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Sustainability thought 184: Why Only Additive Thinking and Distorted Conjunctural Thinking Create Sustainability Gaps: A Maximization-Based Assessment of Red, Green, and true Sustainability Markets

By

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Abstract

Full paradigm variability theory can be structured around two fundamental assumption sets: independency assumptions, which lead to additive thinking, and codependency assumptions, which take you to conjunctural thinking. This distinction allows a formal comparison of how each framework represents sustainability conditions, and when both frameworks are subjected to optimization thinking and to maximization thinking at the same time they reveal structures that lead to sustainability based conditions in the first case, and structures that lead to unsustainability based conditions in the second case. This paper focuses on the application of maximization thinking. By applying maximization thinking to both structures, this paper derives how sustainability gaps are created and the link between maximization trends and sustainability gap expansions, expansions that eventually approach unsustainability. The analysis shows that conjunctural structures cannot be maximized in ways that they do not create sustainability gaps if they are fully distorted conjunctural structures, but they can be maximized in ways that lead to system consistent optimality when the maximum you can get is the true optimal balance if they reflect fully non-distorted conjunctural structures, and hence they do not create sustainability gaps, while additive structures can be maximized always creating sustainability gaps in the process whether we maximize them under externality production neutrality assumptions or under no externality production neutrality assumptions. These results are then applied to three well-known sustainability

paradigms—socio-environmental sustainability (sustainability markets), socio-economic sustainability (red markets), and eco-economic sustainability (green markets)—to assess whether each paradigm creates sustainability gaps. The findings clarify the structural sustainability limitations of additive approaches when maximized under externality neutrality assumptions or not as they always lead to sustainability gap creation, and they highlight too the structural limitations and advantages of conjunctural structures when maximized under fully distorted or fully non-distorted assumptions, respectively, and this unlocks the structural conditions under which maximization of conjunctural structures goes together with sustainability gap creation or not.

Goals of this paper

1) To state the total variability model; 2) To place the total variability model under independency assumptions to free the structure of additive thinking; 3) To place the total variability model under codependency assumptions to free the structure of conjunctural thinking; 4) To place the structure of additive thinking and conjunctural thinking under maximization theory to point out that additive thinking under maximization always leads to the creation of sustainability gaps while only distorted conjunctural structures under maximization lead to sustainability gaps creation; 5) To apply the thinking described above to red, green and true sustainability markets to show that they only make sense inside conjunctural thinking maximization under fully non-distorted conjunctural structure assumptions; and to stress that these markets do not make sense under the additive thinking maximization point of view or under fully distorted conjunctural maximization if the aim is achieving sustainability conditions as the maximization of additive thinking and of fully distorted conjunctural systems always leads to sustainability gap creation.

The paradigm variability model:

If we have a paradigm Ki with 2 components, component L and component M, where

L = Dominant component L l = Passive component L

M = Dominant component M m = Passive component M

Then, the paradigm variability model can be stated as follows:

Ki = L + M

Paradigm Ki exists when only component L is present in dominant form or when only component M is present in dominant form or when both are present in dominant form (LM)

Implication 1

The presence of one component in active form or both components in active form at the same time determines the structure of specific paradigms.

The three possible paradigm structures

i) When only component A is in dominant form

When only component A is active, then we have paradigm K1:

K1 = L

Paradigm K1 expands and contracts as L expands and contracts

ii) When only component B is in dominant form

When only component M is active, then we have paradigm K2:

K2 = M

Paradigm K2 expands and contracts as M expands and contracts

iii) When both component L and component M are in dominant form at the same time.

When both components L and M are active at the same time, then we have paradigm K3:

K3 = LM

Paradigm K3 expands and contracts as LM expands and contracts.

Implication 2

The presence of one component in active form indicates a one component dominant system, and both components in active form at the same time determine a co-dominant system.

Full paradigm variability landscape

If we put together all possible paradigms in the system Ki we create the full paradigm variability landscape or possibilities as expressed below:

FPVL = L + M + LM

The expression above summarizes all possible paradigm variability under no externality assumptions.

Implication 3

The full paradigm variability landscape shows the collection of all relevant one component dominant systems and co-dominant systems possible.

The structure of sustainability

The requirements of sustainability are internal and external optimality consistency so if we have a sustainability system (S) with two components in optimal form such L* and M*, then the following is true:

S = L*M* = (LM)*

The expression above tells us that a system that has both internal component optimality consistency (L*M*) and external optimality consistency ((LM)*) at the same time has the requirements for being a sustainability based system. In other words, since (LM)* = S, conjunctural optimization satisfies both internal and external consistency conditions simultaneously. In other words, system-consistent optimality (S) defined as simultaneous internal and external optimality consistency.

