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# ***SUSTAINABILITY AND PARAMETRIC MODELS FOR ITS MEASUREMENT AND COMMUNICATION***

*Abstract: The current sustainability reporting limits are represented by the absence of a single referential form of the sustainability report construction and by these different report forms comparison and valuation difficulties at the same time. Any sort of politics the organizations assume is judged to the extent that its obtained results are measurable and comparable. For this reason, sustainability has to be quantified and measured at any level and for any organization to explain an element of essential importance to the entire society. The sustainability report is certainly the most operative instrument to relate the organization with its stakeholders; anyway, the absence of a single referential form and of common comparison parameters limits its communication considerably.*

## **1. INTRODUCTION**

Although the concepts of sustainability and sustainable development have been around for decades, they are even more topical now than ever. Development is sustainable when it meets the needs of the present without compromising the ability of future generations to meet their own needs, or when, in other terms, is able to generate situations with substantial balance among the social, economic, and environmental contexts, that is when the balance of the *three “E’s”* – environment, equity and economy – is achieved<sup>1</sup>.

Here, sustainable development embodies the need to protect and safeguard the resources of humankind, the endeavour to achieving a better quality of life, the diffusion of growing and equitable prosperity and the attainment of levels of exploitation and conservation of the environment, that would not be harmful to human beings and other living species and that would enable more equitable access to resources.

Thus, a “sustainable organisation”, regardless of the type, is not only sound from a financial standpoint, but it minimises its negative impacts on the environment and acts in line with societal expectations, by considering the fact that needs of future generations must be met, adopting a responsible behaviour, not only in economic, but also in ethical, environmental and social terms (Jonas, 1978).

It is fairly evident that one of the peculiarities of sustainable development is its wide-ranging and multidisciplinary approach, combining environmental, economic, social and institutional issues. Additionally, the Lisbon Strategy, that is a reference point of the European Union’s political commitment for economic and social renewal, identifies sustainable development as the most important factor when assessing the economical, social and environmental impacts of the initiatives undertaken through decision-making processes (*triple bottom approach*).

The growing attention to sustainability prompted public and private organisations to adopt supervision systems aimed at assessing the sustainability and environmental impact of their own activities.

Agenda 21 was the first voluntary control instrument to be implemented along with a number of legally “binding” instruments, set out in specific Community and national directives, whose application is of great importance in the planning and design of major projects. Moreover, among the voluntary control and communication to the stakeholders instruments, the social report, the environmental report and the sustainability one are very important.

The sector-based setting, obtained from the environmental and social reports, doesn’t allow a transverse comparison that, on the contrary, the sustainability report construction allows. Unlike the social and environmental reports, which highlight the business management influences on social respects and environment respectively, the sustainability report highlights the financial, economic, social and environmental spheres (*triple bottom line*). Providing with the sustainability report seems to be a very good instrument in order to improve the management processes among the three variables, social, economic and environmental, and to have a larger reporting transparency.

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<sup>1</sup> Report Our Common Future, World Commission on Environment and Development (1987)

The current sustainability reporting limits are represented by the absence of a single referential form of the sustainability report construction and by these different report forms comparison and valuation difficulties at the same time. Even if it is commonly recognized a no presently existing sustainability report form, it is possible to state that the guidelines published by the Global Reporting Initiative, born in 1997 from the Coalition for Environmentally Responsible Economies and the United Nations Environment Program, are adaptable to any business for dimension, sector or country.

Any sort of politics the organizations assume is judged to the extent that its obtained results are measurable and comparable. For this reason, sustainability has to be quantified and measured at any level and for any organization to explain an element of essential importance to the entire society.

The sustainability report is certainly the most operative instrument to relate the organization with its stakeholders; anyway, the absence of a single referential form and of common comparison parameters limits its communication considerably.

## **2. THE MILESTONES OF SUSTAINABILITY: THE PHENOMENON IN ITALY**

The milestones in the history of sustainability are the 1972 Stockholm Conference, The United Nations Conference in Rio de Janeiro in 1992 and the Johannesburg Summit in 2002.

Other significant events on sustainable development were held after the Conference in Rio, and they include:

- the 1997 Kyoto Protocol on Climate Change;
- the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters;
- the 2000 United Nations Millennium Declaration, regarding the values upon which the third millennium international relationships should be founded;
- the 2000 Montreal Protocol on Biosafety;
- the 2001 Stockholm Convention on Persistent Organic Pollutants;
- the 2002 Monterrey Conference on Financing for Development.

In 1993, Italy approved the National Plan for Sustainable Development. The plan states: *“Pursuit of sustainable development means seeking to improve the quality of life, while living within the carrying capacity of the environment. Sustainable development does not mean stopping economic growth, also because, even in some areas of our country, environment itself is a victim of poverty and of the spiral of degradation caused by poverty. An action plan for sustainable development should not only promote conservation of natural resources, but also encourage economic activities that would be compatible with future uses. Hence, the application of the concept of sustainable development is dynamic on one side, i.e. linked to the knowledge and the current state of environment and ecosystems, and on the other side it recommends a precautionary approach with regard to the situations and actions that may compromise the environmental equilibria, thereby triggering a continuous process of error correction”*.

In 2002, the Interministerial Economic Planning Committee (CIPE) approved the *National Strategy for Sustainable Development* in line with the aforementioned Sixth Environment Action Programme “Environment 2010: Our Future, Our Choice” (2001). The strategy pinpoints goals and actions, along with a number of indicators to measure progress towards sustainable development, according to four priority areas:

- Climate Change and Protection of the Ozone Layer;
- Protection and Sustainable Enhancement of Nature and Biodiversity;
- Quality of the Environment and Life in Urban Areas and in the Region;
- Sustainable Management of Natural Resources.

Each thematic area is associated with a set of indicators selected on the basis of the requirements of existing law and including the seven indicators of the Barcelona Council, the European Common Indicators (ECI) and the eleven European Environmental Indicators of 2000. The Strategy includes, within the action instruments: the incorporation of the environmental factor into all sectoral policies starting from the environmental assessment of plans and programmes; the incorporation of the environmental factor into the markets; the promotion of public awareness and participation; the development of the Local Agenda 21 processes; the incorporation of environmental accounting systems into the national accounting.

