

The Sustainable Firm: from Principles to Practice

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Abstract

This article wishes to contribute at filling the gap between the theoretical perspective on business sustainability and the actual need for procedures of preliminary evaluation and control for sustainability performances. A framework for the implementation of a sustainability-oriented approach in firm's management is proposed. The frame work assigns a crucial role to the involvement of middle management and to the definition of a control system that emphasizes interdependencies between firm's processes. A specific attention is dedicated to the complexity triggered by relationships with external and internal stakeholders. The impact of identified initiatives is assessed with an importance-performance criterion that weight the effects of planned actions with the importance assigned by the process leader (or process owner) to each specific issue. Finally, the feasibility of the various actions is investigated on the basis of a combination of the financial and organizational effort required, together with the potential impact on overall firm's sustainability assessed in the previous stage.

Keywords: sustainable development, sustainable management, corporate sustainability, sustainability control system, implementation process for sustainability

1. Introduction

1.1 The Need for a Micro Level Approach to Sustainable Development

Since its origin the debate on sustainable development has taken on a connotation that almost ignore the managerial perspective. Sustainability and sustainable development have become the mainstream in several academic disciplines and in everyday life, but it is not yet an acknowledged paradigm of business management. Management literature strives to see sustainability as an opportunity rather than as a constraint. Firms' managers are assuming an increasing commitment towards the adoption of green practices: roofs get covered with solar panels and gardens; fleets incorporate a growing number of alternative-fueled vehicles; new plants are designed with criteria that put the welfare of workers among top priorities, and so on. Nevertheless, the overall contribution of the managerial perspective to sustainable development still lacks of a convincing theoretical systematization. The institutional approach to sustainability has framed principles of ecology and social improvement within the economic theory, but very little has been done to consider the priorities stated by the specific organizational and competitive context. This means, in fact, to neglect the managerial dimension of sustainability and the economic priorities. To bring a firm from declaration of principles to actual sustainability a holistic approach is required and the innovative criteria brought by a sustainability-oriented vision should be integrated into strategic analysis.

The common sense about sustainability in business is to minimize the impact of company's activities on the environment and on social discomfort without sacrificing profitability. The sustainability concept gives to the management discipline the possibility of redeeming the historical conflict between business and the environment. In fact, along history firms and wars are heavily responsible of the unbalanced exploitation and degradation of natural resources. The industrial development in the past has had environmental and social effects probably equal or even worse, proportionately, than it is today. All typical business activities (investments, production, marketing strategies, and so on) have systematically ignored the major damages to the natural environment and the irreversible depletion of natural resources caused by their action. Business has also encouraged consumption patterns that reinforce the waste over time (Utting, 2000). Moreover, the main polluting and social-exploiting companies have built their competitive strength on the systematic shifting of burdens towards natural and social environment (Opschoor & van der Straaten, 1993).

The spillover of a sustainable approach to business management is therefore an important opportunity to catch up on the welfare and quality of life; firms are at the forefront of this complex change, whose nature is strategic and therefore should not be addressed by actions unrelated with the overall strategic design. “Greening” actions might be useful for individual motivation and for the corporate image in the short term, but durable advantages can be obtained only through the integration of the sustainability concept and philosophy into firm’s mission and, consequently, assuming the sustainability issues as a reference point in the formulation of strategic plans. In a word, a mere “cleaner production” does not guarantee neither a more sustainable firm nor an innovative approach to business (Lakhani, 2006, Schaltegger, Ludeke-Freund, & Hansen, 2012).

Indeed, the adoption of a holistic sustainable approach usually implies a broad and pervasive change in all business processes, from strategy formulation to the definition of operational plans. Thus, the actual capability of a company to initiate a path of sustainability, and to successfully implement it in the medium-long term, depends mainly upon organizational and coordination aptitudes. The complexity of the organizational change triggered by an orientation towards sustainability is a problem often absent in the contributions of the management literature. On the other hand, the genesis and evolution of the concept of sustainability has always placed emphasis on the macroeconomic implications, omitting to consider the role of the actions at the micro level and, specifically, the role of business.

1.2 The Hegemony of the Macro Perspective on Sustainable Development

For the majority of time during the industrial development, business has not been considered a threat to development or to the human kind, with few exceptions. The general awareness of the un-sustainability of economic activities has aroused in relatively recent times, since at least two reasons kept it away from the status of concern: First, in the past the availability of resources on a global scale was allegedly unlimited; the problem of resource scarcity was merely ascribed to restriction contexts and was considered relevant in terms of competitiveness and/or opportunities, rather than considered as a global concern (Tijmes & Luijf, 1995). Second, the impact of lifestyles and consumption patterns on the social and ecological environment has been underestimated for a long time.

The origin of the concept of sustainability in economics as it is known today it’s owed to the mindfulness, arising around the early seventies, of the scarceness of global resources. Basically, the idea was that the time had come for the Earth to be unable to meet the needs of humankind exponential growth.