Implication 4

The requirement for system sustainability (S) to exist is the presence of internal and external optimality conditions at the same time

The structure of additive thinking

If we place the full paradigm variability structure (FPVL) under independent assumptions (IA), then the independent variability landscape at the heart of additive thinking (AT) is produced as indicated below:

IA (FPVL) = IA (L + M + LM) = L + M = AT since LM = 0 = codependent

Notice that here in qualitative comparative terms LM = 0 means that under independent thinking (IA) that codependent interaction is absent.

So that:

AT = L + M

Implication 5

Additive thinking (AT) reflects all the one component dominant systems as independent parts.

The structure of conjunctural thinking

If we place the full paradigm variability structure (FPVL) under codependent assumptions (CA), then the codependent variability landscape at the heart of conjunctural thinking (CT) is produced as described below:

CA (FPVL) = CA (L + M + LM) = LM = CT since L + M = 0 = independent parts

Notice that here in qualitative comparative terms L = M = L + M = 0 means that under codependent thinking (CA) those independent interactions are absent.

So that:

CT = LM

Implication 6

Conjunctural thinking captures all the co-dominant parts as codependent parts.

Comparing the structure of additive thinking and conjunctural thinking

Additive thinking takes the component of the system as independent components so the structure of the system is additive, AT = L + M, what one component does has no affect on the other, that is the central structural implication; and conjunctural thinking takes components as codependent components so the structure of the system is conjunctural, CT = LM, what one component does affects the other, that is the key structural implication. The idea of full paradigm variability under independent and codependent assumptions has been used among other things to show that the arrow impossibility theorem is left behind if we shift from deep additive thinking to partially codependent and then to fully codependent systems (Muñoz 2016a) or to point out that

the world may be moving through development ways from deep paradigm thinking to partially codependent to fully codependent paradigm thinking (Muñoz 2016b) or to stress that when we shift from additive thinking to conjunctural thinking the knowledge base of additive thinking is left behind as it does not work in the conjunctural system, but the core values of additive thinking are reflected in the new conjunctural paradigm (Muñoz 2025b) or to indicate that paradigm evolution, merging, and death move from lower level systems or fully distorted systems towards the highest level thinking possible or fully non-distorted conjunctural systems directly or step by step (Muñoz 2019). Notice that key terms such as additive thinking, conjunctural thinking, sustainability gaps (SG), and system-consistent optimality (S) follow the definitions developed in Muñoz (2016a, 2019, 2025b). For completeness and using the same terminology being used in this paper, additive thinking assumes independent components (L + M), while conjunctural thinking assumes codependent components (LM), with sustainability defined as simultaneous internal and external optimality consistency (S = L*M*). Moreover, the use of lowercase letters (l, m, a, b, c) in this paper denote sustainability gaps (SG), while SG = 1 denotes absence of gaps, and this structure is consistent with the use of lowercase letters denoting sustainability gaps across papers, including the ones cited above.

Implication 7

In conjunctural thinking one component's actions such as L affect the other component while in additive thinking the actions of one component such as L does not affect the other component.

Additive thinking under maximization theory

If we maximize (MAX) the additive thinking structure (AT) on both sides we have the following expression:

MAX (AT) = MAX (L + M) ≠ S

The expression above tells us that we need to maximize an additive structure, but additive maximum separability cannot guarantee system-consistent optimality (S) when system optimality requires joint feasibility across interdependent dimensions or components or parts. In other words, maximizing additive thinking (AT) cannot be done without breaking system consistent optimality requirements (MAX (AT) ≠ S).

Implication 8

There is an internal joint optimality inconsistency that comes out when maximizing independent components as separate parts; and this internal joint inconsistency leads also to external inconsistency

MAX (L + M) = ∞ ≠ S

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as literal math infinity symbol

Therefore, maximizing additive independent components leads to joint component optimality inconsistency, and hence, to system optimality (S) inconsistency.

Implication 9

System-consistent optimization is not achievable in additive systems because the necessary conjunctural requirements for general system optimality conditions(S) to hold do not exist in these systems being additively maximized, and this inconsistency, creates and then expands sustainability gaps

Maximizing additive thinking under externality neutrality assumptions

When we maximize additive thinking under impact neutrality assumptions, then we assume that what component L has no impact on component M or vise a versa and hence, we assume that no sustainability gaps are created, but in reality there is an impact that creates, and later expand sustainability gaps such as sustainability gap "l = SG_l" and sustainability gap "m = SG_m" linked to active components M and L, respectively, and which are assumed away:

MAX (AT) = MAX (Lm + Ml) = MAX (L.SG_m + M.SG_l) = MAX (L + M) = ∞ ≠ S

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as literal math infinity symbol and lower case letters (e.g. [m, l]) indicate sustainability gaps (SG) associated with the capital letters (e.g. [L, M]).