Many Italian cities have already started the process of Agenda 21, thereby promoting more sustainable development patterns.

In the Strategy of Environmental Action for Sustainable Development, the Ministry of Environment and Territorial Protection stresses the importance of the environmental impact assessment (EIA) on projects and the

Strategic Environmental Assessment (SEA), in order to ensure projects overall sustainability and environmental compatibility with territorial Plans and Programmes.

The issue of *Environmental Damage* should also be mentioned among the instruments used to promote sustainable development. In this respect, a key role is played by the instrument of Civil Liability for environmental damage introduced at a national level (Art. 18 L. 349/86) and at a Community level (Article 174 of the Treaty establishing the EEC - Rome, 1957; White Paper on Liability for Environmental Damage – Brussels, 2000; Proposal for a Directive on the prevention and remedying of environmental damage - Brussels, 2002) establishing the “polluter pays” principle. The principle, among other things, aims at preventing environmental damages by making the operators who adopt practices and behaviours which endanger the environment, aware of their liability for any damage that could be caused.

### **3. THE STAKEHOLDERS’ FUNCTION IN THE BUSINESS SUSTAINABILITY REPRESENTATION**

The environment in which businesses work is organized in a series of people groups, called stakeholders, that interact with the business because of their proper interest in its undertaken activities. This figure is represented by workers, backers, customers, competitors, suppliers, trade unions, civil service, and the territorial community. The business establishes economic, social and political-institutional relationships with them (Paris, 2003).

The stakeholders follow in an interested manner the business activity trend, like interested holders, in the business economic activity practice, because they are involved. The business and the stakeholders influence each other. In fact, the stakeholders, by being social interested interlocutors, can affect the business activity about the decision of the objectives to pursue, and, at the same time, they are the business activities recipients because they achieve their economic, financial, technological, social and cultural consequences (Cisi, 2003).

Today, the new objectives linked to environment protection, products and offered services quality, security in work places, ethical and social values preservation, are the main elements that the organizations have to respect to pass from a company vision, essentially concentrated on profits, to a vision where the businesses have to integrate with the different stakeholders’ groups needs.

The need to represent to the stakeholders the economic, social and environmental impacts pushes any kind of organization to adopt instruments able to represent their own sustainable impact.

Today, the economic-financial documents are not able to satisfy the information needs of the actors of the environment where the businesses live and work.

From Agenda 2001, the sustainable development has been proposed as a perspective to be followed by and for all the people in the world. It pinpoints the actions, the parties and the instruments necessary to implement the approaches proposed at the Conference, and in particular states that “[...] *the need to operate towards sustainable development is recognised to be a primary responsibility of governments, calling for strategies, policies and plans at national level* [...]”. These premises paved the way to issues such as integrated strategic planning, concertation, participation of the community in decision-making, exploration and experimentation of suitable operational instruments, etc. For decades, international and national communities at the various levels, although not without facing several difficulties, have been trying to find a solution to such issues.

To mitigate the impact of production processes and encourage demand for environmentally-sound products, the European Commission has for some time identified a product and process certification system for enterprises: the most important are EMAS, ISO 9000 and ISO 14001. They are voluntary instruments aimed at improving environmental performance of products and services. The next revision of the ISO 9004 standard – for decades, an international reference point for quality management systems of companies and other institutions – will change the title from “Guidelines for Performance Improvements” (in the 2000 revision) into “Managing for sustainability” (in the 2009 draft revision), just to provide organizations with guidelines for a sustainable success. In the same standard, the proposed definition of “sustainability” is as the “ability of an organization or activity to maintain or develop its performance in the long term” through a balance between the economic-financial interests and the environmental interests.

#### **3.1 THE SOCIAL REPORT**

To explain the whole value generated by its own business, by illustrating the coherence/consistency among the declared values and objectives and the behaviours then put into action, it is an opportunity for the business to renew confidence fomenting the relationship with its different interlocutors. For this reason, during the few years, organizations of any typology put side by side to the traditional report and civil balance sheet forms some

new documents that have the objective to present the business performance in its entirety, by illustrating also how the product value has been generated and which effects its own business activities spreads on society, territory, the environment (Zadra, 2007).

The reason pushing businesses to provide a social report is informative and communicative by nature, and it derives from the need to inform the stakeholders.

The Corporate Social Responsibility report is an account reporting model on the quantity and quality of the relationships between an organisation and its stakeholders, with the aim of providing a comparable, complete and transparent framework for the interdependence between economic factors and the social factors originating from the organisation's decisions (Rubino, 2007). With this instrument, the organisation informs stakeholders of its social and ethical commitment. It, in fact, describes the organisation's identity, its value system, the interactions between the organisation and its surrounding environment, providing details on how these are translated into decision-making criteria, management approach and outcomes, illustrating the goals for continuous improvement that the organisation intend to pursue, and showing added value and how it is allocated. The Global Reporting Initiative defines it as an account reporting model on the quantity and quality of the relationships between a company and external social groups, necessary to outline a comparable, accurate, complete and transparent framework for the complex interdependence among economic factors, on the one hand, and social and political factors, on the other hand, and the impact of business decisions within this framework.

The social report has already a consolidated tradition, especially in European countries such as France, Germany and Belgium: it is complementary to statutory financial statements and is, for the organisations, a carrier of further and more specific information on the one hand, and a device to gain social consensus on the other hand. It assesses the social impact of business decisions and considers issues related to employment, working conditions and safety.

In for-profit organisations, the social report may be considered as a communication instrument with stakeholders, aimed at gaining support by the public opinion as a socially responsible organisation. Whilst, in no-profit organisations, the social report has a "social legitimization" function, necessary to operate in the reference community and to gather financial resources – fund raising – and human resources – voluntary service – (Puntillo, 2008).

Social liability has to be part of the business mission and the business has to behave consistently with this approach in every field of its own activity. Moreover, it is to be hoped that the business establish its own politics with the stakeholders, that can give an important contribution to businesses about the strong and weak points identification.

