The Unity of Sustainability: Integrating Sustainable Lifestyles and Sustainable Production Units

By

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Abstract

Sustainability can be seen as component sustainability or as over all sustainability when based on sub-system or system frameworks. Sub-system sustainability refers to the possibility of component specific sustainability and system sustainability indicates the notion of the presence of optimality in all components making up the system at the same time or the view of unifying optimal conditions. The goals of this paper are to show using qualitative comparative means that the integration of sustainable lifestyles and sustainable production units is the key to achieving the unity of sustainability; and to use this framework to point out some key sustainability implications of this integration. In the end, a few relevant conclusions are provided.

Introduction

Sustainability can be viewed as a process that balances out the goals of conflicting agents acting at the same level of analysis. At lower levels of analysis, sustainability can be seen as a process that balances out the individual choices of consumers and producers. This type of analysis provides a better understanding of available individual sustainability actions and their consequences. For example, more responsible/limited consumption and production choices are believed to be central to reaching sustainability conditions or goals as it has been indicated that insatiable wants/behavior are at odds or are inconsistent with sustainability principles (Brown 2002), and hence the need for responsible production behavior (UN 2025). At middle levels of analysis, sustainability can be perceived as the mean to balance out the concerns of the whole community of consumers (e.g. social segments) and of producers (e.g. industries). This process leads to an appreciation of the sustainability challenges that are present at the community/local level. Today, community wide planning consistent with sustainability principles is being promoted/encouraged through processes such as Agenda 21 and the sustainable production and consumption program withing the current sustainable development goals (UN 2025). At regional or global levels of analysis, sustainability can be understood as the force that balances out the views of regional or global stakeholders, and this level of analysis is currently of increasing relevance due to ongoing economic/liberal globalization processes. This level of analysis leads to the appreciation of country and global social, economic and environmental sustainability concerns or issues. Notice that all levels of analysis we should expect some transition problems when moving from the thinking that more is better to the thinking that less is better that goes with a balanced paradigm (Muñoz 2010).

Also sustainability can be taken as a process or approach that transcends all these different levels of analysis as it can not be possible to have individual sustainability if individual consumers behave responsibly, but individual producers do not; it can not be possible to have community sustainability if producers behave responsibly at the local level, but consumers do not; and it can not be possible to have regional or global sustainability if global consumers(e.g. foreign consumers) behave responsibly, but global producers(e.g. international corporations)do not. Now, it is accepted that only when incorporating all social, economic, and environmental issues in the decision-making process there is a chance of achieving development that is sustainable (OECD 2001), at least in environmental terms (OECD 2011) and in global reporting terms (OECD 2024) or of reaching sustainable conditions/optimal outcomes.

The integrative nature of sustainability

It can be said that when conflicting views and interests are neutralized through balanced decision-making, optimal conditions are created. This is because we cannot maximize the self-interest of all stakeholders actively interacting with each other at the same time, but we can optimize it. Hence, these optimal situations can be viewed as conditions that are made up of characteristics displaying a systematic structure. Simple optimal systems can be combined with other simple systems to form more complex systematic structures. For example, if we have three simple sub-systems such as Y1 = A1B1; Y2 = A2B2; and Y3 = A3B3, then a more complex system can be formed as follows;

Y1Y2Y3 = A1B1A1B2A3B3

Y1Y2Y3 = A1A2A3B1B2B3

Y = AB where Y = Y1Y2Y3
A = A1A2A3
B = B1B2B3

Notice that in all the formulas above, sustainability requires the balancing of the different components through integration/inclusion, not exclusion. And see too that the over all system, Y = AB, is made up of the conjunctural interaction of subsystem Y1 = A1B1, subsystem Y2 = A2B2, and subsystem Y3 = A3B3 to the left of the equal sign or of the conjunctural interaction of subsystem A = A1A2A3 and subsystem B = B1B2B3 to the right of the equal sign.

