A conceptual device for framing sustainability in project development and evaluation

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Abstract

The exclusive use of sustainability criteria does not seem sufficient to orient sustainable development towards the complexity of the societal requirements and to cope with them. The paper provides a heuristic device to determine sustainable development with a more comprehensive vision. The device represents an explicit and transferable back-to-basis approach based on 3 functions: -) sustainability (S), a field of macro-variables underlying normative criteria; -) governance (G), a field of macro-variables pertinent to the organisation of the society in which sustainability is plunged; -) Ethics (Є), a field of principles used to explicitly orient sustainability towards a higher level of individual values. The interlinkages among S, G and Є are explored to enable comprehensive planning and evaluation of sustainability accounting the fair balance among sustainability criteria, governance variables and explicit ethical principles.

Keywords: sustainability, governance, Ethics, orientation of sustainability.

1 Introduction

Criteria of sustainability alone do not seem able to comprehensively frame sustainable development in project development. The term project is used here to cover a large range of human actions, from programmes, master plans, strategies to decision making and policies. Neither traditional impact assessment approaches nor applied sustainability seem able to cope adequately with the dynamic character of our modern society, which seeks balancing between material and non-material values [1, 2]. The purpose of the paper is to present a
holistic model which can support planning and evaluation of sustainability by exploring the interlinkage of sustainability, governance and Ethics, and in the same time systematise sustainability, governance and Ethics in separate fields of explicit criteria or variables. In general, the interlinkages of these variables are not explicitly and analytically considered when planning and assessing sustainable development. Very often the same or very similar variables are used simultaneously to characterise sustainability, governance and Ethics in the social, economic and environmental dimensions. The following questions are posed. Is governance an implicit sub-function of sustainability? Do we have to treat the notions of governance, although complementary to sustainability, in a separate and more explicit field? The general paradigms framing relationships of sustainability vs. governance are mainly centred on the fact that sustainability must be adequately plunged in a system of good governance [3]. Also Ethics is essential to determine the quality of choices for sustainable development [4, 5]. But what are the ethical principles inspiring sustainability? How do we establish useful interlinkages between sustainability and Ethics? They should rather be explicitly expressed and systematised and used as reference for orienting projects since their early-stage phase of design and during their assessment. The proposed model is an underlying criterion for the integration of ethics and governance in sustainability as inspired by the existing literature [2, 4, 5] but not yet analytically explored with satisfactory results. The proposed approach is also inspired by the EU values prevailing in the Treaty of Amsterdam (art. 2), further developed in the published European Commission Communication “Guidelines for Programmes in the period 2000-2006 (OJ 1999/C 267/02) and in the acts of the Process of Lisbon [6]. But perhaps the most relevant EU document for the contextualization of ethics and governance in designing and assessing sustainable development is the Framework Programme-FP for research, technology and development [7]. The final text of the 6th FP makes explicit reference to the EU aim of integrating notions of governance and ethics into sustainable development, without giving an analytical model for integration.

2 Conceptualising a new framework

The model enhances a back-to-basis heuristic approach based on the separate use of three fields of macro-variables: -) Sustainability (S), a field of macro-variables defining normative criteria for sustainable social, environmental and economic development; -) Governance (G), a field of macro-variables pertinent to the organisation of the society, ensuring the realisation of Sustainability; -) Ethics (Є), a field of macro-variables inspired by values residing in individual’s motivation to determine orientation of choices and paths of sustainable development.

A macro-variable is defined here as the result of the combination of sub-sector (e.g.: economic or socio-economic) measurable variables (e.g.: income, economic growth, production, productivity, etc.). The multi-dimensional interlinkages of S, G and Є inscribe the space in which early-stage design or evaluation of projects should be conceptually inscribed (Fig. 1,a). The triangle
of Fig. 1.a is the way to simply represent the conceptualisation lying at the base of the model, where the space delimited by the simultaneous interaction of multi-level variables S, G and Ε is explored. The first step of the work consists in the systematisation of the arena of variables gloomed in current concepts and methods used in project design and assessment, trying to differentiate them in discrete groups of macro-variables for each S, G and Ε field. It is important to underline that the presented methodological outline intends to stimulate the discussion about the reliability of a conceptual model based on separate, pseudo-orthogonal, S, G and Ε fields, the potential and the limits to this regard and the need of more analytical forms to frame sustainability in project scheme development. A conceptual heuristic device based on a 3-D matrix, encompassing the macro-variables of the separate fields, is a useful tool for the graphical representation and analytical exploration (the second step) of the complex nature of the SGC field and internal interlinkages (Fig. 1.b).

