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# Postmodern Sustainability

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**Abstract:** One of the socio-environmental concepts born with postmodernity is "Sustainable Development". This notion was first defined in 1987 as *the "development that meets the needs of the present without compromising the needs of future generations"*. This definition was intended to highlight an important connection presumed between economical development and sustainability of human livelihood on the planet. Definitions, however, need to evolve in order to ensure relevance and applicability to real situations, especially in the rapidly changing technological and social trends of our time. More sophisticated definitions are now needed to cope with the high degree of complexity unfolding on the sustainability sphere. New thoughts and tools are also required to apply new fields of knowledge to the increasing varieties of issues linked to sustainability.

This white paper is intended to reopen the discussion by giving a new definition for sustainability and through calling upon new fields of knowledge and technology to provide tools for solving complex problems associated with sustainable developments. A quantifiable definition of sustainability is given by mapping the textual complements of sustainability (i.e. culture, environment and economy) onto a contextual space defined by "vision", "flexibility", and "harmony".

**Keywords:** Sustainability, Sustainable development, Postmodern, Artificial intelligence, Fuzzy logic, Postmodernity,.

## 1. POSTMODERN IDEAS IN SUSTAINABILITY

Postmodern era began with certain important historical events such as:

1. introduction of internet as a new tool in global communication.
2. a gearshift in the environmental movement, triggered by concerns over global warming and sustainability of our resources.
3. nanotechnology revolution.
4. globalization of social and economical trends.
5. falling of the Berlin wall (signaling a new era in the democratic movement around the world).

What is common among these events and trends is a reaction to the blindness, rigidity and disharmony that we experienced at the high-point of the modern era, when a development was valued only on the basis of its economical merits, ignoring important socio-environmental consequences. The concept of sustainable development was thus born to bring vision, flexibility and harmony to development projects.

The vision expanded our scopes both in time and space. In time, we saw how livelihood of future generations is tied to our present activities. In space, we understood that local effects have global consequences; this guided us to globalization, in its benign cultural sense of the word. The flexibility brought an understanding of the importance of tolerance in environmental, social, political and technological realms. Finally, an urge for harmony leads to developing concepts, such as "mosaic", to celebrate cultural diversities [1].

In contrast with a few decades ago, we now realize that socio-environmental problems (with their exponentially increasing complexity) can no more be solved in closed political or corporate boxes. It takes

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global efforts to solve global problems. Fortunately, we live in an era where global collaboration at grassroots level is possible. Postmodern communication (resulting from revolution in nano-technology and cyber intelligence) has given us valuable tools to create a real cross-cultural and cross-political forum to find solutions to our global problems.

## 2. SUSTAINABILITY IN THE CYBER WORLD

The cyber space can provide the best international round-table to bring humans together and unite them within their unique natural environment.

One of the hottest web cams on the internet, which was enthusiastically viewed in recent years by millions around the world, was an eagle's nest in its real environment. This demonstrated the urge of humanity, especially the younger generation, to re-unite with nature. In the same way, trends such as "facebooks" and "weblogs" comprise a response to the growing urge of humans to know each other and collaborate in solving problems facing them. Internet can therefore play a central role in enhancing the sustainability through bringing people and nature together in real time and attain great objectives through facilitating parallel processing of human minds.

Cyber science and space are, however, severely under-utilized in their capability to solve environmental and sustainability problems of our time. We need to devise modalities to enhance the role of the cyber space in interfacing sustainability and environmental issues.

One practical starting point is internet "charrette" (or collaborative discussion sessions), which can be effectively designed to bring local and global stakeholders together, enhance communication and synergy between them and ensure a holistic understanding of real sustainable development projects.

To make the cyber space more effective, we need, to translate sustainability notions and definition into cyber-friendly parameters, through which humans and computer programs can efficiently communicate. Recent advances in Artificial Intelligence (such as fuzzy logic), have proven successful in creating a bridge between machine and human problem-solving capabilities.

It should be reminded that the notion of sustainability is not yet fully understood. We know its importance in our livelihood. We may have identified the ingredients of sustainability, but we do not yet have a good recipe for it. "Internet charrette" can play an instrumental role in creating a forum to discuss and resolve sustainability issues through iterative processes developing organically in the virtual world.

## 3. NEW DEFINITION OF SUSTAINABILITY

A central issue in human-machine communication (especially in soft sciences such as sustainability and environment) is to reach the right balance between the apparent simplicity of human notions and the complexity of machine processes. In reality, however, human ideas are very complex and machine processes are simple. Efficient collaboration between humans and machine depends therefore on bridging between simplicity and complexity. Machine needs to understand the complex meaning of apparently simple human ideas and humans need to become more sophisticated in terms of scarifying the beauty of simplicity and resign to the fact that we are no longer living in a simple world. Simple definitions of sustainability (presented two decades ago), should, therefore, be expanded to ensure an effective interface with the complexity of tools in the cyber space.