Lifestyles, production processes, and sustainability

Both lifestyles and production processes can be seen as subsystems driven by a set of factors such as innovations, market power, and experience. Sustainability, on the other hand, can be viewed as a system driven by active interaction of lifestyles and producers or by the active interaction of consumer and producer innovations, consumer and producer market power, and consumer and producer experience. Stated as indicated above, the view of the need to have component specific sustainability to achieve system specific sustainability; and the need to have system specific sustainability to reach over all sustainability can be formally explored or expressed using the framework described above.

The goal of this paper

The goals of this paper are to show using qualitative comparative means that the integration of sustainable lifestyles and sustainable production units is the key to achieving the unity of sustainability; and to use this framework to point out some key sustainability implications of this integration.

Terminology

The qualitative comparative terminology used in this paper is summarized in Table 1 below.

Table 1

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S = sustainability   * = optimal conditions
*   *
L = sustainable lifestyle   P = sustainable production unit
*   *
T = optimal technology   C = optimal capital intensities
*   *
R = optimal purchasing power   N = optimal market access
*   *
E = optimal education   K = optimal technical knowledge
*   *
X = optimal innovations   Y = optimal power
*   *
Z = optimal experience   (TC) = optimal interaction

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Methodology

To facilitate the presentation of these ideas, two operational definitions are used, that of "sustainable lifestyles" and of "sustainable production units" based on the concept of optimality described above. It is assumed that the drivers of lifestyles variability are the technology, purchasing power, and education of consumers; and it is assumed that the driving forces of production unit variability are their capital intensities, market access, and technical knowledge. It is also assumed, to simplify the presentation, that innovations are driven by the interaction of consumer’s technology and the capital intensity of producers; that market power comes from the combination of the purchasing power of consumers and the market access of producers; and that experience is the outcome of combining the education of consumers and the technical knowledge of producers. Then, through different combinations of these two formulas and its components, several equivalent sustainability models are developed. From this, the conceptual and sustainability implications of these models are described.

Sustainable lifestyles

A sustainable lifestyle can be defined as an optimal lifestyle(L*): a lifestyle made up by the interaction of three characteristics, optimal technology(T*), optimal purchasing power(R*), and optimal education(E*) as follows (Muñoz 2025a):

1) $$\mathbf{L^* = T^*R^*E^*}$$

Notice that if one element of the system is not optimal [e.g. having too much or having too little purchasing power(R)], that lifestyle is not sustainable, as non-optimal conditions are sources of unsustainability. Therefore, the necessary and sufficient condition for sustainable lifestyles to exist is the interaction of optimal conditions, in this case, optimal technology(T*), optimal purchasing power(R*), and optimal education(E*). Formula 1 suggests that the possibility of reaching optimal levels of consumption exists.

Sustainable production unit

A sustainable production unit can be defined as an optimal unit(P*), one that can be represented by the interaction of three aspects, optimal capital intensities(C*), optimal market access(N*), and optimal technical knowledge(K*) as follows (Muñoz 2025b):

2) $$\mathbf{P^* = C^*N^*K^*}$$

Notice that if one component of the system is not optimal [e.g. too much or too little technical knowledge(K)], then the production unit is not sustainable because a characteristic within the system that it is not in optimal form should be expected to be a source of unsustainability. Hence, the presence of optimal capital intensities(C*), optimal market access(N*), and optimal technical knowledge(K*) at the same time is the necessary and sufficient condition for sustainable production units to exist. Formula 2 indicates that the possibility of achieving optimal levels of production exists.

Sustainability

Sustainability can be viewed as a more complex system made up by the interaction of optimal lifestyles(L*) and optimal production units(P*) as stated below:

3) $$\mathbf{S = L^*P^*}$$

The above formula shows that the necessary and sufficient conditions for the existence of sustainability(S) is the existence of sustainable lifestyles(L*) and sustainable production units(P*) at the same time. Notice that if lifestyles(L) or production units(P) or both are not in optimal form, there is unsustainability in the system.