From 1967 and during the ‘70s’ Ehrlich and Holdren began to report the ecological risk connected to the baby boom in terms of potential catastrophic events. They discuss five theorems that, they argue, are demonstrably true and should be at the basis of any realistic analysis of the impact of population growth (Ehrlich and Holdren, 1971). a) Population growth causes a disproportionate negative impact on the environment. b) Problems of population size and growth, resource utilization and depletion, and environmental deterioration must be considered jointly and on a global basis. c) Population density is a poor measure of population pressure. d) Environment must be construed to include such things as the physical environment of urban ghettos, the human behavioral environment and the epidemiological environment. e) Theoretical solutions to our problems are often not operational and sometimes are not even solutions. Ehrlich and Ehrlich (1972) postulate a concept of sustainability known as “PAT”, from the letters they used to build a formula that represents the human impact on environment as a function of the size of the population (P), the average consumption of each person (expressed by the Affluence – A) and of the Technology (T).

Further alarms about the resource scarcity issue emerged when the “Limit to Growth” report was published (Meadows D.H., Meadows, D.L., Randers & Behrens, 1972). According to this study the trend of population, resources, energy, pollution and industrial development would have provided a scenario of an increasing shortage of resources that would have brought the world economic system to collapse within the twenty-first century (Meadows et. al, 1972).

These scholars and many others agreed in identifying the basis for durable development in a new way of managing the world economy and the resources exploitation in order to evaluate the long-term consequences in terms of economy, society and natural environment. Then, at that time the increasing cognizance of the critical relationship between preservation of natural resources and economic development pushed towards the quest for a way to plan and control the impact of human activities on the natural environment on a global scale.

In the same year in which “Limit to Growth” was published, 26 principles were established at the United Nation Conference on Human Environment, held in Stockholm. This principles aim «to inspire and guide the peoples of the world in the preservation and enhancement of the human environment» (U.N., 1972). Specifically, some of these principles assume a dominant role of the macro level policies and regulation in determining the actual

effectiveness of sustainability actions:

- Sustainability requires a coordination at a super-national level; the interrelation between natural resources, economy and social equity in feeding development operates locally but has increasing implications at a global level;
- Economic policies and regulation is a major driver for reaching the desired effects. Consequently, for the sake of the human kind super-national entities are legitimized to intervene in the legal systems of member states, seeking for agreement and to establish regulation, roadmaps and other form of mandatory rules aiming at promoting sustainability;
- It is denied the idea that the economic well-being must first be achieved and then the social and ecological consequences be repaired. A continuous equilibrium between ecological, social and economic consequences of human activities must be pursued, since consequences of too harsh exploitation can be irreversible.

The set of principles established in the Declaration of Stockholm put into the background the possible role of micro level actions towards sustainable development. The majority of attentions were focused upon the need for controlling the ways and the distribution of economic growth and the evaluation of actual costs of resource exploitation, shifted from the production system towards society and environment (Opschoor & van der Straaten, 1993).

The expression “sustainable development” became popular only several years later, thanks to the publication in 1987 of the document “Our Common Future”, prepared by the World Commission on Environment and Development (WCED, 1987). The document is also known as “the Brundtland Report”, named after the Norwegian Prime Minister, Gro Harlem Brundtland who chaired the commission.

The report compiled by WCED is mainly known for having established a very well-known and in some way controversial (Tijmes & Luijf, 1995), definition of “sustainable development” as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, Part 1, 2, I.). The document also has had a major impact on the general perception of the issue, supported in this by actually visible changes in the environment and climate. Since then, the interface between environment and economics has begun to be part of the economics issues (Goodland & Ledec, 1987); sustainability has been recognized as a priority in the agendas of international organizations and several further steps have taken place in a huge number of world conferences, meetings and summit (Quental, Lourenço & da Silva F.N. 2009).

A number of world conference and declarations followed Stockholm event; the concepts of sustainability and of sustainable development have been used in an increasingly complex and articulated way, especially as regards the difficult relationship between the environment, the society and the economy (Grinde & Kare, 2008).

This historical development is allegedly well known among scholars in the field; however, to our knowledge no one has raised the issue about the radical detachment of this policy-based or macro-level perspective approach from opportunities offered by a business-case approach. Since the origin, and in the subsequent path towards the definition of the principles of sustainable development, concepts and the principles were shaped to provide guidelines for regulation. The micro dynamics, and specifically the business dynamics, have been left behind; no specific attention has been paid to the working conditions and occurrence that would affect the actual implementation of any sustainability principle, like for instance individual motivation or business processes.

