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Green labels and sustainability reporting

Overview of the building products supply chain in Italy

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Abstract

Purpose – This paper aims to contribute to the understanding of corporate sustainability reporting strategies and communication tools that are increasingly being adopted to foster green market outlets, with focus on the building materials supply chain.

Design/methodology/approach – The suitability, feasibility, appropriateness, effectiveness, completeness and redundancy of some of the most common sustainability reporting tools such as Sustainability Reporting (SR), Sustainable Development Indicators (SDI) and Green labels based on Life Cycle Assessment (LCA) were investigated.

Findings – Focusing on the present Italian situation and with emphasis on ornamental stones, ceramic tiles, cement and concrete producers, the interest and the response in the building materials supply chain are highlighted, pointing out strengths, weaknesses and future perspectives.

Practical implications – Green communication tools discussed in the paper can also be used to protect local markets against the unfair competition by those producers that can supply low price building products, but with much higher environmental externalities.

Originality/value – The paper can be considered as a contribution to support the European Commission's and Member States' policymakers which are pushing for instruments that will improve the sustainability of the building products supply chain. The findings can encourage those producers who are more aware of the environmental consequences of extractive and manufacturing activities and that are actively engaged in Sustainable Development.

Keywords Economic sustainability, Supply chain management, Italy

Paper type Research paper

1. Introduction

The desire for high environmental quality is a key issue influencing the behaviour of larger and larger numbers of individuals' consumer behaviour; their market choices are increasingly being driven by the environmental performance of products. This represents a new and promising green market outlet for firms that are trying to understand and satisfy the environmental expectations of their customers, including those in the sector of building products. However, as Pahl (2003) reported, there is growing scepticism among consumers about the validity of "green" product claims. This stems in part from the fact that green labelling schemes range from policy level government-sponsored programmes to claims based on an assessment made by an

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outside group to corporate self-assessment to "rent-a-greenie" product endorsements (Harris, 2007; May, 2010).

At the same time, the European Commission's and Member States' policymakers are pushing for instruments that can improve the sustainability of all economic activities. One method they are increasingly promoting is ecolabeling. EU ecolabels provide information to consumers, and also encourage and support producers who are more aware of the environmental consequences of extractive, industrial, and manufacturing activities. Such firms actively engage in sustainable development issues, and as a result take steps to minimize their environmental footprint by implementing an environmental management system (EMS) and committing to continuous quality improvement.

From the firm point of view, a continuing problem of those producers that act in an environmentally sustainable manner is the difficulty of identifying and capturing competitive advantage from their responsible behaviour. In order to influence market competition towards fair and effective environmental improvements, it is necessary to have instruments such as ecolabels that enable consumers to compare products based on scientifically sound, objective, and comparable environmental indicators (Curran, 2001; Guinée *et al.*, 2001). Otherwise, these firms cannot distinguish themselves from firms who merely pursue market targets with green-wash packaging.

This is particularly true in the case of building products. Quarrying activities, and subsequent manufacturing of products made from stone, exist because of the need for and use of these outputs in construction projects (Badino *et al.*, 2006). In reality, however, many consumers are unaware of the source of the primary materials in their homes or office buildings, and are unfamiliar with the manufacturing processes for building products. Moreover, the attitudes of those consumers who are aware of the quarrying sector have often been negatively impacted by the irresponsible, unsustainable behaviour of a subset of the industry. This makes effective green labelling of quarry products even more challenging. Difficulties not withstanding, however, producers of building materials who can demonstrate that their materials contribute to sustainable development will better be able to secure and grow their markets. Moreover, in the changing market and regulatory context, producers need to become better stewards of their products as they move through the economy, society and the environment (Brady and Bocher, 2007).

Another key issue is the protection of the local, and European Union, markets against the unfair competition by those producers that can supply low price materials, but with much higher environmental burdens (Badino *et al.*, 2003). This occurs because, in the absence of government actions (taxes, fees, environmental regulation, etc.) to force quarrying and manufacturing firms to internalize the environmental costs of their activities, only responsible and environmentally pro-active firms will do so. But they must compete with firms that can price their products lower because they do not face the same set of costs. To do so effectively they need a tool to share information that clarifies the relative value of their products and encourage customers to widely accept the payment of the premium price they need to cover the extra costs (Bianchi and Noci, 1998).

