economic resources to invest in advanced environmental management tools.

But, rather surprisingly, smaller companies are keen and “ready” to use the LCA for competitive purposes and they perceive clear benefits and advan-

tages from applying this tool. This is a very positive outcome of our survey: once the SMEs are able to overcome the barriers they face in the adoption of the LCA, they are also capable of getting the best out of the tool, especially by using it as a management improvement opportunity.

Much of the collected evidence represents the “cornerstones” of the PREFER project strategy, that aims to overcome the barriers and obstacles for SMEs, in order to gain the biggest benefits and opportunities out of it. Actually, these results endorse the so-called “cluster approach” adopted by the PREFER project to foster cooperation between SMEs in order for them to share resources, create synergies and develop common tools to: set up the LCA study, collect the relevant data, involve the suppliers, carry out the assessment and use the LCA results to support their competitive strategies. The future phases of the PREFER project will aim to prove that this cluster-oriented approach can really yield positive results “in-field”.

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