The evolution outlined above shows a profound rethinking of the philosophy of the policy makers. The community of member states and intergovernmental organizations - historically much more attentive to the strategic and economic equilibria than to humanity welfare or to the salvation of ecosystems - at a certain point suddenly determine that it's time to change the route towards sustainability. No economic or strategic benefits are induced to explain the new attitude, apart from the salvation of the earth. An adequate reason, however, to readdress the policies on a global scale. The unambiguous and reiterated declarations from the world representatives initiated a fairly innovative and fruitful field of study in sustainability from the perspective of macroeconomics, economic policy and related disciplines. Unfortunately, although a similar awareness is widespread among entrepreneurs and managers, and a blooming of theoretical contributions might have happened in business disciplines, the change in general attitude is often unacknowledged. Specifically, the hierarchy of goals that managers pursue, reconciling individual and organizational aims, does not coincide with what is the institutional vision of the firm's objective (fig. 1). Policies should instead take into consideration the complex and diversified set of businessmen individual and organizational motivation, as well as the managerial quality and the actual capability of management to link firm's environmental management and economic success

(Schaltegger & Synnestvedt, 2002).

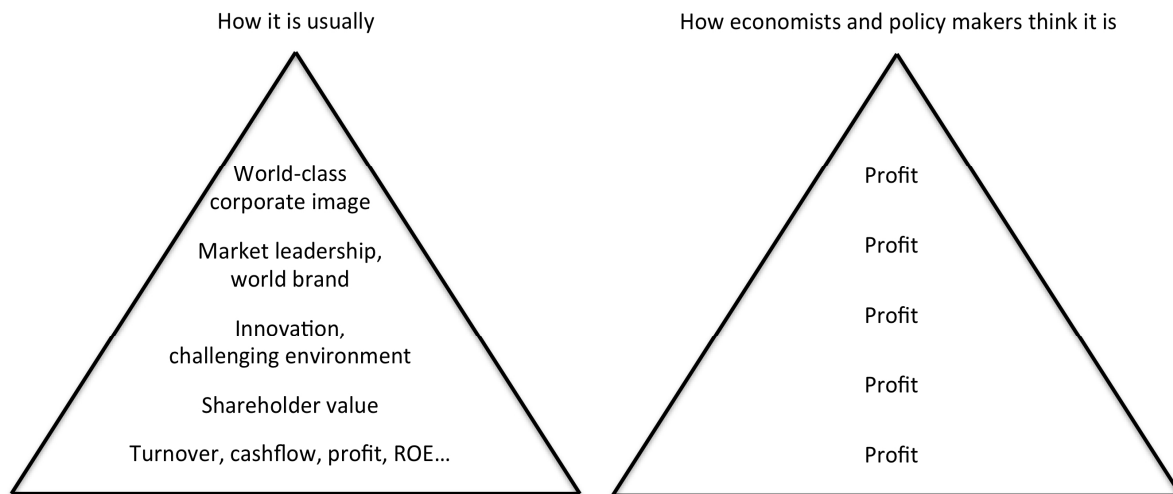


Figure 1. The Maslow hierarchy of managers' values and needs from different perspectives

In our opinion, having considered the sustainability issue primarily from the macro and regulatory perspective led to prejudicially deny a possible active role of business. If one assumes that: a) macro level regulations and policies are effective in fostering sustainability, b) sustainability in business provides only increasing costs and no balancing advantages, c) managers pursue only profits, then adopting a micro level vision for sustainability, as distinguished by a macro level one, appears a useless effort. The role of firms in such framework, as for sustainability, is absolved by merely fulfilling the regulations and by following the policy address. If this was true, there would be little to add in terms of competitive strategies, operations management and sustainability management in general at the firm-level or micro level. We instead argue that a vision of sustainable development focused on the contribution from the business might produce relevant results. The empirical evidence shows a picture where both scholars and business practitioners are willing to go beyond a simple "adaptation-to-the-rules" approach, even independently from the "global endorsement to a vast array of moral principles and institutional demands" (Hedrèn, 2008) brought by the several world conferences and declarations that have occurred after Stockholm's one.

The business case for sustainability should be a primary object of consideration not only by scholars of management, but also by policy makers. The business point of view on sustainability triggers a series of factors that encourage or rather inhibit the reorganization and innovation. Policies that are willing to act on business mechanism are more effective if they follow an adaptive logic (Swanson et al, 2010). If policy-makers fail to consider the business point of view on sustainability, then failing to understand firms' possible active role in sustainable development, then biases in the comprehension of the possible relationships between policies and firms' reactions might arise.

The coordination of policies at the macro level and strategies at the micro level is crucial in what firms can have a major role in developing sustainability, overcoming a mere application-of-rules, or picking-of-opportunities approach. Such issue is relevant for the managerial discipline as well as for business, to the extent managers and stakeholders are actually motivated in pursuing an integrated sustainable philosophy that goes beyond the common green practices and that is ascribed to a strategic design of firm's development.