So, every business should clearly communicate its own commitment and results in terms of social liability. The absence of communication creates a distance from the stakeholders, that are deprived of the knowledge of an important part of the business activity and, above all, it precludes the diffusion of a business ethical culture (Rubino, 2007).

A social report is based on the idea according to which the interaction with the stakeholders is not only referred to the economic relationships and it is not only measurable in terms of economic-financial size. Moreover, the needs pushing to the provision of such an instrument can be various:

1. an external communication way;
2. a way to improve the internal organization, management and communication;
3. an institutional way;
4. a way to elaborate a social strategy;
5. a way to identify its own social mission (Rusconi, 2006).

In particular, the social report should:

- a. allow us to understand the role the organization executes in the civil society;
- b. be an instrument able to give information about the social objectives achievement set;
- c. highlight that the business purpose is not only exclusively to create profits, but also an added value for the community;
- d. represent a breathing space for the engagement in the organization to improve the product and service quality, the relationship with consumers, the work places security, environmental respect, etc. (Di Giandomenico, 2008).

Among the various study associations on social reporting, a key role is played by the Study Group for the establishment of standards for Social Reporting (GBS), an organisation created in 1998 and composed of scholars and experts from universities and consulting firms that has proposed social reporting as an act illustrating the concept of Corporate Social Responsibility.

According to GBS, only documents containing some minimum elements set out in the social reporting standards issued by the same organisation can be regarded as "social report", namely:

- Responsibility towards the stakeholders to which the business must report;

- Identification of the business, the responsibilities connected with its activity and its mission by highlighting its ethical values, principles, rules and objectives;
- Transparency towards stakeholders: all stakeholders should be able to understand the social report;
- Involvement: all stakeholders should have the right to express their opinion, either directly or indirectly;
- Consistency of management policies to the declared corporate values;
- Neutrality, fairness and freedom from third-party interests;
- Accrual basis;
- Prudence, in order to prevent overestimation of social impacts, both positive and negative;
- Comparability in time and space;
- Meaningfulness, clarity and intelligibility based on the correct balance between style and content;
- Regularity and timeliness in the presentation of social reports that, being complementary to statutory financial statements, must cover the same period as the latter;
- Uniformity of currency values;
- Relevance of information, aimed at satisfying stakeholders;
- Materiality and significance of the reported impacts: any estimates or valuations must be based on clear and consistent assumptions;
- Verifiability of the information by tracking back the gathering and reporting processes;
- Reliability and true presentation of information;
- Independence from any third parties engaged in preparing the social report.

The detailed distinction of the standards to be complied with in preparing a social report highlights its importance. The information contained in the social report, in fact, must be verifiable, significant and intelligible also by readers unversed in the subject.

The GBS model of social report is structured into the following three sections:

1. The corporate identity: it entails a description of the shareholding structure, the framework of ethical values, the mission, the strategy and the policies of the business;
2. The creation and allocation of added value: it is based on two statements, the first quantifying added value and the second describing its allocation;
3. The social statement: it provides a qualitative and quantitative description of the results achieved by the business in relation to the commitments undertaken, the plans implemented and the impacts generated on the individual stakeholders.

Social reports experience seems to demonstrate a cultural change diffusion beginning to understand the real business dimension whose main objective is the creation of social-economic value for the entire community (Fazzi, 2005).

The social report has been a significant step forward, bringing organisations closer to their stakeholders and triggering a process of open and fruitful dialogue based on the principles of responsibility and clarity.

The positive experience made so far seems to demonstrate that social report has a central role, since it is able to drive change processes, and is an important support for the strategic and decision-making processes, for communication, and for the participation of stakeholders. In fact, the organisations which adopt social report, increase their ability to pinpoint their results and present them to the outsiders.

### **3.2 THE ENVIRONMENTAL REPORT**

Negative influences on territory, climate, human health, countryside, have always been considered secondary and marginal elements in business decisions. For a few years now, the relationship between business and environment has been changing towards the consciousness that the environment can't be considered only as a resource container to be used without an economic quantification, but it represents an out-and-out productive factor for the organization. Traditional control systems characterized by financial, patrimonial and economic analysis, are unable to measure, understand and control the business environmental dimension. The environmental dimension representation is only possible through the integration in traditional instruments of an informative instrument that has to verify the environmental variable in the report. From this point of view, the environmental report configures itself as an accounting instrument that represents the relationships between business and the environment. This instrument derives its name from the analogy with the traditional annual report. Both statements, in fact, refer to the results achieved by organisations within a given time frame, although in different areas (Cisi, 2003).

The Environmental Report is a voluntary "control" instrument that both public and private organisations can adopt to develop broader knowledge of environmental issues related to its operations.

The matrix of environmental report lies in the social report. Like the social report, the environmental report is, for an organisation, another important instrument to testify its willingness to implement an effective integrated information system which, as such, would facilitate a “global” evaluation of the organisation. Suitable environmental information must already be contained in the statutory financial statements, since it is here that all the contents - including environmental issues - relating to an organisation must be reported.

Environmental accounting stems from the need to have better understanding of the impacts of business decisions on the environment, as compared to the information that can be obtained from the traditional accounting instruments. This kind of accounting helps assessing the environmental impact of economic policies and costs of economic development in terms of pollution, restoration expense and compensation.

The final objective of environmental accounting is the construction of an environmental report, as a joining element between the external environment and the organisations, from which it is possible to obtain physical data on the natural resources used as input in the production process, atmospheric emissions, water discharge, waste and noise produced by an organisation, and monetary data relating to the expense borne by an organisation for environment protection (Puntillo, 2008).

Organisations, by means of this communication instrument, provide stakeholders with all the necessary information in order that they be able to understand the actions undertaken, the resources employed and the results obtained by the organisation in performing its activity.

The parties mostly interested in such information are the following:

- a. Customers and consumers, who are able to verify products’ compatibility with the environment;
- b. The workers, in order to know the risks related to their work;
- c. The environmental groups, with respect to the environmental impacts of the organisation’s decisions;
- d. Financial institutions and shareholders, for monitoring possible causes of environmental risks;
- e. Local communities, as regards the negative effects of the external diseconomies caused by production processes;
- f. Governmental supervising authorities, so that they may know the characteristics and effects of the environmental management systems adopted by organisations;
- g. Suppliers, business partners, etc. as for possible causes of limitation of the organisation’s reliability;
- h. Trade associations, to gather information on environmental protection on a sectoral basis.