The first specific objective of the paper is an analysis of the most important sustainability reporting instruments, with focus on Sustainable Development Indicators (SDI), Sustainability Reporting (SR) and Green labels based on Life Cycle Assessment (LCA).

With emphasis on the Italian situation, the second specific objective is to highlight the interest and response of producers in green labels, by outlining strengths and weaknesses, as well as future perspectives of the European Ecolabel award scheme and the Environmental Product Declaration (EPD) system.

With respect to the building products industry, sustainability, supply chain management, sustainability indicators and other forms of reporting are discussed in the next section. Ecolabels are then introduced, compared and contrasted with sustainability indicators and other reporting methods, identifying overlaps and opportunities for synergy. Finally, the value of eco-labelling for informed consumer choices and for sustainable building activity in the European Union is considered.

2. Sustainability and the building products industry

We are coming to understand that many of the issues faced by both developed and developing nations alike are highly uncertain, urgent, complex, and interconnected. Human activities are having impacts that exceed the Earth's carrying capacity on global, and in many places, regional and local scales. We can no longer afford to address individual environmental and social problems in a convenient isolation of their context, or their spatial or temporal scale (Funtowicz and Ravetz, 2001).

The sustainability paradigm provides a framework for addressing complex problems because it is both comprehensive and flexible (Shields *et al.*, 2002). Sustainable development strives to improve the economy, environment, and society for the current generation, without compromising the ability of future generations to meet their needs. Moreover, the overarching goals of economic prosperity, environmental health, and equity for the present generation, and equal opportunities for future generations, are simple and flexible enough to allow for multiple interpretations, as well as application in a variety of circumstances and across sectors of the economy.

Although this paper is focused on environmental reporting, an important feature of the sustainable development paradigm is explicit recognition of the interconnectedness of social, economic and environmental systems. Economic growth and technological advancement are deemed to be essential to sustainable development, but need to be achieved in an environmentally sensitive manner.

The principles of sustainable development apply not only to governments and individuals, but to businesses as well. Increasingly firms are expected to behave sustainably. Producers that operate in an international context are being challenged to incorporate economic, environmental and social aspects in their policies, culture and decision-making. However, such incorporation has implications that extend well outside the manufacturing process and that can be tracked according to three intersecting life cycles, typical of the manufacturing industry, the project (design), asset (operational facility) and product life cycles (Brent, 2005). This approach was adapted to the quarrying sector, with the following three intersecting life cycles:

(1) *Quarry life cycle*: Sustainable development must be integrated in the design and management over the life cycle of quarry from exploration to post closure.

(2) *Asset life cycle*: The life cycle of assets must be optimised in terms of sustainable development performance of the manufacturing facility.

(3) *Product life cycle*: The from-cradle-to-grave consequences of products on economies, environment and social systems must be considered (see Figure 1).