1.3 The Theoretical Background for the Business Point of View on Sustainability

The pioneering work from Elkington (1997) has probably built a bridge between institutional economics and management of sustainability, triggering a series of contributes about the triple bottom line and the business case for sustainability (Dyllick & Hockerts, 2002; Salzmann, Ionescu-Somers & Steger, 2005; Schaltegger, 2008; Schaltegger, Lüdeke-Freund & Hansen, 2012; Boons & Lüdeke-Freund 2012). These contributions went beyond the idea of sustainability as a pseudo-constraint and assert the importance of a systemic orientation towards the innovation of the business model and/or the organization for sustainability. However, the significant attention to the issues of sustainability implementation is not adequately followed by theoretical stances. Considering the criticality of the topic, relatively few scholars have developed the conceptual basis of

sustainability to integrate them within the theory of the firm (Rodriguez, Ricer, & Sanchez, 2002; Artiach, Lee, Nelson & Walker, 2010; Crittenden V., Crittenden W., Ferrell L., Ferrell O. & Pinney, 2011; Connelly, Ketchen Jr & Slater, 2011). The concept and the principles of sustainability for management fetch minor benefits if not encompassed within a holistic view or, at least, in a general framework (Salzmann et al., 2005; Grinde and Kare, 2008; Bonn and Fisher, 2011). Even the few meritorious attempts to disseminating the sustainability philosophy and reporting practice (e.g.: Global Reporting Initiative (GRI), Dow Jones and STOXX sustainability indexes) end up being little more than data retrieval systems rather than the opportunity to rethink management premises.

The business case for sustainability guarantees several reasons to go further than simply being spectator and passive subject of mandatory rules. According to Bansal & Roth (2000) the corporate ecological responsiveness is driven by four key elements: legislation, stakeholder pressure, competitive opportunities and ethical motives. Size and visibility, as it relates to stakeholders and regulators pressure, is associated with a greater commitment towards sustainability and with higher performances (Artiach et al., 2010). Human factor, both as a derivative of ethics and/or of corporate leadership values, is often mentioned in opposition to the argumentation that the commitment towards improving the environmental and social performance enhance profitability (Shrivastava, 1995; Russo & Fouts, 1997; Cohen & Winn, 2007); main causes are the following:

a) The commitment towards sustainability is perceived as perseverance towards excellence. It increases corporate reputation (Lee, 2012), legitimates management's decision in front of shareholders (Hart & Milstein, 2003), improves HRM relationships, attracts better resources and reduces stakeholder's pressure on the company (Hardjono & van Marrewijk, 2001). As a result more "visible" firms, typically larger firms, have higher commitment towards sustainability (Artiach et al., 2010).

b) The sustainability-driven reengineering creates the opportunity for the adoption of new technologies, new material management criteria and new tools of process analysis (e.g.: Total Quality Environmental Management –TQEM; Life-Cycle Assessment–LCA, ISO 14001). The actual benefits deriving from such innovations depends on firm's capabilities (Christman, 2000) but in any case they put the premises to develop metrics related to several fields of application in which the firm has the opportunity to increase its own efficiency, thus highlighting inefficiencies, wastes and weak points (Jasch, 2003; MacDonald, 2005; Tsoulsaf & Pappis, 2006).

c) Sustainability represents an important advantage in terms of marketing as long as environmental and socially responsible customers are presently an increasing and high-value market segment, and probably will represent the predominant share of demand in a near future (Barthel & Ivanaj, 2006; Chabowsky, Mena & Gonzales-Padron, 2011).

This reasons, and few others, pushed management scholars towards the study of the "business case for sustainability" (Salzman et al, 2005), a terminology which clearly recalls the "case for corporate social responsibility" by Henry Mintzberg (1983). The issue is to bring the debate on business contribution to sustainable development within a track that sounds familiar to management strategic analysis: to identify potential, sustainability-related competitive advantage. The micro-level analysis took into serious consideration concepts and principles from the macro-level analysis, even the inherently unenforceable Bruntland's definitions. To date, however, it seems that the analysis at the macro level does not take into account at all the business point of view on sustainability.

Although Korhonen (2007) warns about the adoption of sustainability principles in their prescriptive form, generally speaking sustainability principles are wide enough to be adapted and applied at the business level (Dyllick & Hockerts, 2002; Robèrt et al, 2002) and several authors are committed to demonstrate the adequacy of commonly used control tools (Figge, Schaltegger & Wagner, 2002; Bonacchi and Rinaldi, 2007; Chalmers & Palomero, 2011).

The criteria to pursue a sustainable business have been extensively defined by Dyllick and Hockerts (2002). These authors also identify three key-principles in corporate's sustainability: to integrate the economic, ecological and social aspects in a triple-bottom line; to integrate the short-term and long-term aspects; to consume the income and not the capital (Dyllick & Hockerts, 2002, 132). Parrish (2010) proposes an in-depth analysis of the entrepreneur's motivation for sustainability and identifies the principle of "perpetual reasoning" as a dominant organizational design driver in sustainable entrepreneurship as opposed to the traditional "exploitative reasoning". Hart (1997) and Hart & Milstein (2003) propose a classificatory scheme for alternative strategies and drivers based on present vs future and internal vs external dimensions. These authors suggest to approach sustainability as a multidimensional source of opportunities rather than as a single or multiple elements of necessary compliances. Epstein and Roy (2001) propose a comprehensive framework that includes sustainability drivers, a series of action and related consequences on performances. A detailed list of key steps in

the process development for new projects can be found in Brent and Labuschagne (2005), whose contribution suggests a scheme to couple each stage of product life-cycle with proper indicators of social, environmental and economic performances.