![Figure 1: a) The SGC triangle inscribing multi-dimensional interlinkages b) The multi-dimensional interlinkage of S, G and Ε illustrated by a 3-D matrix (MV = macro-variable).](image)

### 3 Systematisation of the main elements

#### 3.1 Sustainability - S

We consider the field of sustainability as a vector resulting from the combination of normative macro-variables pertinent to the societal, environmental, economic dimensions and their interlinkages. The discreteness proposed for the S field is given by a set of macro-variables generalised from the imperatives of sustainability proposed by Valentin and Spangenberg [8] for the social, economic and environmental dimensions and interlinkages established between the above dimensions. The S-field is expressed by 6 macro-variables (Table 1). An extensive description of these macro-variables is given in the recent literature [8,9,10,11]. In order to avoid the fuzzy coexistence and combination of sustainability and governance variables under the same non-linear function, and
with the aim of systematising them in separate fields, we have assumed the institutional dimension to be an element of the sphere of governance and not of the domain of sustainability.

Table 1: MV$_1$–MV$_6$ are the six macro-variables of the Sustainability field.

<table>
<thead>
<tr>
<th>Dimensions and interlinkages</th>
<th>Macro-variable (MV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>Improve competitiveness (MV$_1$)</td>
</tr>
<tr>
<td>Social</td>
<td>Safeguard cohesion (MV$_2$)</td>
</tr>
<tr>
<td>Environment</td>
<td>Limit throughput (MV$_3$)</td>
</tr>
<tr>
<td>Environment-Economics</td>
<td>Eco-efficiency (MV$_4$)</td>
</tr>
<tr>
<td>Environment-Social</td>
<td>Access (MV$_5$)</td>
</tr>
<tr>
<td>Social-Economic</td>
<td>Burden sharing (MV$_6$)</td>
</tr>
</tbody>
</table>

### 3.2 Governance - G

Governance is that state of minimum regime based on established rules, collective capabilities and knowledge, integration of all social parties, roles, participation, interdependences shared by individuals, households, groups and institutions. Such a type of regime is at the base of governance to enhance sustainability through the tool of policy. The institutional dimension, although important, does not constitute a main variable of governance, as the concept of governance is centred on the collective capacity to govern without government [12]. Governance as such should rather be characterised by the combination of macro-variables describing the dynamics of societal participation, knowledge society and societal capability, as these elements are at the base for building the system of societal interdependences.

#### 3.2.1 The triangle of governance

Although we recognise the high complexity, we assume that in a simplified but justifiable fashion governance can be described as the vector resulting from the interactions of three main macro-variables: i) knowledge, KN; ii) critical mass, CM and iii) capacity – CA.

**Knowledge-KN**

A good governance system depends on the development of factual knowledge shared by all the components of the society from individuals to groups and institutions. The knowledge is an important element influencing the orientation and mode of governance. Building shared factual knowledge is at the base of the knowledge society, necessary – although not necessarily sufficient - for bridging the positions and interests of different stakeholders, institutions, citizens and societal groups enabling self-organisation for effective governance.

The knowledge based on trans-disciplinarity helps to build comprehensive knowledge, conveying the diversity of expertises, from technical to economic, social and humanistic sciences to support problem resolution with a holistic approach.
Critical mass—CM
Critical mass includes two concepts: i) the integration of the diversity of notions, established by the overall volume of integrated disciplines and knowledge and ii) the integration of people, established by the cooperation of an high diversity of institutions, stakeholders and citizens [3,12]. If critical mass is low there is no strong condition for sustainability. Reaching a high diversity of participation is the main target for designing and assessing the critical mass.

Capacity—CA
Capacity is related to concepts like ability and readiness of the system to ensure sustainable development. Capacity is a “dominium” in which the entities involved can act in certain ways and have the assets and-or power to accomplish objectives for progress [13]. Capacity is a key element to improve governance. Its design and evaluation is difficult, as progress varies greatly depending on the specific reference values of the evaluator. However, there is a general acceptance that the greater the collective capacity in the society, the higher the opportunity of governance. Effective capacity depends on the quality of collaboration, communication, reciprocal understanding and participation of people and institutions in the process of governance.