See that in the formula above there are sustainability gaps "m" and "l" so m = SG_m and l = SG_l, which are assumed away under impact neutrality assumptions, but since L is maximized subject to M creating the sustainability gap "m" and since M is maximized subject to L it creates the sustainability gap "l", gaps that expand through time as L or M expand. As the sustainability gaps "l" and "m" are assumed away, they can be dropped from the formula to make a clean formula at the end such as MAX(L + M), which is a sustainability gap creation and expansion formula under externality production neutrality assumptions so the gaps here are assumed to be passive sustainability gaps, when they are not. In other words, the formula above reflects fully

distorted additive thinking assumed to be fully non-distorted thinking, which is inconsistent with system consistent optimality requirements (S).

Maximizing additive thinking under no externality neutrality assumptions

When we maximize additive thinking (MAX (AT)) under no impact neutrality assumptions, then we cannot assume that what component L does has no impact on M or vise a versa because these impacts are now accepted as they are, as real impacts, as they are impacts that create and later expand sustainability gaps such as sustainability gap "l =SG_l" and sustainability gap "m = SG_m" linked to active components M and L, respectively and which are no longer assumed away:

MAX (AT) = MAX (Lm + Ml) = MAX (L.SG_m + M.SG_l) = $\infty \neq$ S

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as literal infinity not used as literal math infinity symbol and lower case letters (e.g. [m, l]) indicate sustainability gaps (SG) associated with the capital letters (e.g. [L, M]).

See that in the formula above there are sustainability gaps (SG) "m = SG_m" and "l = GS_l", which are no longer assumed away under no impact neutrality assumptions, and since L is maximized subject to M, it creates the sustainability gap "m = SG_m"; and since M is maximized subject to L it creates the sustainability gap "l = SG_l", gaps that expand through time as L or M expand, affecting the sustainability of the system they are embedded in. As the sustainability gaps "l = SG_l" and "m = SG_m" can no longer be assumed away, they cannot be dropped from the formula to make a clean formula at the end so the formula stays such as MAX (L.SG_m + M.SG_l) which has sustainability gaps, making it a sustainability gap creation and expansion formula under no externality production neutrality assumptions so the gaps are seen here as they are, as active sustainability gaps. In other words, the formula above reflects fully distorted additive thinking, which is inconsistent with system consistent optimality requirements (S).

<u>The additive system maximization possibility and gap creation theorem:</u>

All additive systems can be maximized, other things being equal, but not in ways that guarantee system-consistent optimality when optimality needs joint feasibility across interdependent components so additive independent thinking does not lead to system-consistent optimality (S) when maximized, which manifest as distorted optimality and sustainability gap pressures. This is because internal non-optimal conditions under additive maximization propagate external non-optimality. Under externality production neutrality assumption the active sustainability gaps created are

assumed to be passive and drop from the analysis while under no externality production neutrality assumptions the sustainability gaps created are taken as they are as active sustainability gaps affecting the sustainability of the system in which they are embedded in or which creates them, both cases lead to situations inconsistent with system consistent optimality requirements (S), and to sustainability gaps creation.

Additive Maximization Impossibility Theorem

It is impossible to achieve system consistent optimality by means of maximizing additive thinking, whether under externality neutrality assumptions or not.

Conjunctural thinking under maximization theory

If we maximize (MAX) the conjunctural thinking structure (CT) on both sides we have the following expression:

MAX (CT) = MAX (LM)

The expression above tells us that we need to maximize a conjunctural structure, which is possible as you can maximize joint components, but consistency with system consistency requirements (S) depends on the type of conjunctural structure, fully distorted or fully non-distorted, where fully distorted means producing sustainability gaps and fully non-distorted means producing no sustainability gaps.

Maximizing fully distorted conjunctural thinking

Fully distorted conjunctural thinking means having fully distorted components interacting with fully distorted components or reflects the interaction of components with sustainability gaps, such as component "$Lm = L.SG_m$" and component "$Ml = M.SGL_l$". Notice that components with sustainability gaps (SG) implies that those components are under full cost externalization, which creates specific sustainability gap pressures to each component, and this fully distorted conjunctural structure is being subjected to maximization thinking as indicated below:

$MAX\ (CT) = MAX\ (Lm.Ml) = MAX\ (L.SG_m.M.SG_l) = \infty \neq S$

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as literal math infinity symbol and lower case letters (e.g. [m, l]) indicate sustainability gaps (SG) associated with the capital letters (e.g. [L, M]).