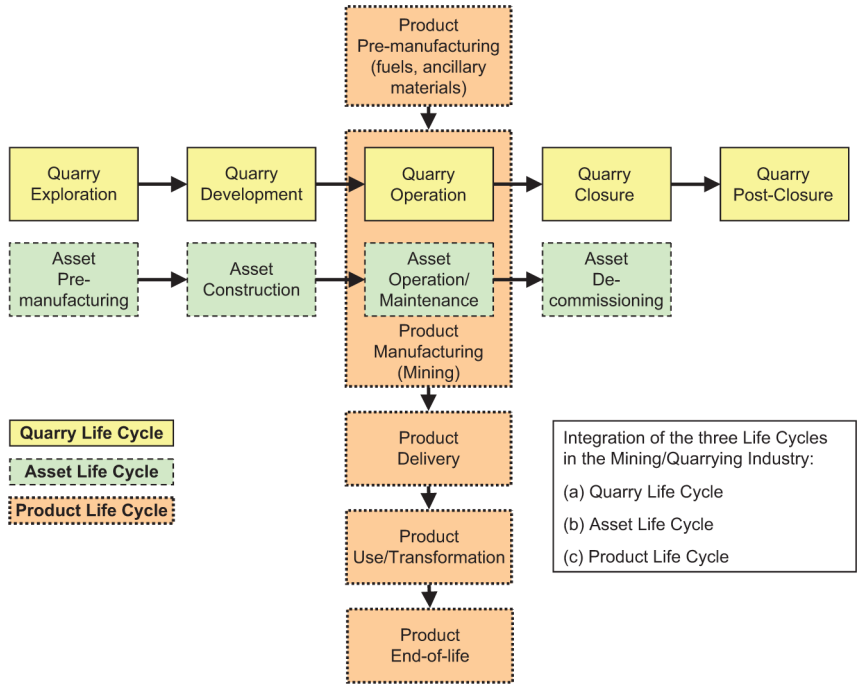

Figure 1.
The quarry, asset and product life cycles

The operational phases of the quarry and the asset intersect the production phase of the product. An integrated life cycle management (LCM) is therefore required, which implies that management practices must improve sustainability performances in all three of these life cycles, through effective sharing and coordination of resources, information and technologies. This perspective motivates sustainable supply chain management as will be discussed in the following.

Further, the firm must integrate social and environmental concerns in their operations and in their interactions with all their stakeholders, i.e. they must practice corporate social responsibility (European Commission, 2001). Corporate social responsibility (CSR) is a form of business behavior that leads firms to voluntarily contribute to a better society and a cleaner environment. Businesses take on commitments beyond common regulatory and conventional requirements, which they would have to respect in any case (European Commission, 2001). CSR has many aspects, however, this paper is limited to only one, corporate reporting, because it directly informs the consumer's attitude about a manufacturer and perception of the value of their products.

2.1 Supply chain management

The expanded approach for understanding the environmental consequences of production, based on interdependencies between players, is consistent with the shift toward green supply chain management. Focal companies of supply chains tend to be

held responsible for the environmental and social performance of their suppliers (Handfield and Nichols, 1999). Focal companies are those that:

- rule the supply chain;
- have direct contact with customers; and/or
- design the product.

Such firms practice supply chain management for one or both of two reasons:

(1) To manage risk and performance.

(2) To manage for sustainable products (Seuring and Müller, 2008).

If the producer of a final product sees market benefit in having an ecolabel based on sustainable production, they will strive to ensure that the components used are produced sustainably. To remain a member of the firm's sustainable supply chain, environmental and social criteria will need to be fulfilled by each firm within the chain. Thus, improved sustainability performance must be achieved by building and strengthening new relationships and dynamics between players along the supply chain and creating more comprehensive information relevant to environmental implications and risks (Hall, 2000).

In the context of building materials, such approaches are also consistent with the UN Agenda 21's goals of sustainable construction, which is a holistic way of thinking about buildings that encourages harmony between the natural and built environment (Du Plessis, 2001). Construction materials should be produced in a sustainable manner and design should be environmentally oriented. The environmental burden of each type of building product is dependent on the accumulated internal and external burdens. Firms that want to construct sustainable buildings are more likely to utilize inputs that are certified as having been sustainably produced. This in turn provides a motivation for producers and suppliers of building materials to obtain some credible form of certification or ecolabel.

A key issue is the influence of firm size and the position in the supply value chain (Bianchi and Noci, 1998; Blombäck and Wigren, 2009). In fact, although all building products are delivered to the same sector of economic activity (construction), buyers can be different and suppliers are characterised by different firm size: cement producers are usually large firms, ornamental stone and aggregates suppliers are typically small and medium-sized enterprises (SMEs), while tiles manufacturers can be both. Because of this diversity, not every buyer or seller has the same degree of motivation to seek out or offer for sale sustainably produced building products.

Supply chain management is related to the concept of "material stewardship" which embodies the range of activities and actions to improve both the upstream processes that support the production of a building, and the products that it goes into (Shields and Šolar, 2005). It requires the firm to be responsible for their product throughout its life, including the disposal or reuse/recycling phase. Product stewardship programs have been implemented in minerals and metals industries (Brady and Bocher, 2007), as well as in the chemical industry (Bianchi and Noci, 1998).

2.2 Corporate reporting

One of the core tenets of sustainable development is transparency and information sharing, i.e. reporting. Producers at any point in the supply chain report:

(1) In response to legal mandates.
(2) In response to financial demands.
(3) Internally for decision making.
(4) To maintain or acquire a social license to operate.
(5) To encourage consumers to select their product.