The environmental report provision is divided into three phases:

1. the first one counts the collection of the data whose observation is considered useful and, at the same time, they are classified according to the set aims;
2. then the collected data have to be treated in order to transform them in an environmental report;
3. in the last one, treated data and information are communicated.

This external communication instrument provides the stakeholders a series of environmental information about:

- a. the undertaken actions about the environment respect;
- b. the invested resources;
- c. the expected results (Cisi, 2003).

The role of environment in modern management approaches is necessarily linked to the awareness that the uncontrolled exploitation of natural resources may lead the system to a crisis of unsustainability. Companies that do not consider, in its decision-making processes, the impacts of their activities on the environment, will impose its costs on the community, according an “*externalisation process*”. Hence, it must be pointed out that, although the environmental report is a “voluntary” instrument, considerable benefits may be obtained, from an operational standpoint, on the one hand, since the organisation is able to monitor environmental performance not only in relation to costs and waste (assessment of the level of protection and enhancement of the territory; assessment on the use of less environmentally damaging equipment; development of instruments that are ever more suitable for environmental communication, etc.) and, on the other hand, as regards the corporate image perceived by stakeholders.

### **3.3 THE SUSTAINABILITY REPORT: THE GLOBAL REPORTING INITIATIVE (GRI) FRAMEWORK**

The sustainability report is a document illustrating the organization efforts to represent the impacts its actions have on the economic, social and environmental spheres. The creation of a synthesis document on economic, environmental and social impacts is a more and more recurrent habit, due to interest group pressures and to the benefits that the business gets in terms of image and credibility. Moreover, under interest group pressures, national and international government institutions have been and still are very active in asking businesses to

explain their objectives and their behaviours consequences on life quality and respect for the environment and human rights (Paris, 2003).

While social and environmental reports highlight the impacts of corporate management respectively on social aspects and on the ecosystem, the sustainability report is a combination of both reports in economic, social and environmental terms. It allows organisations to report, in a single document, multiple aspects related to business activity, namely, financial, economic, social and environmental aspects. For that reason, the definition *triple bottom line* reporting is used (Romolini, 2006).

The sectoral approach of the environmental report and the social report does not allow for transversal comparison of the social impacts of environmental policies and the environmental impacts of social policies. Such comparison, instead, is possible in sustainability reporting (Vaccari, 2005).

The sustainability report is an instrument for account reporting, planning and strategic monitoring, whereby an organisation may be evaluated taking economic efficiency, environmental protection and social equity into consideration. The sustainability report is aimed at:

1. improving governance processes in order to facilitate the management of confrontation among the social, economic and environmental variables;
2. improving integration among sectoral policies;
3. analysing the confrontation factors among environmental, social and economic policies and describing the balance point achieved;
4. ensuring greater reporting transparency and a higher level of participation of stakeholders and in-house staff.

The preparation of a sustainability report can be based on the guidelines issued by the Global Reporting Initiative (GRI), created in 1997 from the *Coalition for Environmentally Responsible Economies* and the *United Nations Environment Program*, whose mission is to set up a trustworthy and reliable sustainability reporting system for all organisations regardless of size, sector, or location.

A sustainability report provides a balanced and reasonable representation of the sustainability performance of the reporting organization, including both positive and negative impacts generated by operations.

The sustainability reporting guidelines consist of the Reporting Principles and Guidance and the Standard Disclosures.

The first part contain:

- Principles to define report content;
- Principles to define report quality;
- Guidance on how to set the report boundary.

This part is useful to define content and the relevant indicators to be included in the report by using the principles of *materiality*, *stakeholder inclusiveness*, *sustainability context*, and the instructions to set the report boundary. Based on the contents and the identified indicators, organisations are able to prioritize topics in accordance with their nature and the principle of *completeness*. Thus, according to GRI guidelines, only “significant” topics and indicators should be included in the report: that is, those topics and indicators which may be regarded as being significant in terms of organisation’s economic, environmental and social impacts. Moreover, the organisation should identify the stakeholders, indicate where and how it has responded to their expectations and interests, and describe their engagement in the reporting activity. Additionally, reporting should not be limited to presenting an organisation’s individual performance, but it should also describe how an organisation contributes, or aims to contribute in the future, to the improvement or deterioration of economic, environmental and social conditions at the local, regional or global level. All the information included in the report should be complete as for:

- the objective to reflect significant economic, environmental and social impacts;
- the boundary of entities whose performance is represented by the report;
- the time period the report refers to.

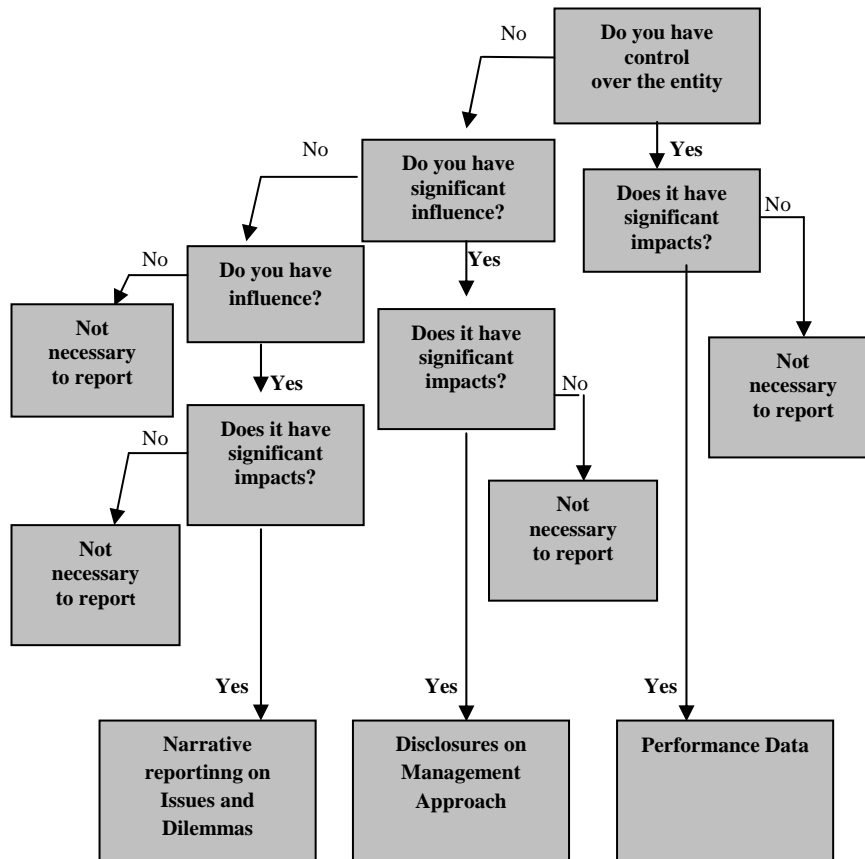
Besides the principles defining the report content, it is necessary to ensure the quality of the reported information, so as to allow the reporting organisation to be transparent in its communication. Quality is therefore ensured in compliance with six principles:

1. *Balance*: the report should reflect both positive and negative aspects to provide an unbiased picture of the organisation’s overall performance;
2. *Comparability*: the information contained in the reports should be comparable both in relation to time, with respect to the reporting organisation, and vis-à-vis other organisations;
3. *Accuracy*: the reported information should be sufficiently accurate and detailed for stakeholders to assess the reporting organisation’s performance;
4. *Timeliness*: reporting should occur on a regular schedule and information should be available in time to stakeholders to make informed decisions;

5. *Clarity*: information should be made available in a manner that is understandable to all stakeholders using the report;
6. *Reliability*: the reported information should be subject to internal controls or documentation proving its veracity, that could be reviewed by third parties.

In parallel with defining the report content and the transparency of the reported information, an organisation must define the boundary of the entities whose performance will be represented in the report. Therefore, the report boundary will have to include both the entities over which the reporting organisation exercises control or significant influence and the entities exercising control or significant influence over the reporting organisation. Obviously, not all entities must be described using the same methods. The thoroughness of such description depends on the type of control and the type of information.

Figure n. 1: decision scheme for sustainability perimeter definition



Source: adapted from “Sustainability Reporting Guidelines”

While the first part of the GRI guidelines defines the report content and boundary, the second part specifies three different types of information disclosure:

1. *Strategy and Profile* set the overall context for understanding organisational performance. This macro-area contains four sections:
  - a) Section One, *strategy and analysis*, provides organisational strategic view, through a statement from the most senior decision-maker about the relevance of sustainability to the organisation, the strategic priorities, the key events occurred in the reporting period, views on performance with respect to targets, outlook on the organisation’s main future targets and any other items pertaining to the organisation’s strategic approach;
  - b) Section Two of the *profile* macro-area focuses on the organisational structure, size and production;

- c) Section Three sets out *report parameters*, i.e. a series of general items on the reporting period for the information provided, the date of any previous report, the reporting cycle, the report scope and boundary – which must also include a report explanatory table of contents (GRI content index);
  - d) Section Four, *governance, commitments and engagement*, provides a set of information items on the governance structure of the organisation, its commitments in external initiatives, and on stakeholder engagement, mostly contained within the report;
2. *Management Approach* of the organisation with reference to the economic aspects for each information category;
  3. *Performance Indicators* organised by economic, environmental, and social categories. Performance Indicators are divided into Core Indicators, that are generic and are assumed to be material for most organisations regardless of their nature, and Additional Indicators that, due to their nature, may be material only for some organisations. Economic Performance Indicators refer, in addition to economic performance, also to market presence and to indirect economic impacts, while Environmental Performance Indicators are divided into a number of aspects: materials; energy; water; biodiversity; emissions, effluents, and waste; products and services; compliance; transport; and an overall aspect for environmental protection expenditure and investment. As to Social Performance Indicators, key aspects are identified regarding labour practices, human rights, society, and product responsibility.

Lastly, any organisation applying the GRI Reporting Framework, will have – based on its own assessment of its report content and via the “GRI application levels” system – to declare the level to which it has applied the GRI Reporting Framework. GRI application levels are three: A, B, and C. An organisation can add a “plus” (+) at each level, self-declaring its own reporting level.

It must be pointed out that this reporting model is applicable to any type of organisation, including the public sector. Furthermore, in order to better represent the Public Administration sector, a specific supplement has been developed, that is the Sector supplement for public agencies. In this model, besides the three standard sections, amended and supplemented to better fit the requirements of local authorities, regional governments and central Governments, a further section has been added, namely “public policies and implementation measures”, for the description of public policies, the level of importance and the measurement approach.

#### **4. PARAMETRIC MODELS FOR SUSTAINABILITY MEASUREMENT**

As already specified, adopted politics are judged to the extent that the achieved results are measurable and comparable. For some time, tendencies pushed towards the creation of models able to measure and represent the sustainability through indicators set made to orient the decision procedures and carry out continuous monitorings/supervising.

The valuation is not only based on monetary indicators, but on an indicators set, some of which are economic, others environmental and of other nature. This is why multicriterion valuation methodologies assume a central function. The valuation is based on several attributes, but the final result is not expressed in monetary terms. Multicriterion valuations are particularly useful in a comparative context, that is they are adapt to guide the choice among alternative solutions to get to determinate objectives. Multicriterion analysis allows us to face complicated problems by valuating singularly, but in an integrated way, every variable at stake, by attributing to each of them its own relative importance. Multicriterion valuation allows us to examine a problem from many points of view at the same time. So, also from an economic, social and environmental point of view, as required by the intervention sustainability idea (Boggia, 2007). The parametric approach to models is based on econometric valuation procedures. The model is called parametric when it is defined by a parameters vector and it doesn't necessarily require the complete density function knowledge. The parametric choice depends on the analysis objectives and interpretative or methodological exigencies (Gardini et al., 2003). Uninterruptedly the main parametric models, elaborated by international organism for different Countries sustainability performance measurement, are described (Maiolo et al., 2006). These models, although created to be applied to the different Countries sustainability measurement, can be used for any organization by modifying the indicators.