The expression above tells us that maximization of fully distorted conjunctural thinking is possible, but it does not lead to system consistent optimality conditions (S).

Maximizing fully non-distorted conjunctural thinking

Fully non-distorted conjunctural thinking means having fully non-distorted components interacting with fully non-distorted components, or having the interaction of components without sustainability gaps (SG) such as component "L" and component "M", which are then components under full cost internalization, which leads to no sustainability gap creation (SG = 1) so that L.SGm = L.1 = L and Ml = M.SGl = M.1 = M as both L and M do not create sustainability gaps, and this fully non-distorted conjunctural structures are being subjected to maximization thinking as shown below:

MAX (CT) = MAX (LM) = S = L*M* = the true optimal balance

Notice that here SG = 1, SG_m = 1, and SG_l = 1 means in qualitative comparative terms that no such sustainability gaps are created.

The expression above tell us that maximization of fully non-distorted conjunctural thinking is possible, and it leads to system consistent optimality conditions (S) as the maximum equals the true optimal balance or true optimal minimum.

Implication 10

Conjunctural thinking can be maximized, but the maximization of fully distorted conjunctural thinking structures lead to system optimality inconsistencies while maximization of fully non-distorted conjunctural structures takes you to the world where the maximum equals the true optimal minimum, In other words, the maximization of fully distorted conjunctural systems leads to the creation of sustainability gaps due to general system optimality inconsistent conditions while the maximization of fully non-distorted conjunctural systems leads to the true optimal balance being the maximum possible.

And this means, you cannot achieve system-consistent optimality (S) when maximizing fully distorted codependent components:

MAX (Lm.Ml) ≠ L*M* = S

Therefore, maximizing fully distorted codependent components does not lead to component optimality consistency (L*M*) and system optimality consistency(S).

But you can achieve balance system-consistent optimality (S) equal the maximum possible when maximizing fully non-distorted codependent components:

MAX (LM) = L*M* = S = TRUE OPTIMAL BALANCE = THE TRUE OPTIMAL MINIMUM

Therefore, maximizing fully non-distorted codependent components leads to component optimality consistency (L*M*) and system optimality consistency(S = (LM)*). In other words, MAX (LM) = S is possible only under fully non-distorted conjunctural conditions.

Implication 11

Maximization is possible in conjunctural systems, but only under the maximization of fully non-distorted conjunctural components you meet the necessary conjunctural requirements for general system optimality conditions(S) to exist, at the point where the maximum is the optimal balance since the maximization of fully distorted conjunctural systems leads to general system inconsistent optimality and to the creation of sustainability gaps.

The conjunctural system maximization possibility and sustainability gap creation theorem:

All conjunctural systems can be maximized; other things being equal, but not all conjunctural system maximization possibilities satisfy system consistency optimality requirements (S). When fully non-distorted conjunctural systems are maximized they lead to conjunctural structures without sustainability gaps, but when fully distorted codependent maximization thinking takes place this does not lead to system-consistent optimality (S), which manifest as distorted optimality and sustainability gap pressures. This is because in the case of fully non distorted conjunctural systems consistent internal optimality ensures external optimality consistency; and in the case of fully distorted conjunctural systems inconsistent internal optimal conditions generate external optimality inconsistency. And this optimality inconsistency found in fully distorted conjunctural structures under maximization is true whether distorted conjuncturally under maximization takes place under externality production neutrality assumptions or not while the optimality consistency found under fully non-distorted conjunctural structures under maximization holds for all fully non-distorted conjunctural structures under maximization, regardless of the type of externality neutrality assumption made.

Conjunctural Conditional Optimality Theorem

Conjunctural optimality under maximization thinking exists only when fully non-distorted conjunctural structures are maximized.

Red, green, and sustainability markets as additive corrections of traditional economic thinking (B)

Correcting the traditional markets (B) of Adam Smith (Smith 1776) to reflect social and/or environmental sustainability concerns as requested in 1987 by the Brundtland Commission (WCED 1987) using additive thinking leads to red markets, green markets, and true sustainability markets in additive forms as shown below:

1) Correcting for social concerns (A)

If we add social concerns (A) to traditional economic thinking (B), we get the following:

AT = B + A = RM

The expression above indicates that social concerns (A) are external add-ons to the working of traditional economic thinking (B) leading to additive red markets (RM), markets where social issues are exogenous issues.

2) Correcting for environmental concerns(C)

If we add environmental concerns (C) to traditional economic thinking (B), we arrive to the following:

AT = B + C = GM

The expression above indicates that environmental concerns (C) are external add-ons to the working of traditional economic thinking (B) leading to additive green markets (GM), markets where environmental issues are exogenous issues.