Considering these motivations in terms of the intersecting life cycles illustrated in Figure 1, (1) to (4) are related to the horizontal paths of quarrying and manufacturing, whereas (5) relates to the intersection of the former with the vertical life cycle of the product itself. Our interest here is how companies report information on their products and how that information can inform ecolabels, recognizing that firms also report information on their overall operations. Two reporting formats were considered: sustainable development indicators and indicators created through life cycle assessment. Each uses a different methodology, but both are used as the basis for ecolabels.

2.2.1 Indicators of sustainability. A full set of sustainable development indicators (SDI) comprises a detailed reporting of financial, environmental and social performance information, in this case with respect to the manufacture of a product and the inputs necessary for its production. Developing a set of SDI involves a series of hierarchical steps that on its top resides a broad, over-arching, vision of sustainable development. The ways in which the vision is carried out are defined by principles. A principle is a fundamental truth or law as the basis of reasoning or action. Principles are in turn supported by criteria. Criteria describe what it means to be sustainable. They serve as the basis for evaluation, comparison or assessment.

An indicator is a parameter (a property that is measured or observed), or value derived from a parameter, which provides information about the state of a phenomenon, environment, or area with a significance extending beyond that directly associated with a parameter value. Indicators describe, display, or predict the status or trend of some aspect of sustainable development. Often an indicator will be judged against a verifier, a floor or ceiling value, above or below which the indicator must remain for the parameter to be judged positively contributive to sustainability (Shields and Šolar, 2005).

There are three basic functions of indicators: simplification, quantification, and communication. Ideally, an indicator should meet the following criteria:

- be representative and scientifically valid;
- be simple and easy to interpret;
- show trends over time;
- give early warning about irreversible trends;
- be sensitive to the changes in the system;
- be based on readily available data or be available at reasonable cost;
- be based on data adequately documented and of known quality;
- be capable of being updated at regular intervals; and
- have a target level or guideline against which to compare it (DETR Department of the Environment, Transport and the Regions, 2000).

The information contained in indicators can contribute to public understanding of the state of the world and the potential consequences of making alternative choices or fulfilling various sustainability objectives. But this will happen only if the information contained therein is communicated in a manner that is appropriate to the audience for which it is intended. Often that means condensing the information from multiple indicators into a more easily understood metric, e.g. an index. An index is a set of aggregated or weighted parameters or indicators. That index, or alternatively a set of multiple indicators, can be used to evaluate a product to determine whether it deserves certification as sustainable, i.e. as having been produced in a sustainable manner.

2.2.2 LCA approach and methodology. According to Albino and Kühtz (2004), the complexity of the concept of sustainability makes it necessary to study the sustainable development of systems through analytical methods. One quantitative approach is life cycle assessment (LCA), which allows the total environmental impact of a design or a product to be analyzed. It can be used during different stages of the design process, and covers all phases of product life: raw material acquisition and refining; processing and the production of both outputs and production equipment; distribution and transport; use, reuse, and maintenance; and end-of-life. As it allows objective and meaningful measurement of product environmental performances, the methodology (LCA) is increasingly accepted and appreciated worldwide.

LCA is in fact an objective technique for assessing the potential environmental impacts associated with a process or activity from "cradle to grave" (see Figure 2), that

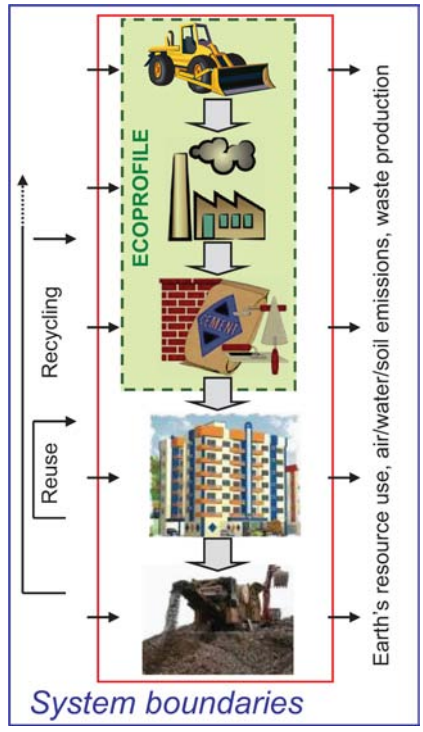

Figure 2.
ISO14040 Life Cycle Assessment (LCA) framework

means, in the case of construction sector, from raw materials excavation, throughout materials production, building construction and use, until dismantling, recycling and disposal (Badino and Baldo, 1998).