Several scholars (e.g.: Robért, 2000; Azapagic & Perdan, 2000; Veleva & Ellenbecker, 2001; Krajnc & Glavic, 2005; Waage, 2007;) suggest models aiming at linking sustainability principles to firm's activities and to metrics, through indicator systems and/or control systems. Azapagic & Perdan (2000) identify a set of indicators for industrial sustainable practices, within a model that puts into connection the micro and the macro features of sustainability. A further development of this approach is in Azapagic (2003), who presents a general framework for linking firm's vision and strategy to a Corporate Sustainability Management System (CSMS).

The "human factor" and motivations that are rooted in the human nature are less evident from an academic point of view but definitely real and effective. People can have, and usually have, motivations that go beyond organizational target (Parrish, 2007); specifically, institutionalization of sustainability practices have a role on the acceptance and legitimization of the innovation design among involved actors (Etzion & Ferraro, 2009).

Bansall & Roth (2000) showed that, depending on the organizational context, legitimation and competitiveness accompany the environmental responsibility in pursuing ecologically responsive initiatives. Sustainability in business can be seen like an outcome of the individual ethic, but its actual implementation is far from being granted. Since sustainability agenda is in competition with all the other firm's agendas, in an orthodox management perspective it seems reasonable to assume that in the everyday operations there is little room for anything but competitiveness-driven policies. Nevertheless, individual motivation towards ecological and social responsiveness, is an evident driver for sustainability both at an individual and at an organizational level (Bansall & Roth, 2000; Dangelico & Pujari, 2010; Parrish, 2010), although it is often unacknowledged as a driver for the definition of firm's operational target.

Parrish (2007) deals with the questions of what are the conceptual essence and aims of a sustainable enterprise, then identifies two – very general - principles for sustainable organization design, stating the need for concord of activities within the hierarchy and between the various dimension of firm's aims. It was also noticed that within complex systems the mere consideration of prescriptive principles as planning tools fails to ensure a holistic approach to sustainability. Peculiar industry features, specific organizational and competitive environment must be taken into consideration, while prescriptive principles should rather be translated into descriptive indicators for a methodical system analysis (Korhonen, 2007).

Apart from specific aspects and issues arising in each contribution, the evident common trend in management doctrine stands in the inclusion of sustainability in daily operation, putting sustainability criteria on a par with those of efficiency and effectiveness. The critic effort is to show that sustainability is not discordant either separated from the normal daily operations, but it rather should be intended as a prerequisite to normal business activities. A crucial issue is to build a methodology capable of integrating the sustainability approach within a strategic plan and to translate strategy into action. If we assume that human motivation is the among the main drivers for the implementation of a sustainable company, the spread of a shared vision along the organizational structure, and specifically between managers and process owners, is important as well. Thus, the implementation system must ensure a high degree of participation by the process leaders at various organizational levels and adequately report the progresses.

2. From Principle to Practice: the Framework

2.1 Implementing Sustainability through a Focus on Processes

Between 2008 and early 2011 a panel of eight managers from five organizations (4 companies, 1 firms' association) were subjected to unstructured interviews about their perception of critical implementation issues in sustainability practices. Subjects were chosen for having a high commitment towards sustainability issues; however, this was somehow offset by concerns about the impact on the organization and processes. The research was the preliminary investigation of an ongoing research about the factors of inertia in the adoption of a sustainable attitude within firms. From the dialogues with managers emerged the need for a conceptual tool capable of overcoming some crucial obstacles that have emerged as relevant while rethinking the processes in terms of overall sustainability and that can be summoned as follows: a) difficulties in implementing a shared vision of the mission and the objectives of a sustainability-driven reengineering; b) misgivings about the possible arise of unpredicted side effects on economic performances; c) fear of increase in the complexity and in the pressure of external stakeholders; d) uncertainty about the convergence on targets that are often perceived as unclear and undefined. These issues must be considered as simple remarks emerged in unstructured conversations during a research that is still ongoing. They cannot be considered as research conclusions since

there is no validation at the time, but they anyway sparked a debate on possible shop floor solutions to the “how to implement sustainability” question.

The first draw of a procedure that seeks to overcome those perceived problems is here presented in the form of a three-steps, top-down process:

- 1) Definition of a “Control System for Sustainability” (CSS).
- 2) Assessment of the impact of actions and investments on the overall sustainability performance.
- 3) Identification of priorities.

2.2 Definition of a “Control System for Sustainability”

Performance measurement is the basis of all business processes. In our view, the first step should consist in the definition of a Control System for Sustainability (CSS) capable of measuring and monitoring over time the performance of the firm in relation with a set of Sustainability Variables (SVs). SVs are identified in order to be expressive of the impact of firm’s processes upon the various sustainability areas. CSS is defined as a general scheme that is unique for the whole firm although very likely each process’ impact on SVs will be significantly different.