![Figure 2: The triangle of governance (KN=Knowledge, CM=Critical Mass, CA=Capacity, MV=macro-variable).](image)

KN-CM-CA interlinkages
KN, CM and CA variables express the necessary conditions of governance at different scales and levels, without giving information on the character of their interlinkages. The connections among KN, CM and CA are encompassed in the triangle of Fig. 2. The interlinkages of Fig. 2 establish the operability criteria for a balanced integration of KN, CM and CA. The triangle of governance illustrates the following interlinkages: 1) the expression of diversity in communication society, 2) the collective preventive planning and 3) the diversity of planning and management. Balancing KN and CM establishes the interlinkage based on the involvement of high diversity and equity of access to knowledge through the...
enforcement of diversity in networks of stakeholders, citizens and institutions, including genders and minorities. The second interlinkage between KN and CA establishes the collective capacity to make the best use of societal shared factual knowledge to develop preventive planning to mitigate effects of system perturbations. The third interlinkage trades CM and CA for strengthening the bulk of societal participation in planning and management. Unfolding the triangle of governance and interlinking the KN, CM, CA variables with the macro-variables of the S and Œ fields enable the exploration of the interlinkages among S, G and Œ. As we will see later in the paper, only KN, CM and CA will be used for the exploration of the S,G,Œ interlinkages. The choice of accounting only the three main variables of the G-field is enforced by the need of prioritising and reducing the number of interlinkages to be explored, while in the same time leaving the choice to extend in the future the exploration of interlinkages involving all the variables of the triangle of governance (Fig. 2).

Table 2: List of ethical principles proposed as macro-variables (MV) of ethics.

<table>
<thead>
<tr>
<th>Macro-variables</th>
<th>Characterization</th>
<th>Pertinent links</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosperity (MV₁)</td>
<td>Development of co-existing material and spiritual benefit</td>
<td>Economic</td>
</tr>
<tr>
<td>Fraternity and love (MV₂)</td>
<td>Pursue the “me and you”</td>
<td>Social, Economic</td>
</tr>
<tr>
<td>Peace (MV₃)</td>
<td>Non-conflicting co-existence of different desires and stakes</td>
<td>Social, Economic</td>
</tr>
<tr>
<td>Wisdom (MV₄)</td>
<td>Enhancement of conflicts, crisis and degradation</td>
<td>Environmental</td>
</tr>
<tr>
<td>Truth (MV₅)</td>
<td>Trustfulness in relationships</td>
<td>Environment</td>
</tr>
<tr>
<td>Ecological responsibility (MV₆)</td>
<td>Collective responsibility to respect and restore biodiversities</td>
<td>Environmental, Economic</td>
</tr>
<tr>
<td>Ecological enrichment (MV₇)</td>
<td>Minimal use of resources</td>
<td>Social, Environmental</td>
</tr>
<tr>
<td>Individual life (MV₈)</td>
<td>Rights of individuals to spiritual and material happiness</td>
<td>Social</td>
</tr>
<tr>
<td>Living in community (MV₉)</td>
<td>Union of Solidarity</td>
<td>Social, Economic</td>
</tr>
</tbody>
</table>

3.3 Ethics - Œ

Ethics is conceptually incorporated in the framework by principles that can support sustainability. The sphere of Ethics is constellated by different types of ethical values. We excluded the ones based on ego satisfaction, consumerism or “me or you” business as usual, as these kind of ethical principles do not support sustainable development as such. Ethical principles should be sought to support societal orientation towards sustainable development, accounting for more reflexive and modern economic, social and ecological models [13]. The kind of Ethics referred to in the paper should encompass the main motivations for sustainability that reside as non-expressed values in the individuals. The use of Ethics helps to express more explicitly those values which are attracted by sustainability but remain often hidden. If Ethics is an important device to plan and assess sustainable development, it must be explicitly and analytically linked
to notions, models or variables of sustainability [14, 15, 16]. To give a practical example, nine ethical principles are proposed as macro-variables of the € field, to support the orientation of Sustainability (Table 2). Although the ethical principles of Table 2 could pervade the whole sphere of sustainability, we have considered that some principles are more pertinent than others when considering the interlinkage with one or the other dimension of sustainability.

4 Exploring the S-G-€ interlinkages

The systematisation in of S, G and € in different groups of variables, although it remains a subjective exercise, it opens further the discussion on the type of variables to be arranged in each field. However, it gives the opportunity to develop early-project design and assessment accounting for a more comprehensive concept of sustainable development, extended along the multi-dimensional system of governance and ethical variables. Separate S, G and € fields only express some partial, although necessary, conditions to frame sustainable development in early-stage project design, keeping alive the separate three functions, without giving any explicit information on the overall volume of the SG€ field delimited by the interlinkages. It is very important to pay the attention to the interlinkages as they constitute the tool for establishing the balanced integration of S, G and € in project development. Exploring the meaning of the interlinkages should be also a target of future research, in order to further the knowledge regarding the nature of the SG€ field. The model offers also an interesting matter for future mathematical modelling development. However, the operability of the model is centred on the translation of the simultaneous interaction of macro-variables of the SG€ framework into a scheme of interlinkages’ headings usable as a preliminary guide for planners and evaluators. The simultaneous interaction of S, G and € variables is framed by the theoretical 3-D matrix of Fig. 1.b, where the SG€ interlinkages (ITKG) are inscribed.