##### **4.1 DASHBOARD**

The Dashboard of Sustainability is a software developed in the United Nations Commission for Sustainable Development (UNCSD), later improved by a small research group under the International Institute for Sustainable Development (Canada), finally realized by Jochen Jesinghaus in the Ispra JRC.

The Dashboard is an instrument to visualize, in a synthetic way, the development sustainability level of a determined territorial reality, by beginning from a selected indicators set. By integrating the three economic, social and environmental spheres in a unique item, the Dashboard supplies a synthetic square of the complex information set describing a nation, region, province, town, life quality and reality. By this instrument, the authors expressly wanted to go beyond the PIL or other welfare one-dimensional indicators, and to make the development sustainability concept multidimension and complexity explicit.

The considered geographic areas final ranking or general performance indicator (overall) is obtained by summarizing the macrocategories score through a weighted arithmetic average. In detail, from a methodological point of view, the overall index elaboration procedure can be subdivided in four levels:

1. Single indicator level.

The dashboard put the values in an increasing order and interpolates them with theoretic values from 0 to 1000. By the obtained values (0 for the worse country, 1000 for the best one) a position list (ranking) is generated. This step is repeated for every indicator in the dashboard.

2. Sub-theme level.

For every sub-theme variables group, the dashboard creates a position list by using synthesis indicators that are calculated through a single indicators scores weighted arithmetic average. This step is repeated for every considered sub-theme.

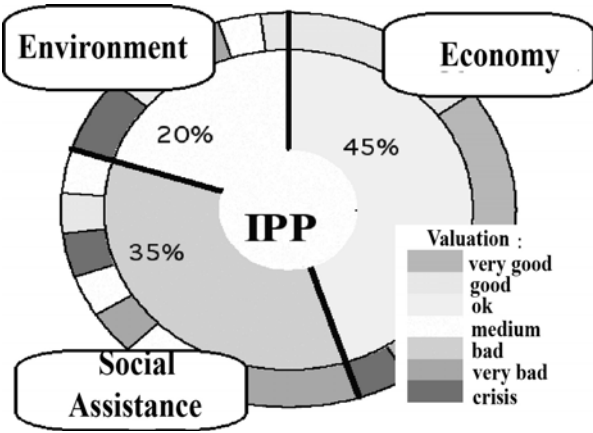
3. Thema level.

For every Sub-theme belonging to the Thema, the dashboard creates a position list by using synthesis indicators calculated through a single Sub-theme scores weighted arithmetic average. This step is repeated for every considered Thema.

4. Overall level.

The Overall is obtained through a single Thema scores weighted arithmetic mean/average. The software output allows to visualize not only the tables with the relative scores, but also an interpolation graphic presentation and/or a cartogramme, with nine colours colorimetric scales, for the reference territories (Renzo, 2003).

Figure n. 2 –Dashboard of Sustainability summarizing scheme



Source: Dashboard

In this scheme:

- the circular sector dimension reflects the relative importance of the argument described by the indicator;
- a coloured code signals the services with respect to the others;
- the central circle (PPI, Policy Performance Index) summarizes all information.

The dashboard offers various way of data representation, all of them are based on a colour scale (from green: excellent, to red: critical, by passing through yellow); it can employ a simple quadrant with a pointer; a pie chart; a point diagram; or a map of the territory object of the analysis.

**4.2 HDI – HUMAN DEVELOPMENT INDEX**

In 1990 the first Report on human development was born. It was edited by the UNDP (United Nations Development Programme) and, precisely, wanted by Mahub ul Haq, who, not wanting to use the PIL to measure a Country welfare and development, wanted to create an other index “of the same PNL immediacy level... but not blind regards to human lives social aspects, like the PNL is”<sup>20</sup>. So, the Human Development Index (HDI) or Indice di Sviluppo Umano (ISU) was created. In order to measure the human development, in union with a dignified life standard, “the possibilities of a long life, of possessing some knowledge and of benefiting a dignified life standard” were considered (Renzo, 2006).

So, an index able to make this concept formal was elaborated: Human Development Index (HDI) or Indice di Sviluppo Umano (ISU). It is based on three indicators:

Longevity, by measuring life expectancy at birth;

education level, whose 2/3 are represented by adult literacy rate, that is the percentage of people, aged more than 15 years, able to read and write, and 1/3 is the gross enrolment report, that is the report among the enrolled in primary, secondary and high school, and the people of the corresponding age bands.

Living standard, measured by the real per capita PIL (in dollars PPA)

To each of these three factors is given the same importance for the HDI calculation, and they are transformed into indexes on the base of the following formula:

$$Index = \frac{actual\_value - least\_value}{greatest\_value - lowest\_value}$$

### 1. Longevity

$$life\_expectancy\_index = \frac{actual\_value - 25}{85 - 25}$$

### 2. Education level

$$adult\_literacy\_rate = \frac{actual\_value - 0}{100 - 0}$$

$$gross\_enrolment\_report = \frac{actual\_value - 0}{100 - 0}$$

$$education\_index = \frac{2}{3}(adult\_literacy\_level) + \frac{1}{3}(school\_enrolment\_rate)$$

### 3. Living standard

$$income\_index = \frac{\log(actual\_value) - \log(100)}{\log(40.000) - \log(100)}$$

The HDI is calculated on the base of the arithmetic average of the values assumed by these three components:

$$HDI = \frac{1}{3}life\_expectancy\_index + \frac{1}{3}education\_index + \frac{1}{3}income\_index$$

HDI value, between 0 and 1, indicates how much each Country approached the three prefixed objectives achievement:

- life expectancy 85 years (min. 25- max 85);
- education accessible to anyone (min. 0%- max 100%);
- decent income level (min. 100- max 40.000).

## 4.3 MILLENNIUM DEVELOPMENT GOALS

In 2000, in the USA, the Millennium Summit took place. On that occasion, the government and state leaders of the United Nation countries adopted the United Nations Declaration in which a series of development objectives to be achieved by 2015(the Millennium Development Goals), was defined.

The Millennium Declaration has 8 objectives, 18 target and 48 indicators that the Countries promised to reach and that are constraining for all the international community.