According to ISO 14040 (2006), an LCA comprises four major stages: goal and scope definition, life cycle inventory, life cycle impact assessments and interpretation of the results:

(1) The Goal and Scope Definition phase defines the overall objectives, the boundaries of the system under study, the sources of data and the functional unit to which the achieved results refer.

(2) The Life Cycle Inventory (LCI) consists of a detailed compilation of all the environmental inputs (material and energy) and outputs (air, water and solid emissions) at each stage of the life cycle.

(3) The Life Cycle Impact Assessment (LCIA) phase aims at quantifying the relative importance of all environmental burdens obtained in the LCI by analysing their influence on selected environmental effects.

(4) In the Interpretation phase, as the last step of an LCA study, the results from the LCI and LCIA stages must be interpreted in order to find hot spots and compare alternative scenarios.

The LCA approach currently represents the scientific basis for several environmental sustainability indicators as well as green communication and green marketing instruments. For these reasons, among other methodologies, Life Cycle Assessment (LCA) is increasingly being used as an objective and credible tool to measure the environmental performances of products and understand the environmental sustainability of the production chain.

3. Eco-labels and the building products industry

Eco-labels are instruments aimed at communicating to potential customers how producers are engaged in the internalization of externalities that are caused by the manufacture and use of their products. Such instruments are completely based on the market approach but, due to the fact that eco-labels hold information on environmental performances, they can assist market players in their choices towards economic and environmentally efficiency objectives. In such a context, the selling price stops to be the only parameter that addresses consumer's choices, and therefore a sound competition among firms can take place, based on both environmental and economic issues.

Ecolabels are a derivative form of corporate sustainability reporting. They represent a condensation of basic reporting information, so that much information is reported in a single (binary) indicator. A product either meets the predetermined criteria, and earns the label, or it does not. Relative valuation does not come into play. As a result, firms that far exceed the certification requirements gain no market advantage for doing so.

There are several non-profit organisations that set sustainability standards for particular products, independently audit the production of those products, and then certify those meeting their criteria as having been sustainably produced. These include the Marine Stewardship Council for seafood, the Rainforest Alliance for coffee, tea and cocoa, and the Soil Association for organic produce (May, 2010).

Wood-based building products are certified by one of two organisations, the Programme for the Endorsement of Forest Certification Schemes (PEFC) and Forest Stewardship Council (FSC) (FSC, 2009). It should be noted that FSC has a variety of certifications, ranging from designating the forest itself as being managed sustainably, certifying that the end product is made entirely of inputs coming from certified forests, or certifying that some of the product's inputs come from sustainably managed forests (FSC, 2009). Both wood-product programs base their certifications on review of a set of sustainability indicators (SAVCOR, 2005). There are, however, no SDI-based certifications for stone-based building products, so the paper turns now to ISO labels, two of which are used in this sector.

3.1 ISO environmental labels

ISO 14020 standard (2000) classifies Environmental labels according to the three groups shown in Figure 3:

(1) *Type I* labels can be awarded to products which are consistent with environmental criteria released by a third party organisation. An example is the European Ecolabel whose award criteria are issued on the results of a LCA application under the supervision of the Ecolabel Committee. As a clearly recognizable guarantee of environmental excellence, the EU Ecolabel can become a key marketing tool addressed to environmentally conscious consumers.

(2) *Type II* labels are constituted by self-declaration of producers, based on environmental performances of their products, for example the recyclability at end of life.