Figure 2 presents a portion of a hypothetical CSS with a few examples of the above-mentioned areas and related variables. In the scheme, some of the possible connections between processes, areas and variables are highlighted. The three macro-areas are defined according to the traditional dimensions of sustainable development: Environment (E), Society (S) and Economic Performance (P). The identification of separate area of intervention (e.g.: innovation, personnel, finance) is meant to facilitate the process of target definition and issues identification. However, overlaps between areas and even conflicts between targets are unavoidable: for instance, higher salaries increase the social commitment towards employee but might decrease the shareholder satisfaction.

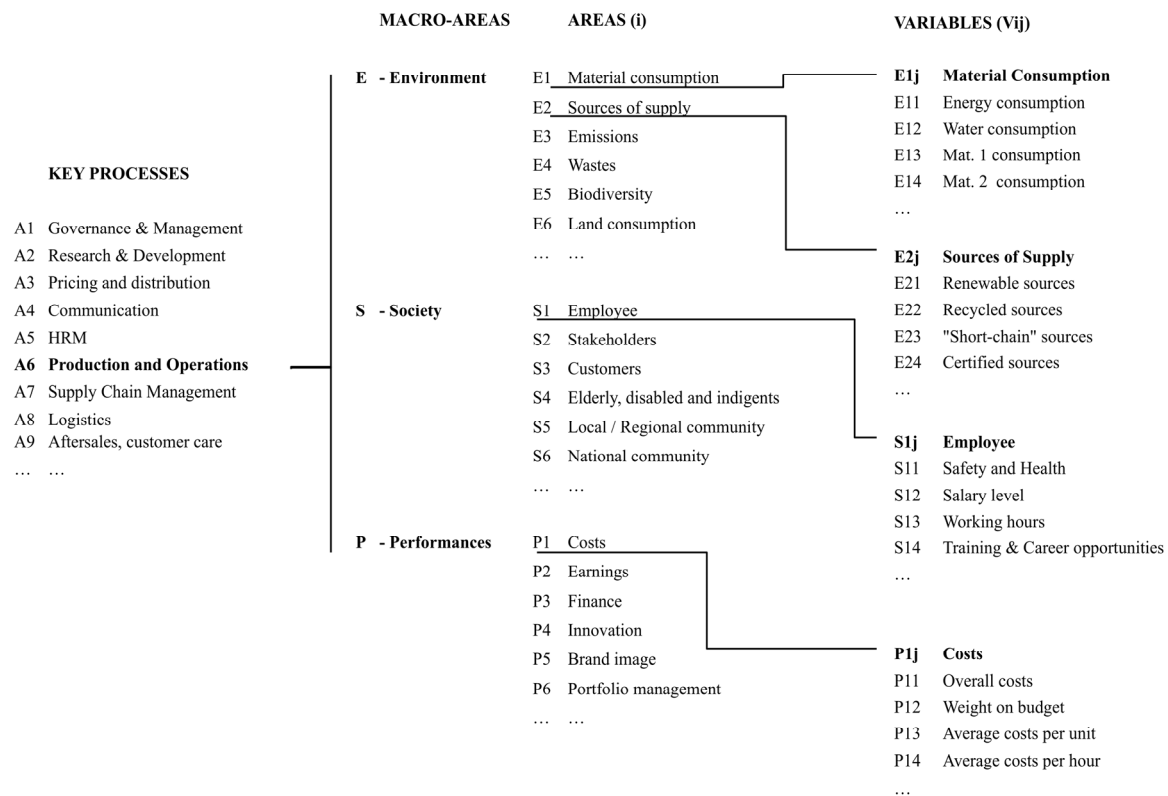


Figure 2. Example of a frame of reference for CSS

At a first stage the aim of the process that move the organization towards the construction of the CSS is to emphasize and spread awareness of the interconnections between operational variables at shop-floor or office level (e.g. water consumption) with overall process performances (e.g.: production capacity). The actual CSS scheme generated by this participatory process can be significantly wide and complex in relation with the extension of firm's activities, with the complexity of processes and with the management's commitment towards detailing the various aspects involved. For this reason, the definition of the CSS is a process that involves negotiations that are predictably shaped, among the rest, also by power relations and by the specific organizational context.

The development of a CSS is a complex task that requires an in-depth investigation of each process since CSS is supposed to be tailored around the peculiarity of each activity. Nevertheless, standards frames of reference can greatly facilitate the work in its early stages. To our knowledge, the CSMS model (Azapagic, 2003) is presently, the more complete and feasible tool for bridging the sustainability commitment towards an actual implementation. Other standard frames of reference (e.g.: Global Reporting Initiatives – GRI; Environmental Management Assessment Strategy – EMAS; ISO 14001) are useful guidelines although not pervasive enough of a specific firm's operational reality.

In our view the implementation of the sustainability philosophy should – at least in its earlier stages – adhere as close as possible to firm's specific features rather than indulge to the concern of certification. Moreover, probably the employees would welcome more a firm-based CSS than an advice-based management control system.