*Table n. 1 – Objectives, Actions and Indicators (Millennium Development Goals)*

<i>N°</i>	<i>Objective</i>	<i>Concrete actions</i>	<i>Indicators</i>
1	Eliminate extreme hunger and poverty	Halve the number of people suffering hunger and living with less than 1 dollar a day	1) population living with less than 1 US dollar a day; 2) poverty discrepancy report; 3) most poor quantile quota of the national consumption; 4) under 5 years undernourished children percentage; 5) proportion of the population living under the least limit of dietetic energy consumption;
2	Primary instruction for anyone	Allow to every child, female and male, to complete the primary school cycle	6) primary education rate; 7) percentage of pupils who from the first class arrive at the fifth one; 8) percentage of literacy between 15-24 years;
3	Equal opportunities between sexes	Eliminate gender differences in primary and secondary schools.	9) number of students booked in the primary, secondary and high school; 10) relationship between the number of girls and boys, aged between 15 and 24 years, able to read and write; 11) not agricultural payed women occupation/employment percentage; 12) percentage of parliamentary seats occupied by women;
4	Reduce children mortality	Reduce of 2/3 the child mortality rate with respect to the 1990's level	13) under 5 years mortality rate; 14) child mortality rate; 15) percentage of 1 year vaccinated against measles;
5	Improve maternal health	Reduce of 3/4 the maternal mortality rate with respect to the 1990's level	16) maternal mortality report; 17) percentage of equal assisted by a qualified sanitary staff;
6	Fight HIV/AIDS and malaria	Stop and begin to reduce the HIV/AIDS, malaria and other serious infective illnesses diffusion.	18) HIV diffusion among pregnant women aged from 15 to 24 years; 19) contraceptive use percentage; 20) orphan scholastic frequency rate like non-orphans percentage from 10 to 14 years; 21) diffusion and percentage of mortality caused by malaria; 22) proportion of population in malaria risk areas where preventive measures are used; 23) diffusion and percentage of mortality caused by tuberculosis; 24) percentage of tuberculosis cases discovered and cured by the DOTS system;
7	Assure the environmental sustainability	Halve the number of people who don't have access to drinking water and sanitation	25) percentage of forest covered areas; 26) percentage of protected area to maintain the superficial areas biological variety; 27) PIL for unity of energy use; 28) carbon dioxid emission and ozone CFCs consumption per capita; 29) percentage of population using solid combustibles; 30) percentage of population with sustainable access to a clean water source; 31) percentage of population with access to improved sanitation; 32) percentage of families with access to a steady occupation;
8	Develop a global alliance for development	Favour the cooperation to the development Nord-Sud, the debt reduction, the access to medicines	33) official assistance to development; 34) proportion of bilateral total, allocable sector ODA of OECD/DAC donors to base and welfare services; 35) proportion of bilateral ODA of OECD/DAC donors; 36) transport sector ODA percentage for the countries that don't have access to the sea; 37) ODA received in developing little islands; 38) total importation rate of industrialized countries; 39) mean customs tariff imposed by industrialized countries on some developing countries goods; 40) agricultural aid estimate of the OECD countries like their PIL percentage; 41) percentage of official assistance to development to help the commercial capacity construction; 42) number of countries arrived to HIPC and number arrived to HIPC completion; 43) debt relief under HIPC initiative; 44) debt service as a percentage of goods and services exports; 45) youth unemployment rate between 15 and 24 years; 46) population with access to economically sustainable essential medicines; 47) telephone lines and mobile users; 48) personal computers in use and internet users.

*Provenance: author's own elaboration*

#### 4.4 MONET

Monet is a Swiss project aspiring to develop a monitoring system for the sustainable development Swiss strategy (Maiolo et al., 2006). At present, there are 100 indicators in this model, distinguished among social, environmental and economic spheres:

1. The economic sphere indicators are:

- economic system;
- efficiency and competitiveness;
- production/consumption;
- work;

- international exchange.
2. The environmental sphere indicators are:
- resources consumption;
  - materials and rubbish;
  - risks;
  - change percentage;
  - nature and agriculture.
- 3 The social sphere indicators are:
- life condition objectives and sub-objectives;
  - distribution equity, opportunity equality;
  - social cohesion;
  - human capital development.

#### 4.5 ISSI

ISSI (Indice di Sviluppo Sostenibile Italia) is an aggregated index developed by the Italian Institute for Sustainable Development to quantify the improvements compared to sustainability development. The ISSI model uses the first three levels of the informative system. The first level indicator, ISSI, Italy Sustainable Development Index, measures the sustainability general condition in Italy, in relation to the general objective to be achieved by 2012. The second level is based on three domains: economy and society, environment and resources use. For each domain, the third level is composed by ten key-indexes coupled with a target and an achievement time. Key-indexes can sometimes be composite, that is derived from the union of several indicators through an appropriate combining algorithm. In the ISSI project a full-blown fourth level is not present, that is a list, or indicators core set, even if the variables set used for the key-indicators calculation represents itself an extended list. ISSI wants to be a unique indicator able to integrate the three sustainable development components, economy, society and environment, and to compete, from the communication and information point of view, with the PIL, Prodotto Interno Lordo (that is GDP, Gross Domestic Products). On the second level there are three domains. Economy and Society are integrated in the first domain (S&E) that improves some elements relative to economic growth quality and culture, information and international solidarity aspects. The second domain is Environment (E). The third domain, the Resources use (R), integrates further elements of the delicate input-output equilibrium, of the economic system with energy, rubbish and transports. To the ten key-indexes of each sector is assigned the duty to interpret the Institute sustainable development vision (Federico et al., 2008).

Economic and Social development key-indicators (S&E) are:

1. life expectancy;
2. per capita income;
3. unemployment rate;
4. unemployment rate in the Mezzogiorno;
5. income distribution equity (Gini's index);
6. female social discomfort;
7. education level;
8. access to welfare, health, safety and culture;
9. aids to development;
10. expenses for scientific research.