3) Correcting for social and environmental concerns (A + C)

If we add social and environmental concerns (A + C) to traditional economic thinking (B), we create to the following:

AT = B + A + C = TSM

The expression above indicates that both social concerns (A) and environment concerns (C) are external add-ons to the working of traditional economic thinking (B) leading to additive true sustainability markets (TSM), markets where social and environmental issues are exogenous issues.

Implication 12

Additive systems-red markets (RM), green markets (GM) and true sustainability markets (TSM) - reflect different types of additive corrections to traditional linearity issues, social, environmental, and socio-environmental issues respectively.

Red, green, and sustainability markets as conjunctural corrections of traditional economic thinking (B)

Correcting the traditional markets (B) of Adam Smith (Smith 1776) to reflect social and/or environmental concerns as requested in 1987 by the Brundtland Commission (WCED 1987) using conjunctural thinking leads to red markets, green markets, and true sustainability markets in conjunctural forms as indicated below:

1) Correcting for social concerns (A)

If we internalize social concerns (A) in traditional economic thinking (B), we create to the following:

CT = BA = RM

The expression above indicates that social concerns (A) are internal add-ons to the working of traditional economic thinking (B) leading to conjunctural red markets (RM), markets where social issues are endogenous issues.

2) Correcting for environmental concerns(C)

If we internalize environmental concerns (C) in traditional economic thinking (B), we produce the following:

CT = BC = GM

The expression above indicates that environmental concerns (C) are internal add-ons to the working of traditional economic thinking (B) leading to conjunctural green markets (GM), markets where environmental issues are endogenous issues.

3) Correcting for social and environmental concerns (AC)

If we internalize social and environmental concerns (AC) in traditional economic thinking (B), we generate the following:

CT = BAC = TSM

The expression above indicates that both social and environmental concerns (AC) are internal add-ons to the working of traditional economic thinking (B) leading to

conjunctural true sustainability markets (TSM), markets where social and environmental issues are endogenous issues.

Implication 13

Conjunctural systems-red markets (RM), green markets (GM) and true sustainability markets (TSM) - indicate different types of conjunctural corrections to traditional linearity issues, social, environmental, and socio-environmental issues respectively.

Additive red, green and true sustainability market corrections under maximization theory

Placing the structure of additive red markets (RM), additive green markets (GM), and additive true sustainability markets (TSM) under maximization thinking (MAX) produces the following structures and implications:

MAX (AT) = MAX (B + A) = MAX (RM)

MAX (AT) = MAX (B + C) = MAX (GM)

MAX (AT) = MAX (B + A + C) = MAX (TSM)

We can see that all expressions above have internal optimality inconsistency and external optimality inconsistency since you cannot achieve general system-consistent optimality (S) simply by adding maximum independent components, and all expressions above operate under the externality production, social or environmental or socio-environmental, neutrality assumption, and therefore:

MAX (AT) = MAX (B + A) = MAX (RM) = $\infty \neq$ S

MAX (AT) = MAX (B + C) = MAX (GM) = $\infty \neq$ S

MAX (AT) = MAX (B + A + C) = MAX (TSM) = $\infty \neq$ S

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as math literal infinity symbol

All additive expressions above, red markets (RM), green markets (GM), and true sustainability markets (TSM), indicate that maximizing additive thinking is possible, but it does not lead to general system optimality consistency (S) as there are internal joint optimality inconsistencies in each of them, and if we assume that maximization of additive systems leads to system consistent optimality (S), then this produces distorted

optimal conditions under sustainability gap pressures as internal optimality inconsistencies propagate external optimality inconsistencies. And notice that in all the structures above, whether under no externality production neutrality assumptions or under externality neutrality production neutrality assumptions, the maximization of additive thinking leads to external optimality inconsistencies as they all display internal optimality inconsistencies, and hence, in all cases those inconsistencies lead to the creation, and later expansion of sustainability gaps (SG).

Implications 14

Additive markets are not optimal ways to correct traditional market's social and/or environmental problems as maximizing them cannot be done in ways that satisfy system consistent optimality conditions (s). In other words, maximizing additive thinking is not a suitable way to correct traditional market thinking as independent non-optimal additive conditions lead to internal optimization inconsistency that result in general system optimization inconsistency; and therefore, maximizing additive red markets, additive green markets, and additive true sustainability markets are not optimal ways of fixing the social and/or environmental issues associated with the working of traditional market thinking as all of them are processes that are inconsistent with system optimality requirements (S).