(3) *Type III* labels consist in a quantified declaration of the environmental performance of products throughout their life cycle. The purpose of an Environmental Product Declaration (EPD) is to provide transparent information

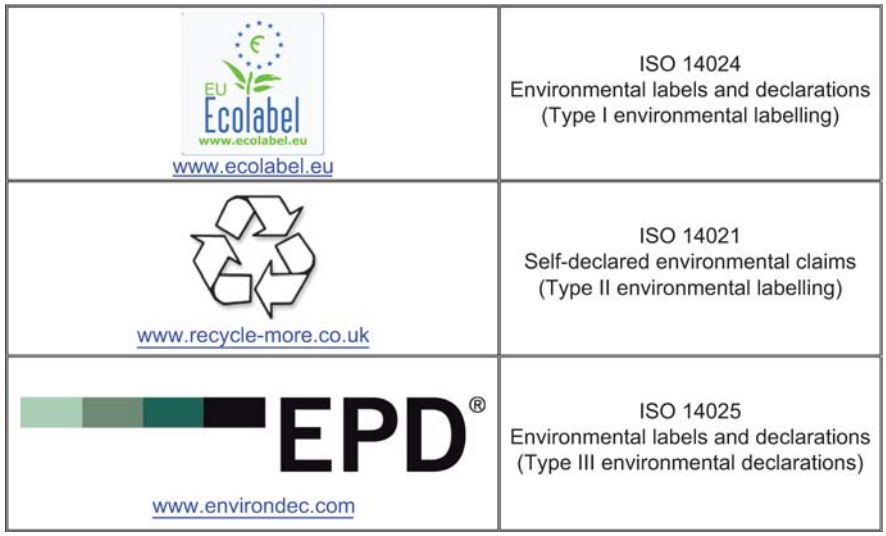

Figure 3.
ISO14020 classification of environmental labels

relevant to the environmental performances of products and services for comparison purposes. Such environmental performances listed in the EPD can be verified by a third party organisation.

3.2 Type I European ecolabel and the HFC group

The European Ecolabel is a voluntary market tool that promotes the environmental excellence of products and services at European level/scale (Baldo *et al.*, 2002, 2009). The EU Ecolabel is administered by the European Ecolabelling Board (EUEB) and receives the support of the European Commission, all Member States of the European Union and the European Economic Area. The Ecolabelling Board includes representatives such as industry, environment protection groups and consumer organisations. There are currently 26 different product groups (PGs), and already nearly 800 producers/retailers from 42 countries have been awarded for 4,582 products (www.eco-label.com). Nearly 28 percent of eco-labelled products are from Italian manufacturers and/or dealers.

After having completed the feasibility and market studies (ANPA, 2001), a joint working group composed by competent bodies, interest groups and the European Commission developed the Ecolabel criteria for a new product group: the hard floor coverings (HFC).

The product group was subdivided into two major subgroups: "natural products" and "processed products". The first one included marble, granite, sandstone, quartzite, slate, tuff and schist. The second one included hardened products (agglomerate stones, concrete paving units, terrazzo tiles) and fired products (ceramic tiles and clay tiles for internal and external use).

Ecolabel criteria mainly refer to the life phases generally associated with important environmental impacts (Lovera *et al.*, 2002; Baldo *et al.*, 2002):

- extraction and selection of raw materials;
- production and finishing; and
- use and end of life.

Moreover, when the eco-label is awarded to a HFC product, it means that this fulfils the following criteria:

- reduced energy and water consumption during the production phase;
- limitation of substances harmful for health and the environment;
- reduced impact of extraction on habitats and natural resources;
- limited emissions to air and water; and
- improved waste management.

In 2005, the European Commission, DG Environment, entrusted APAT (the Italian Agency for the Protection) for the revision of the existing eco-labelling criteria for the HFC and for developing criteria for a new product group: the Soft Floor Coverings (SFC). The revision was made available at the end of 2008 (ISPRA, 2008). Currently, a working group is in charge of setting criteria and tools for including the carbon footprint calculation in the EU Ecolabel scheme (Baldo *et al.*, 2009).

3.3 Producers' interest in the Type I Ecolabel of HFC

An analysis of the present situation relevant to the diffusion of eco-labelled products in the HFC group revealed that the EU Ecolabel scheme is still restricted to a limited number of players, though it's expanding. By August 2009, 20 manufacturers/retailers have in fact labelled 385 HFC products.

Table I shows the eco-labelled HFC products belonging to 22 out of 26 product groups (for four PCs there is still not any Ecolabel awarding). As it can be seen, HCF products represents 8 percent of the total labelled products. Among HFC labelled products, 88 percent are from Italy, 9 percent from France and 3 percent from Spain. Italian manufacturers/retailers are 17, while one is from France and two from Spain.