Environment key-indicators (E) are:

1. green-house emissions;
2. air quality in the eight Italian main cities;
3. Dioxin and Furani emissions;
4. coastal-sea water quality;
5. environmental quality and certification;
6. forest fires;
7. plant medicines consumption;
8. building without planning permission;
9. Hydro-geological risk;
10. Marine and terrestrial protected areas.

Resources use key-indicators (R) are:

1. GDP energetic intensity;

2. energy production from sustainable sources;
3. materials direct input;
4. per capita water consumption;
5. marine biological sources sample;
6. new built area;
7. per capita urban rubbish;
8. collection of items for recycling;
9. road transports;
10. rail transports.

#### **4.6 UNCDS**

The United Nations Commission for Development Sustainability (UNCDS) was created after the Conference of Rio in 1992 to keep track of the Agenda 21 realization, and at the same time it developed a sustainable development indicators model. This model, revised in 2001, is divided into themes and sub-themes collected in four pillars: social, environmental, economic and institutional, for a total of 15 themes, 38 sub-themes and 58 indicators. In the economic pillar the themes are economic structure, consumption and production. In the social pillar the themes refer to equity, health, instruction, building trade, security, population. In the environmental pillar plans the atmosphere, earth, oceans, seas, coast, drinking water and biodiversity themes. Finally, the institutional pillar is built on the themes of legality to structure and institutional ability (Maiolo et al, 2006).

#### **4.7 US-IWG-SDI**

The US Intergovernmental Working Group elaborated a model and some indicators for USA sustainable development. The selected indicators are represented by economic, social and environmental measures (Maiolo et al, 2006).

1. the economic indicators are:
  - a. personal compared to state consumption expenses per capita;
  - b. home ownership level;
  - c. families with housing problems;
  - d. use of property transport vehicles;
  - e. economic management index;
2. the social indicators are:
  - a. life and health expectancy;
  - b. crime percentage;
  - c. instruction level;
  - d. access to medical treatment;
  - e. homeless;
  - f. child poverty;
3. environmental indicators are:
  - a. renewable water resource supply;
  - b. fishing activities;
  - c. threatened and damaged species;
  - d. earth erosion percentage;
  - e. forest growth;
  - f. greenhouse gases/gases carbon emission;
  - g. rubbish production;
  - h. population living into areas where the air quality doesn't respect quality targets.

#### **4.8 DPSIR - DRIVING FORCES, PRESSURES, STATES, IMPACTS, RESPONSES**

The organization for cooperation and economic development created a model called Pressure-State-Response (PSR) later increased by the European Agency for Environment Protection whose result is the DPSIR model (Driving forces, Pressures, States, Impacts, Responses).

This model links the 5 variables by cause relations, inserted in an analysis that, by starting from processes determining environmental impacts (DF & P), focuses on environmental repercussions (S & I) to reach, finally, the examination of the efforts acted by the social-economic system to solve the highlighted crisis (R). Practically, through the DPSI indicators, it is possible to obtain information on complex phenomena, to quantify data, to highlight the actual conditions and to understand in which direction they are evolving, to adopt the necessary politics. There is no standard application of the model, because it supplies a unique logic by living to users the definition of the most appropriate indicators to the reality object of their analysis:

- driving Forces are factors influencing the variables (economic sectors, human activities);
- pressures describe the variables directly causing the considered environmental problems (natural resources use, emissions, wastewaters, impacts on biodiversity and urban environment);
- state, state indicators recording changes and the present environment conditions;
- impacts, impact indicators measuring the effects on the system deriving from natural system changes;
- response quantifies social and political system efforts to solve environmental problems, concerning principally prevention, demolition and renovation actions. (Iacobacci, 2004).

#### **4.9 WORLD DEVELOPMENT INDICATORS**

The World Development Indicators database is the World Bank principal statistical publication in which are collected almost every Country in the world and the progress in the Millennium Development Goals reaching is highlighted in an analytical way.

Used indicators are about 1000, organized in more than 80 tables and grouped in 6 sections, they confirm an integrated approach on population economic and social conditions, on the different Countries financial situation, on natural resources, the environment and energy conditions. Attention is not exclusively focused on traditional economic development indicators, but it focuses on political and social development, on governance and individual life quality. The areas in which the database is usually divided, themselves divided in several sub-categories, are:

- people;
- environment;
- economy;
- state and trade;
- global links.

#### **4.10 PPI - POLICY PERFORMANCE INDEX**

The Policy Performance Index is developed under UE initiative with the objective to replace traditional indicators like PIL (that is GDP), unemployment rate and inflation in single countries results measurement by a program lines performance index composed by three sub-indexes of economic, social and environmental types.

#### **4.11 SDI - SUSTAINABLE DEVELOPMENT INDICATORS**

The sustainable development indicators are individuated in respect of the European Union sustainable development strategy. In this range, there are ten principal themes:

1. economic development;
2. poverty and social exclusion;
3. population ageing;
4. public health;
5. climate changes and Energy;
6. production and consumption models;
7. natural resources management;
8. transports;
9. good government;
10. transnational partnerships.

In these themes, the indicators set composed by 12 themes, 45 sub-themes and 98 analytical indicators, represents a good start to reach the European Union Sustainable Development Strategy.

## 5. FINAL REMARKS

A large number of different instruments may be used for social reporting, however, the sustainability report is certainly the most complete in order to know, measure, understand and account for the outcomes of an organisation's activity in a joint perspective. Sustainable development should be a priority for all organisations, whether private or public, and sustainability reporting seems to be a very good instrument to improve the governance processes among the social, economic and environmental variables and ensure greater reporting transparency.

At the moment, there is no sustainability report structure commonly recognized and, of consequence, an instrument to measure and compare the business sustainability. The guidelines issued by the Global Reporting Initiative are flexible and, therefore, adaptable to a large variety of organisations, and make sustainability reports comparable over time and space. A parametric model with indicators created ad hoc to measure the business sustainability degree in an aggregated index could be applied to this scheme.

Moreover, although the instruments designed to measure the typical elements related to sustainability, through an integrated approach, are mainly used, at present, in the for-profit industry, it is desirable that the need to account for economic, environmental, and social impacts at all levels should lead all types of organisations to adopt, in the future, a universally recognised document, as in the case of economic and financial reporting.

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