Implications 15

Maximizing additive thinking is not the appropriate approach to addressing the social or environmental or socio-environmental issues linked to the working of traditional market thinking due to the existence of internal joint optimality inconsistencies in each additive market being maximized as maximizing non-optimal conditions generates non-optimal conditions.

Additive red, green and true sustainability market corrections under maximization theory and under no externality production neutrality assumptions

If social or environmental or socio-environmental externalities cannot be assumed away means we have additions of different distorted components so now the structure of fully distorted additive red markets, fully distorted additive green markets and fully distorted additive true sustainability markets under maximization can be indicated as shown below:

MAX (AT) = MAX (Ba + Ab) = MAX (RM) = $\infty \neq$ **S**

MAX (AT) = MAX (Bc + Cb) = MAX (GM) = $\infty \neq$ **S**

MAX (AT) = MAX (Bac + Abc + Cba) = MAX (TSM) = ∞ ≠ S

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as math literal infinity symbol and lower case letters (e.g. [a,b,c]) indicate sustainability gaps (SG) associated with the capital letters (e.g. [A, B, C]).

All expressions above indicate that the maximization of fully distorted additive structures under no externality neutrality assumptions means maximization is possible, but not in ways consistent with system consistent optimality requirements (S)

Applied additive system maximization possibility theorem and sustainability gap creation:

No additive red market or green market or true sustainability market can be maximized in ways that lead to system-consistent optimality (S), and these non-optimal characteristics manifest as distorted optimality and sustainability gap pressures in each of those markets, ceteris paribus. This is because maximizing internal non-optimal conditions in red markets or in green markets or in true sustainability markets means maximizing external non-optimality conditions in each of those markets. Optimization requires the existence of internal and external optimality conditions, and all the additive markets under maximization above violate these conditions, whether they are being maximized under externality production neutrality assumptions or not.

Applied additive Maximization Impossibility Theorem

It is impossible to achieve system consistent optimality by means of maximizing additive thinking, be it additive red markets or additive green markets or additive true sustainability markets, whether under externality neutrality assumptions or not.

Conjunctural red, green and true sustainability market corrections under maximization theory under fully non-distorted conjunctural assumptions

Placing the structure of conjunctural red markets (RM), conjunctural green markets (GM), and conjunctural true sustainability markets (TSM) under maximization thinking (MAX) and fully non-distorted conjunctural assumptions leads to the following structures and implications:

MAX (CT) = MAX (BA) = MAX (RM)

MAX (CT) = MAX (BC) = MAX (GM)

MAX (CT) = MAX (BAC) = MAX (TSM)

We can see that all expressions above have internal optimality consistency and external optimality consistency since codependent component based structures can be maximized (MAX) in ways leading to system consistent optimality (S) under the true optimal balance principle as all of them do not have sustainability gaps embedded in them, and therefore:

MAX (CT) = MAX (BA) = MAX (RM) = S = true optimal red market balance

MAX (CT) = MAX (BC) = MAX (GM) = S = true optimal green market balance

MAX (CT) = MAX (BAC) = MAX (TSM) = S = true optimal true sustainability market balance

All conjunctural expressions above, red markets (RM), green markets (GM), and true sustainability markets (TSM), indicate that maximizing fully non-distorted conjunctural thinking is structurally possible, and it leads to optimal conditions under no sustainability gap pressures. In other words, all structures above show the maximum unity of sustainability, the maximum unity of red markets (MAX (RM) = MAX (BA)), the maximum unity of green markets (MAX (GM) = MAX (BC)), and the maximum unity of true sustainability markets (MAX (TSM) = MAX (BAC)), all consistent with system optimality consistency (S). The unity of true sustainability markets in terms of the interaction of optimal producers and optimal lifestyles has been recently shared (Muñoz 2025), reflecting internal and external consistency, which can be maximized on both sides to show the maximum unity of sustainability in terms of lifestyles and producers.

Implications 16

Conjunctural markets and their maximization are optimal ways to correct the traditional market's social and/or environmental problems. In other words, conjunctural thinking and its maximization is a suitable way to correct traditional market thinking as fully non-distorted codependent conjunctural conditions even when maximized lead to internal optimization consistency that results in general system optimization consistency, and in this case maximization equals the true optimal codependence balance. And therefore, maximized conjunctural red markets, conjunctural green markets, and conjunctural true sustainability markets are optimal venues to fixing the social and/or environmental issues associated with the working of traditional market thinking respectively as these processes lead to systems operating at the point where the maximum is equal to the optimal codependence balance in each of those markets.

Implications 17

Conjunctural thinking even when maximized is the appropriate venue to address the social or environmental or socio-environmental issues linked to the working of traditional market thinking due to the existence of optimality consistencies, where the maximum point in each market is equal to the true optimal balance in that market.