The CSS should not be taken as a rigid or definitive framework of reference. The evolution of the firm over time originates different impact of business activities on the dimensions of sustainability. It is therefore necessary to periodically reshape the structure of the scheme to ensure that all the emerging aspects that are critical for sustainability are taken into consideration.

A complete framework of analysis might be made of tens of areas for each macro-areas and hundreds of variables as a whole, including replications. In theory for each variable one or more improving initiatives can be defined; such initiatives, or action, need to be evaluated in relation with the benefits they can produce relatively to the organizational and financial effort they will require.

2.3 Assessing the Impact of Planned Actions on Sustainability Performances

Once defined the structure and the variables of the CSS the interrelationships between processes as for the areas of sustainability are highlighted. At this point the process owners (or process leaders) of each area must evaluate the impact of their activities upon the SV, both analyzing their present effect and suggesting future possible interventions and innovations aiming at improving the overall sustainability performance. We suggest that the definition of priorities should follow an importance-performance approach (Martilla & James, 1977), where each variable of the Environment and Society areas (ES) is weighted according to its impact on the economic Performance area (P) estimated according to the procedure for preferences estimation described in Krajnc & Glavic (2005). For this purpose, direct linkages between ES variables and P variables, both positive (e.g.: waste reduction and efficiency) and opposing (e.g.: salaries and distributable income) should be highlighted first. A matrix is built that relates connected areas; performance measures, or otherwise evaluations (in the case of qualitative variables) of ES variables are introduced. The aim of this procedure is to flank the standard measure parameters with a set of measures expressing the sustainability of business processes. Such parameters are listed in order of the relevance as regards the impact on the overall performance. Then, the leader of each process expresses his or her appreciation on a determined scale (e.g.: 0-9) in relation to the perceived importance (weight) of the investigated variable for the sustainability. The weight of the variable is expressed by the mean value of all expressed preferences, while the standard deviation might be intended as a proxy of the degree of agreement about the actual role of that variable in contributing to firm's overall sustainability.

Table 1 shows an example where the weighted impact is calculated for the variables of the area of material consumption. E.g., raw material 2 presents the highest weighted impact because of the highest assigned importance and in spite of its lowest weight on budget. A comparatively low value of the standard deviation signals a certain agreement on the assessment.

Table 1. Calculation of weighted impact according to impact on budget and importance (example)

	Importance		Impact on performance			
	Mean	s.d.	Yearly costs (/000)	Weight on budget (%)	Weighted Impact	
E1j Material Consumption	(0-9)	s.d.				
E11 Energy consumption	7,3	0,74	390,9	2,9%	0,215	
E12 Water consumption	8,9	1,26	12,5	0,1%	0,008	
E13 Raw material 1	5,9	3,10	459,4	3,5%	0,204	
E14 Raw material 2	9,1	0,60	322,7	2,4%	0,221	

The output of stage 2 is therefore a ranking of variables determined according to their potential impact on sustainability performances, identified by combining the opinion of management with metrics. The firm could then target its investments in innovation focusing on the areas that have a major capability to improve economic performances and sustainability at a time.

Nevertheless, to identify the actual priority of various, possible sustainability actions a further evaluation is needed concerning the effort that will be required; such effort includes both financial and organizational capabilities, as well as the intensity and the kind of coordination effort required to fulfill them.

2.4 Identification of Priorities

The adoption of sustainable innovations in a firm is a cross-function activity that involves also stakeholders and third parties (e.g. suppliers, customers, labor union, local communities, etc.). The financial investment represents just one side of the effort, while a considerable energy might be required to overcome obstacles and barriers deriving from the coordination and negotiation related to the implementation of the new policies and the new tools. Moreover, the motivations rooted in sustainability enthusiasts often bring with them an intrinsic pressure towards the adoption of drastically new technologies and organizations. Common sense suggests then to consider how action planned upon prioritized variables will impact on organization as for the kind of investment required and for the degree of coordination / negotiation involved.

Figure 3 shows a matrix created to classify the planned sustainability action according to the degree of effort they require. The “investment / coordination” matrix is based on two categories: the first category identify the financial and organizational effort related to the kind of innovation introduced. The second class refers to the extension of the processes involved in the innovation, therefore refers to the degree of coordination, or negotiation, which is required to actually implement the new process or the new technology. The various actions are placed on the matrix according to the type of investment and the intensity of the commitment required for the coordination or negotiation. The actions that are at the top right of the diagram require a particularly high effort in terms of financial resource, required knowledge and intensity of the impact on the organization and processes.

The horizontal axis of the matrix classifies the investment effort as follows:

- At the first level a basic, low-cost improvements implemented. This is the case for basic reorganizations and elimination of wastes with least intervention from the point of view of the organizational impact and at low costs. E.g.: orientation of individual behavior, use and reallocation of internal resources, marginal technological improvements.
- The second level identifies improving investments adopting established procedures and technologies to increase the efficiency of existing structures by the addition of external resources and low impact process re-engineering.
- The third level consists of innovative investments: it implies the adoption of new procedures, regulations or technologies that are already tested in the competitive environment but in fact innovative for the firms as regards the impact on the structures, on people and organizational units in general.
- At the fourth level a pioneering innovation is introduced: it implies the development, testing and prototyping of actually new procedures and/or new technologies, where a specific commitment to R&D function is assigned.
- The fifth stage involves a systemic re-orientation: both internal and external relationships are redefined considering their degree of efficiency and the coherence of the stated values with sustainability principles.