Nearly all HFC manufacturers/retailers are from Spain or Italy, the major ceramic tiles manufacturing countries, representing together more than 70 percent of the total European production.

According to the latest annual report issued by Assopiastrelle (the Italian Association of Ceramic Tile Manufacturers), the overall production of the five Italian ecolabelled manufacturers represents 28,6 percent (130Mm^2) of the total national production, the total quantity of ecolabelled products being estimated around 10 percent.

The authors report here a study conducted by the Italian Environmental Protection Agency (APAT and LCE, 2007) that involved manufacturer associations in order to understand more about the dynamics of the companies' response to the certification scheme.

Product groups	No. of labelled products	
	World	Italy
All purpose and sanitary cleaners	983	120
Bed mattresses	16	7
Camp sites	72	19
Copying and graphic paper	337	27
Dishwashing detergents	85	10
Footwear	42	22
Growing media	37	0
Hand dishwashing detergents	171	28
Hard floor coverings	385	341
Heat pumps	30	0
Indoor paints and varnishes	862	111
Laundry detergents	129	50
Lightbulbs	22	0
Lubricants, hydraulic fluids	67	0
Personal computers	6	0
Portable computers	7	0
Soaps and shampoos	96	37
Soil improvers	22	2
Televisions	144	0
Textiles	299	47
Tissue paper	437	290
Tourist accommodation	333	172

Source: www.eco-label.com

Table I.
Products groups and number of eco-labelled products included in the European Ecolabel scheme

Their survey showed that:

- natural stones producers are more familiar with mandatory regulations relevant to safety and environmental restrictions than with voluntary market oriented schemes. Thus, while stones producers are fully engaged in complying with mandatory regulations, which are regarded as the first goal to be achieved, the culture of green marketing and green labels is not yet diffused; and
- in case of clay tiles and agglomerated stones, the pressure on environmental labels is usually determined by overseas markets (especially North America and Australia). Therefore, although the EU label does not fully comply with US and Australia customers' expectations, these products may be the next group of applicants when green marketing needs will gain importance in Europe.

It must be said that some pressure and incentives are expected from the "green public purchasers" (GPP) which are trying to improve HFC manufacturers awareness relevant to the green market potential of ISO 14020 Type I labels (APAT and LCE, 2007).

3.4 Type III EPD programmes in the building sector

According to the Final Report Evaluation of Environmental Product Declaration Schemes (European Commission/DG Environment, 2002), compared with other sectors, the construction industry is a frontrunner in providing environmental performance information about its products for a number of reasons, including:

- political pressure;
- major benefits to the sector;
- level-playing field for suppliers;
- alternative to eco-labelling which is not suitable for business-to-business communication; and
- elimination of "black lists" and "preference lists" based on questionable methodologies

According to the content of the web site dedicated to the EPD system (www.environdec.com), there is not a specific product category dedicated to the building products. However, among the 90 EPDs currently available, belonging to 18 product categories, 20 are building products (22 percent), 17 of which were issued by Italian companies (see Table II).

4. Results and discussion

A company can report information about the sustainability of its products in the form of indicators of sustainability and/or outcomes of LCA, in either case as quantitative data, or in the form of an eco-label. Both of these types of reporting provide important and unique information, and each has some overlap with the others. Whether there is synergy or redundancy among these reports depends on the form(s) of reporting the company undertakes (Shields and Šolar, 2007). Only indicator sets address social sustainability, but do include environmental and economic information; only LCA track and link activities to units of pollutants.

Product category	Product	Country
Basic metals	Hot dip zinc and painted steel	Italy
	World Wide Standard Cable	Japan
Chemicals and chemical products	Concentrated pigment dispersion	Italy
Fabricated metal products	Air ducts	Italy
Other non-metallic mineral products	Cement production	Italy
	Clay roof tile	Italy
	Concrete	Italy
	Concrete roof tile	Italy
	Concrete roof tile	Italy
	Concrete roof tile	Italy
	Concrete roof tile	Italy
	Masonry units, clay bricks	Italy
	Polyester panels for thermal and acoustic insulation	Italy
	Windows	Italy
Rubber and plastic products	Polystyrene insulation panels	Italy
	Polyurethane rigid panels for thermal insulation	Italy
	Recycled polystyrene insulation panels	Italy
Wood and wood products	Raw and melamine faced particleboards	Italy
	Wood Particleboard 18M	Japan
	Wood Particleboard 18M Paraffin	Japan