Substituting terms in formula 3), we can express sustainability(S) in terms of the optimal subsystems within sustainable lifestyles and sustainable production units as follows:

$$4) \quad S = T^*R^*E^*.C^*N^*K^*$$

The model above indicates that sustainability(S) can be expressed also in terms of the interaction of optimal subsystems.

Now, rearranging terms in formula 4) to combine consistent optimal conditions across systems such as the optimal technology of consumers and the optimal capital intensities of producers(T*C*), the optimal purchasing power of consumer and the optimal market access of producers(R*N*), and the optimal education consumers and the optimal technical knowledge of producers(E*K*), we can restate it as seen below:

$$5) \quad S = T^*C^*.R^*N^*.E^*K^*$$

If we redefine the three optimal interactions in formula 5) as optimal innovations (X* = T*C*), optimal power (Y* = R*N*), and optimal experience (Z* = E*K*), then the sustainability system(S) can be simplified as indicated below:

$$6) \quad S = X^*Y^*Z^*, \text{ Where } X^* = T^*C^*;\ Y^* = R^*N^*;\ Z^* = E^*K^*$$

Now sustainability(S) can be seen as the result of three optimal interactions, optimal innovations(X*), optimal power(Y*), and optimal experience(Z*) at the same time. In other words, unsustainable conditions would be present if innovations(X), power(Y), and experience(Z) were not in optimal forms individually o in any combination.

If we combined optimal conditions, we get the following:

$$7) \quad S = (XYZ)^*, \text{ Where } X = TC;\ Y = RN;\ Z = EK$$

The formula above indicates that sustainability(S) can also be seen as the product of optimizing the interaction of innovations(X), power(Y), and experience(Z). Hence, formula 7 provides the possibility of having unsustainable conditions when at least one of its driven factors is not in optimal form [e.g. extreme concentration/inequality of power(Y)].

Notice that we can also expressed formula 3) in terms of optimizing (*) the interaction of lifestyles(L) and producers(P) as follows:

$$8) \quad S = L^*P^* = (LP)^*$$

The formula above shows that the necessary and sufficient condition for sustainability(S) to exist is the optimization (*) of the interactions of lifestyles(L) and producers(P). This means that the presence of non-optimal lifestyles(L) or non-optimal producers or both at the same time would lead to unsustainable conditions. Hence, formula 8 indicates that the possibility of having optimal consumption and optimal production at the sustainability point exists.

Sustainability implications

From the eight formulas above, the following implications of sustainability can be derived:

i) Optimal modeling

Sustainability brings into context the concept of optimality. All simple and complex models from 1 to 8 above are consistent with optimality as they all are balancing out conflicting views and interactions while keeping diversity. Notice that in all sustainability formulas from 1 to 8, if one component of the system is not in optimal form or if the interaction of optimal conditions is not the rule, there is no sustainability.

ii) Optimal market

Sustainability(S) implies the existence of an optimal market. In fact, as shown in formula 3, sustainability is the optimal market where optimal lifestyles(L*) interact with optimal producers(P*) or where the interaction of optimal lifestyles (optimal consumption) and optimal producers (optimal production) takes place.

iii) Optimal conjunctural determinism

Sustainability is also based on the concept of optimal conjunctural determinism in which sustainability is characterized by the conjunctural presence of optimal conditions, at the component level (e.g. optimal technology[T*] component in formula 1); at the subsystem level (e.g. optimal producer subsystem(P*) in formula 2); and at the system level (e.g. sustainability(S) in formula 3). The above implies that subsystem sustainability requires over all component sustainability and that system sustainability requires over all subsystem sustainability. And hence, the necessary and sufficient condition for sustainability to exist is the conjunctural interaction of optimal components and/or subsystems.

Conclusions

It was shown that the integration of sustainable lifestyles(L*) and sustainable production units(P*) leads to the determination of the necessary and sufficient conditions for sustainability(S) to exist, reflecting the unity of sustainability. The main implications of this unity through the different representations of sustainability(S) provided in the 8 formulas above are its bases on optimal modeling, its consistency with optimal markets, and its reliance on optimal conjunctural determinism.

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