The main concepts of sustainable development are known to be, Environment, Society and Economy. The economy and environment are, however, part of the society in its broad meaning of the word. What is meant by "society" as independent from environment and economy is therefore the cultural aspects of the society. For this reason it is recommended to replace the word "society" with "culture" as an independent dimension, along with environment and economy, in the sustainability space. Including these three dimensions

in the classical definition of sustainability and expanding the notions over both time and space, sustainable development can be more effectively defined as a development which:

1. Provides or preserves environment, economy, and cultural values for the present generation, without compromising the environment, economy, and cultural values of future generations.
2. Provides or preserves environment, economy, and cultural values for local communities, without compromising the environment, economy and cultural values of the global population.

## 4. BRIDGE BETWEEN QUALITY AND QUANTITY

In order to create an AI (or cyber-friendly) language for sustainability, both at policy and project levels, it is imperative to create modalities to convert qualities (in the human perception domain) to quantities (in the machine perception fields) and visa versa. The three-dimensional textual space (Culture, Environment and Economy) of sustainability should be mapped onto a more-sophisticated contextual space of vision, flexibility and harmony as shown in table 1.

**Table 1**
**Sustainability Components**

| *Text = j* / *Context = i* | *T1 = culture* | *T2 = environment* | *T3 = economy* | *Overall* |
|---|---|---|---|---|
| C1 = vision | $S_{11}$ | $S_{12}$ | $S_{13}$ | $S_v = \Sigma S_{1j}$ |
| C2 = flexibility | $S_{21}$ | $S_{22}$ | $S_{23}$ | $S_f = \Sigma S_{2j}$ |
| C3 = harmony | $S_{31}$ | $S_{32}$ | $S_{33}$ | $S_h = \Sigma S_{3j}$ |
| Overall | $S_{cu} = \Sigma S_{i1}$ | $S_{en} = \Sigma S_{i2}$ | $S_{ec} = \Sigma S_{i3}$ | $S = \Sigma\Sigma S_{ij}$ |

While "textual" components of sustainability (i.e. culture, environment and economy) are necessary to create a practical balance at the project level, the "contextual" components (i.e. vision, flexibility and harmony) help adding futuristic, global and holistic dimensions to the equation. Note that relations between various components of sustainability are not necessarily linear. Flexibility is therefore necessary for linearization and harmonization of equations which may otherwise be conflicting [2, 1].

An overall arithmetically normalized value for sustainability obtained from this mapping can be defined as:

$$S^2 = (\Sigma\Sigma S_{ij}^2)/3 \quad (1)$$

The values to be put in the table 1 can be linguistic (e.g. best, good, average, bad, worst) or numerical on both human and machine ends (such as in Table 2). Values can be extracted from statistical databases and or expert views. Fuzzy logic offers excellent tools for creating and processing perception-based values. Parameters can be scaled between 0 (for worst) and 1 (for best) situation or for lowest and highest degree

**Table 2**
**Relating Linguistic, Visual and Numerical Values**

| *Linguistic scale* | *Visual scale* | *Numerical scale* |
|---|---|---|
| Best | Violet | 1 to 0.8 |
| Good | Blue/Green | 0.8 to 0.6 |
| Average | Yellow | 0.6 to 0.4 |
| Bad | Orange | 0.4 to 0.2 |
| Worst | Red | 0.2 to 0 |

of belief [3, 4]. Alternatively, values can be color coded on the human side (Table 2) to facilitate opinion acquisition through "internet charrette". Any color-coded visual scale should be clearly defined and explained within its context. Green color, for example is highly valued within environmental community, while in a general fuzzy scaling of sustainability violet and blue nuances may represent the highest values.

## 5. REWARD AND PENALTY

Fuzzy values on sustainability can be given numerically equivalent values and weights to provide a basis for calculation of incentives and disincentives (such as penalties and taxes) for specific elements of sustainability (e.g. carbon emission).

Note that there may always a tendency to give money values to socio- environmental consequence of sustainability. That will reduce the three-dimensional space of sustainability to a simple economical vector. While this level of simplification may be required at some administrate levels. Yet, it should be cautioned that total pecuniarization of cultural and environmental components of sustainability can be counterproductive in long term. In other terms, sustainability and environmental advocates should not define their bottom line only with money.

Policy makers and advocacy groups should devise reward and penalty modalities which are applicable not only in the economical and legal fields, but also in the moral and ethical domains. Education, culture, and spirituality (in its general sense) are tools which can be used to increase sensitivities towards social and environmental components of sustainability, independent of economical incentives. This means that as sustainability is defined in a complicated tensorial space of "text" and "context", rewards and penalties should also be defined in the same multi-dimensional space in a way to maximize the sustainability as defined in equation 1. Cyber space can provide a great forum to devise both economical and non-economical rewards and reward-trading systems.

## 6. EPILOGUE

Most of the socio-environmental disasters we are facing today, issue from unsustainable developments during the last episode of modernity. In this chapter of or our history, a widespread individualistic attitude separated us from each other and from our environment. We forgot that we are musicians but in a universal symphony. We played our instruments inharmoniously, not listening to birds, trees, rivers, and oceans. Sustainability is to play harmoniously in a universal symphony. Sustainability is the art of singing in a choir. Sustainability, as Shakespeare put it, is to "Find tongues in trees, books in the running brooks, sermons in stones, and good in everything"

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