Conjunctural red, green and true sustainability market corrections under maximization theory under fully distorted conjunctural structure assumptions

If social or environmental or socio-environmental externalities cannot be assumed away means we have different distorted components at play so now we have the structure of fully distorted conjunctural red markets, fully distorted conjunctural green markets and fully distorted conjunctural true sustainability markets under maximization, which can be indicated as shown below:

MAX (AT) = MAX (Ba.Ab) = MAX (RM) = $\infty \neq$ S

MAX (AT) = MAX (Bc.Cb) = MAX (GM) = $\infty \neq$ S

MAX (AT) = MAX (Bac.Abc.Cba) = MAX (TSM) = $\infty \neq$ S

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as math literal infinity symbol and lower case letters (e.g. [a,b,c]) indicate sustainability gaps (SG) associated with the capital letters (e.g. [A, B, C]).

All expressions above indicate that the maximization of fully distorted conjunctural structures under no externality neutrality assumptions means maximization is possible, but not in ways consistent with system consistent optimality requirements (S)

<u>Applied conjunctural system maximization possibility and no or yes sustainability gap creation theorem</u>

All conjunctural fully non-distorted red, green and true sustainability markets can be maximized in ways that lead to system-consistent optimality (S) at the point of the true optimal balance, which manifest as non-distorted optimality free of sustainability gap pressures in each of those markets, ceteris paribus. This is because internal optimal conditions in red markets or green markets or true sustainability markets when fully non-distorted mean external optimality in each of those markets. All fully distorted conjunctural markets can be maximized, but not in a way consistent with system consistent optimality requirements (S).

<u>Applied conjunctural Conditional Optimality Theorem</u>

Conjunctural optimality under maximization thinking exists in red markets or green markets or true sustainability markets only when their fully non-distorted conjunctural structures are maximized.

Extracting the necessary and sufficient conditions for market sustainability to exist under fully non-distorted conjunctural market assumptions using maximization theory

We can extract internal optimality consistency from each of the conjunctural market structures above, fully non-distorted red markets, fully non-distorted green markets and fully non-distorted true sustainability markets as indicated below:

MAX (CT) = MAX (BA) = MAX (RM) = S = (BA)* = true optimal balance

MAX (CT) = MAX (BC) = MAX (GM) = S = (BC)* = true optimal balance

MAX (CT) = MAX (BAC) = MAX (TSM) = S = (BAC)* = true optimal balance

And then the expressions above highlight the following aspects about the maximization of fully non-distorted conjunctural systems: i) that the necessary and sufficient condition for red market maximization sustainability to exist (MAX(RM) = S = (BA)*) is when the maximum equals the optimal interaction of fully non-distorted economic and social components, which reflects maximization under full econ-social cost internalization; ii) that the necessary and sufficient condition for green market maximization sustainability to exist (MAX(GM) = S = (BC)*) is when the maximum equals the optimal interaction of fully non-distorted economic and environmental components, which reflects maximization under full eco-economic cost internalization; and iii) that the necessary and sufficient condition for true sustainability market maximization sustainability to exist (MAX(TSM) = S = (BAC)*) is when the maximum equals the optimal interaction of fully non-distorted economic, environmental, and social components, which reflects maximization under full eco-socio-economic cost internalization;

Implication 18

Internal and external optimality consistency exist at the maximum because i) there is no social cost externalization in red markets, ii) there is no environmental cost externalization in green markets, and iii) there is no socio-environmental cost externalization in true sustainability markets, which means that the maximum in each market is equal to the true optimal balance in each of those markets.

Implication 19

Under full social cost internalization i) conjunctural red markets when maximized have internal and external optimality consistency as social issues are now endogenous issues; ii) under full environmental cost internalization green markets when maximized have internal and external optimality consistency as environmental issues are now endogenous issues; and iii) under full socio-environmental cost internalization true sustainability markets when maximized have internal and external optimality consistency as social and environmental issues are now endogenous issues. Optimization requires system-consistent optimality (S), and all the fully non-distorted conjunctural markets above when maximized satisfy this condition.