Source: www.environdec.com

Table II. Building products included in the EPD scheme

Thus, the question "should a producer develop, implement, report through sustainability indicators or through eco-labels" is misleading. This is not an either/or question because, in reality, eco-label information is a subset of the full suite of information incorporated in a set of SDI. Eco-labels address only the environmental aspect. This is the major difference between the full indicator approach and the eco-label approach, but is also the point of overlap between the two. SDI may be reported as a set of temporal data points, showing trends, or as an index that combines a suite of SDI. They are nonetheless numerical scores.

Ecolabels are a binary indicator. A firm's product either meet the specifications or it does not. Having the label says only that the firm has met a minimum standard, but does not show relative performance. This makes ecolabels distinctly different from SDI, which shows whether or not a firm is excelling relative to its competitors.

The type of reporting utilized, as result of producer's activities, is one way to evaluate overall business performance. "The more the better" is a simple rule when the goal is demonstrating producer's economic, environmental and social "positive" contribution to society. However, collecting, analyzing, storing and reporting information is not a costless activity. Moreover, information technology has lead to a dramatic increase in the amount and diversity of information available. How much information is enough and how much is too much is unclear. The decision will have to be made by producers who would experience the benefits and costs of these activities. From an economic standpoint, lack of information or too costly information can lead to market failure and inefficiencies due to poor decisions (Shields and Šolar, 2007).

Transparent performance (reporting) can and will pay off in the long term. The question is whether small and medium-sized quarry and building product

manufacturers can survive that long. The authors believe that the way to increase the likelihood of this desirable outcome is to actively involve stakeholders in the creation and dissemination of ecolabels. Stakeholder's involvement is one of the important aspects of successful sustainability reporting.

How many stakeholders and which should be their origin/background/"stake"? Special stress should, of course, be put on the end-users (actual buyers) of building products! Sustainable production can, and needs to be, complemented by sustainable consumption and lifestyles. While it is necessary for industry to behave sustainably, that alone will not be sufficient for society to achieve a sustainable future. Individual responsibility for consumption choices will also be necessary. However, ecological modernization of production does not develop at the same rate or in the same manner in different sectors (Spaargarten, 2003). Consumers are more aware of green options in other sectors, for instance in the food chain. Thus, eco-labelling can make designers and end-users more aware of green options in building materials.

5. Conclusions

In conclusion, the overall objective of the present paper has been to supply an overview of corporate sustainability communication tools related to product manufacturing, comparing the SDI and LCA approaches for developing ecolabels. Two types of LCA-based ecolabels were proposed and have been adopted during the last years for the most common building products: dimension stones, ceramic tiles, cement, aggregates, concrete, etc. The goal of such labelling is to distinguish products produced sustainably from those that have been merely labelled as green.

However, in such a context, firms are challenged, by several issues, which can limit the effectiveness of sustainability corporate strategies. The first issue relates to the acquisition of those human and financial resources that allow the shift from a re-active to a pro-active "green" firm strategy, but which usually imply a significant effort that firms cannot always afford. Only by increasing the environmental culture of the firm and the technical and managerial skills of employees will it in fact be possible to improve the overall environmental performance of production systems.

As a second issue, it has been remarked that the introduction of the life cycle approach requires a better understanding of the use and application of materials and products. The third issue is related to the importance of enhancing comsumers' understanding of and regard for the environmental background of products. This is the field of green communication instruments, like eco-labels, which are aimed at communicating to the potential intermediate or end customers that producers do care about the internalization of environmental externalities that are caused by their products.

Finally, the building sector is economically important to OECD countries and also has a great impact on the environment. The OECD has been investigating the concept of environmentally sustainable buildings (OECD, 2003) and has focused on reducing construction and demolition waste, improvements to energy efficiency and reduction of CO_2 emissions. However, they also point out the need for greener purchasing strategies, public and private. Eco-labelling of building products in the EU could help governments and individuals make environmentally friendly material choices in construction projects and would, at the same time, support responsible firms and foster the economic activity in the EU.

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