- The sixth stage is that of strategic sustainable innovation initiatives: the business areas, the network and the competitive positioning are re-oriented and/or re-engineered according to the leading sustainability criteria.

The second dimension of the matrix considers the amplitude of the intervention aiming at improving the sustainability performance. The scale of the intervention leads to a different organizational effort that is induced by the need of coordination and/or negotiation; such effort depends on: a) the number of processes, hierarchical levels, functions, etc. involved, b) the necessity to coordinate actions with external contractors and stakeholders. Several classification are possible, here we propose the following:

- Action implemented at a technical or administrative unit level (office, shop floor, plant, functional area.); it covers all situations in which a unique manager for the investment or the action of sustainability is detectable.
- Inter-unit initiatives; the implementation of the initiative requires the coordination of two or more managers of the same hierarchical level.
- Firm-level coordination: the innovation to achieve results in widespread changes in several units or in the entire organization; e.g., requires a cross-divisional process reengineering.
- Supply-chain coordination/negotiation: to achieve progress in sustainability performance the company must develop agreements with suppliers and/or customers, thus giving rise to a process which implies negotiation and the quest for mutual advantages or interest.
- Coordination with external stakeholders: at this level third parties (e.g. institutions, representatives from association and local community, etc.) are involved in the planning and implementation of sustainability initiatives (figure 3).

External stakeholders						
Supply-chain						
Firm						
Inter-unit						
Single organizational unit						
Coordination level	Rationalization at minimal cost	Improving investments	Innovative investments	Pioneering innovation	Systemic re-orientation	Strategic sustainable innovation
Action						

Figure 3. The investment / coordination matrix

A higher priority is assigned to those sustainability actions that presents the highest potential impact with comparatively lowest organizational effort (fig. 4), while investments that present a high effort with relatively low impact should be evaluated carefully since, apart from the higher intrinsic risk, they are also perceived as less relevant in affecting the overall sustainability of the organization. Consequently, in the scheme here adopted a lower commitment could be expected for these actions in front of higher difficulties of implementation.

High effort	low priority
Low effort	high priority
	low weighted impact high weighted impact

Figure 4. Identification of priorities for sustainability initiatives

4. Conclusion and Discussion

The rationale of sustainability is driven by simple principles, but a high level of interdependency is triggered by their application. The seeming intuitiveness of sustainability rules is likely to misjudge the pervasiveness of sustainable innovations, presuming that good intentions and adequate resources are all that is needed to get to the result. The tool of analysis here proposed aims to highlight the hidden obstacles on the way to the sustainable firm. At the same time, it can be used to evaluate the actual trustworthiness of the warnings and sources of resistance invoked by those who oppose to innovations. In both cases, to be aware of the type and of the extent of these difficulties is an important first step to understand whether and how to cope with them. It is also relevant in cases where the enthusiasm for such an endearing idea, as sustainability is, can bring out of sight the economic priorities, as well as relational and organizational complexities that might undermine the effectiveness of the initiatives.

The framework proposed in this article aims to give to managers a tool for the proper assessment of the implications of sustainability-oriented actions, through a process that requires the direct involvement of middle management, who is asked to assume the responsibility for the preliminary assessments and, subsequently, the accomplishment of the actions identified.

The scope of this scheme is likely to be highly pervasive of the structure and of its processes, although its application may be gradual and modular. The procedure is similar to those of the QFD, but extended to a large number of organizational units, potentially across the whole enterprise. The framework does not consider the issue of overlapping responsibilities that would emerge in particular within functional organization structures. It is assumed a process-focused organization, specifically it is assumed that the map of interdependencies at the basis of subsequent analysis (the CSS) can be identified by mutual interaction between process managers.

The more broad is the scope of application, the more complex is the framework implementation. Although this is formally a top-down process, it is not centralized or hierarchical and it assumes an emerging representation of the existing interdependencies between processes and between performances in various areas. At the corporate level the number of interdependencies and the complexity of strategic appraisals go far beyond the capability of representation of this tool.

An in-depth investigation of organizational implications of such an invasive reengineering process should be addressed; in particular it is necessary to deepen the links between organizational variables and the critical implementation phases. A large number of interdependencies could lead to an impasse in the process of setting goals.

The proposal here presented needs further investigation in the conceptual development of the metrics behind the identification of priorities. Specifically, the empirical analysis agenda should consider: a) to classify the positioning of the initiatives in the investments /organization matrix, b) to get out of ambiguity those investments that are located in the in empty areas of the matrix in Figure 3 (high impact and high effort; low effort and low impact).

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