4.1 An outline of the new interlinkages

Exploring the interlinkages at each of the 6 macro-variables of Table 1 for given ethical principles and governance variables has lead to the abstraction of 18 main headings (Table 3). Some general remarks on the S-G-€ interlinkages and possible framing in design and evaluation process are given.

*Improving competitiveness vs. Governance vs. Ethics* - The economic dimension of sustainability is mainly expressed today through the concept of competitiveness [8]. One main limitation of the concept of competitiveness as such, is the scarce level of ethical notion embedded in the concept self. The operability of competitiveness is often interpreted to support economic benefit or power of small groups or individuals against others. Does this kind of interpretation align with the perspectives of sustainability? The new interlinkage establishes a different concept of competitiveness, seeking both material and non-material profit, involving a high level of diversities and affirming value of...
justice (Table 3). The interlinkage orient the concept of competitiveness to production and consumption mechanisms based on systemic logic and reflexivity, material and non-material prosperity, repositioning citizens as manipulator of production and consumptions needs.

*Safeguard cohesion vs. Governance vs. Ethics* - The opportunity of exploring the concept of cohesion in the new interlinkage enables a more explicit characterisation of paths and targets of the social dimension. Interlinking the social dimension with KN and CA variables and Ethics put the emphasis on a concept of cohesion built on the societal access to knowledge, to enhance the collective determination of the decision-process (democratic process) oriented towards the relevant ethical principles. The involvement of CM orients the formulation of cohesion based on diversities of people and knowledge in decision-rights, prioritising the democratic process on the ethical values. The new interlinkage gives the opportunity to further orient the concept of democracy, already established by Valentin and Spangenberg [8] as the interlinkage between social (cohesion) and institutional dimensions. The new interlinkage orients the evaluation of democracy not only on the base of the co-decision process (participation) but also on the collective determination of democracy based on higher level of values like fraternity, peace, ecological enrichment and individual life (Table 3).

*Limit throughput vs. Governance vs. Ethics* - The imperative of “limit throughput” [17] resembles the environmental imperative of sustainability, although it is not referenced by explicit governance and ethical variables. The regulation of material and spiritual conciliation of human being in ecosystem science-technology and the building of relevant knowledge channelled in the principle of dynamic ecosystem equilibrium and integrity are established by the new interlinkage. In Valentin and Spangenberg [8] the interlinkage between environmental and institutional dimensions is established under the heading of “care”. The new interlinkage orients the concept of “care” towards the minimization of resources use (particularly in regions with scarce resources), shared on the base of trans-disciplinary and trans-sector diversities of stakes and minorities, and tutoring minimal use of resources with creative policy to regulate ecosystem perturbation (Table 3).

*Eco-efficiency vs. Governance vs. Ethics* - The variable “eco-efficiency”, established by the connection between the economic and environmental dimensions of sustainability conceptually addresses accountability between the protection of natural resources (based on the “limit throughput”) and the economic development [8]. The main limitation in conceptualising the interlinkage of eco-efficiency is the scarce level of ethical knowledge attached to the traditional concept of eco-efficiency. The main question is: how eco-efficiency should be ethically pursued and on what ethical perspectives? Eco-efficiency must leave the inspiration of traditional production-consumption models and valorise the intrinsic values of resources. Knowledge and capacity to develop ecosystem resources in terms of natural intrinsic value and minimal use lies at the base of the interlinkage between eco-efficiency, governance and ethical values like ecological enrichment and ecological responsibility (Table 3).
Table 3: Representation of the 3D interlinkages in a bi-dimensional matrix S vs. G, at selected ethical principles (Є-MVn).

<table>
<thead>
<tr>
<th></th>
<th>Knowledge (G-MV₁)</th>
<th>Critical mass (G-MV₂)</th>
<th>Capacity (G-MV₃)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve competiveness (S-MV₁)</td>
<td>Є-MV₁,₂ Material - non material benefit and reflexive production-consumption mechanisms to enhance cooperative competitiveness and equity (based on the principle of equivalence).</td>
<td>Є-MV₁,₂ Collective cooperation to repositioning the individual as manipulator of production-consumption. Equity extended beyond cultural boundaries.</td>
<td>Є-MV₁,₂ Improve diversity in collective innovative choices beyond the short time horizon.</td>
</tr>
<tr>
<td>Safeguard cohesion (S-MV₂)</td>
<td>Є-MV₂,₃,₇,₉ Shared knowledge to improve determination of collective decision-process.</td>
<td>Є-MV₂,₃,₇,₉ Diversity of players, individuals and minorities in steering ethics in co-decision process.</td>
<td>Є-MV₂,₃,₇,₉ Strengthen democracy based on collective determination of the future.</td>
</tr>
<tr>
<td>Limit throughput (S-MV₃)</td>
<td>Є-MV₄,₅,₆ Knowledge to regulate conciliation of human being in ecosystem science-technology.</td>
<td>Є-MV₄,₅,₆ Care mechanisms oriented towards the minimization of resources use based on trans-disciplinary and trans-sector diversities stakes involved.</td>
<td>Є-MV₄,₅,₆ Tutoring minimal use of resources and creative policy to support adaptation to ecosystem perturbation.</td>
</tr>
<tr>
<td>Eco-efficiency (S-MV₄)</td>
<td>Є-MV₆,₇ Shared knowledge of natural resources intrinsic value and minimal use.</td>
<td>Є-MV₆,₇ Collective involvement of diverse economic stakes in enhancing minimal use of resources.</td>
<td>Є-MV₆,₇ Capacity to improve policy enhancing intrinsic non-material value and minimal use of resources.</td>
</tr>
<tr>
<td>Access (S-MV₅)</td>
<td>Є-MV₇,₉ Knowledge of the balanced individual-societal-ecosystem sanitation and happiness.</td>
<td>Є-MV₇,₉ Develop access for all levels of economic and social strata of society, gender and minorities.</td>
<td>Є-MV₇,₉ Regulation of balanced collective material and spiritual values in using resources.</td>
</tr>
<tr>
<td>Burden sharing (S-MV₆)</td>
<td>Є-MV₉ Models of solidarity to enhance real union.</td>
<td>Є-MV₉ Union of diversities.</td>
<td>Є-MV₉ Forms of regulation ensuring continuous solidarity.</td>
</tr>
</tbody>
</table>
Access vs. Governance vs. Ethics – The new interlinkage enhances individual and societal sanitation and happiness, conciliation with the criteria of non-perturbation of environment, collective/multi-stakeholder involvement and the regulation of the conflict between collective material and spiritual satisfaction from using resources (Table 3). The access to resources must more explicitly prioritise the non-material aspects, in order to enforce the intrinsic value of the resource, enforcing the orientation towards ecological enrichment.

Burden sharing vs. Governance vs. Ethics - The concept of solidarity is established by the interlinkage (Table 3). Description of burden sharing is given in Valentin and Spangenberg [8]. The interlinkage establishes the concept of solidarity and union based on the high diversity of societal and economic interests, building forms of regulation to ensure continuous union.

The set of new interlinkages can be used in multi-stakeholder meetings to design or evaluate the orientation of project goals. The interlinkages are the datum points in the process of sustainability goal prioritisation, while covering the balance of a broad sphere of elements. Tools like the Logical Framework [18] can be connected to the SGЄ meta-framework for the purpose of expressing SGЄ interlinkages in a hierarchical sequence of project goals.

5 Conclusions

The representation of separate fields of explicit macro-variables of S, G and Є and their integration operated by multi-dimensional SGЄ interlinkages helps to illustrate in a holistic, systematized and explicit way some main conceptual criteria usable to embed sustainable development in projects. The new interlinkages enhance a more comprehensive determination and framing of sustainable development, improving the transferability of interpretation of the main imperatives (macro-variables) of sustainability. The introduction of Ethics, as a separate domain, although complementary to sustainability and governance, emerges as a need to avoid fragmentation of visions of sustainability and consequent risk of shifting away from the genuine common objectives of sustainability-self. The attention must be given to the kind of approach and not to the type and number of variables or ethical principles used. What matters is the option provided by the heuristic framework of leaving traditional designing and evaluation of sustainability based on reductive and implicit approaches. The paper intends to stimulate the scientific community as well as project proposal makers, evaluators and practitioners to consider a different way of framing sustainability when developing or evaluating projects, programmes, strategy plans or policies.

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References