Extracting the necessary and sufficient conditions for market unsustainability to exist under fully distorted conjunctural market assumptions using maximization theory

We can extract internal optimality inconsistency from each of the conjunctural market structures, fully distorted conjunctural red markets, fully distorted conjunctural green markets and fully distorted conjunctural true sustainability markets as indicated below:

MAX (CT) = MAX (Ba.Ab) = MAX (RM) = ∞ ≠ S ≠ (BA)* ≠ true optimal balance

MAX (CT) = MAX (Bc.Cb) = MAX (GM) = ∞ ≠ S ≠ (BC)* ≠ true optimal balance

MAX (CT) = MAX (Bac.Abc.Cba) = MAX (TSM) = ∞ ≠ S ≠ (BAC)* ≠ true optimal balance

Where the symbol ∞ is used in qualitative comparative thinking terms to denote non-feasible under system-consistent optimality requirements, not used as math literal infinity symbol and lower case letters (e.g. [a,b,c]) indicate sustainability gaps (SG) associated with the capital letters (e.g. [A, B, C]).

And then the expressions above stress the following aspects about the maximization of fully distorted conjunctural thinking: i) that the necessary and sufficient condition for red market maximization unsustainability to exist (MAX (RM) = MAX (Ba.Ab) ≠ S ≠ (BA)*) is when the maximum is inconsistent with the optimal interaction of fully distorted economic and social components, which reflects maximization under full econ-social cost externalization; ii) that the necessary and sufficient condition for green market maximization unsustainability to exist (MAX (GM) = MAX (Bc.Cb) ≠ S ≠ (BC)*) is when the maximum is inconsistent with the optimal interaction of fully distorted economic and environmental components, which reflects maximization under full eco-economic cost externalization; and iii) that the necessary and sufficient condition

for true sustainability market maximization unsustainability to exist (MAX (TSM) = MAX (Bac.Abc.Cba) ≠ S ≠ (BAC)*) is when the maximum is inconsistent with the optimal interaction of fully distorted economic, environmental, and social components, which reflects maximization under full eco-socio-economic cost externalization;

Implication 20

Internal and external optimality inconsistency exist at the maximum because i) there is social cost externalization in distorted red markets, ii) there is environmental cost externalization in distorted green markets and iii) there is socio-environmental cost externalization in distorted true sustainability markets, which means that the maximum in each market is inconsistent with true optimal balance in each of those markets.

Implication 21

Under full social cost externalization i) conjunctural red markets when maximized have internal and external optimality inconsistency as social issues are here exogenous issues; ii) under full environmental cost externalization green markets when maximized have internal and external optimality inconsistency as environmental issues are here exogenous issues; and iii) under full socio-environmental cost externalization true sustainability markets when maximized have internal and external optimality inconsistency as social and environmental issues are here exogenous issues. Optimization requires system-consistent optimality (S), and all the fully distorted conjunctural markets above, red markets, green markets, and true sustainability markets, when maximized do not satisfy these conditions.

Conclusions

Among specific conclusions that can be highlighted are the following: 1) the paradigm variability model is a useful tool to generate all logical paradigms that make up the total paradigm variability landscape or possible active paradigms. 2) Subjecting the total paradigm variability landscape to independent assumptions and conjunctural assumptions leads to unlocking the structure of additive thinking and of conjunctural thinking, respectively. 3) Subjecting additive thinking to maximization requirements shows the nature of the additive thinking maximization possibility and sustainability gap creation theorem, whether done under externality production neutrality assumptions or not. 4) Subjecting conjunctural thinking to maximization requirements highlights the nature of the conjunctural thinking maximization possibility theorem in instances when sustainability gaps are created and cases when they are not generated. 5) Subjecting the structure of additive red markets, additive green markets, and additive true sustainability

markets to maximization requirements shows, whether they are maximize under externality production neutrality assumptions or not, that none of them is an optimal tool to correct the social and/or environmental limitations of traditional market thinking because they have a system optimality inconsistency. 6) Subjecting the structures of conjunctural red markets, conjunctural green markets, and conjunctural true sustainability markets to maximization requirements show that all of them if in fully non-distorted form are optimal tools to correct the social and/or environmental limitations of traditional market thinking respectively, but if they are in the fully distorted conjunctural form then their maximization leads to optimality inconsistencies making them inappropriate correction tools. 7) The maximization of conjunctural red markets, conjunctural green markets and conjunctural true sustainability markets when in fully non-distorted form brings out the necessary and sufficient conditions of each type of sustainability to exist, in the case of red markets it is the interaction of optimal economic and optimal social components when at the maximum, in the case of green markets is the interaction of optimal economic and environmental components when at their maximum, and in the case of true sustainability markets is the interaction of optimal economic, social, and environmental components when at their maximum. 8) The maximization of conjunctural red markets, conjunctural green markets and conjunctural true sustainability markets when in fully distorted form brings out the necessary and sufficient conditions of each type of unsustainability to exist, in the case of red markets is the inconsistency of optimal economic and optimal social components when at their maximum, in the case of green markets is the inconsistency of optimal economic and environmental components when at their maximum, and in the case of true sustainability markets is the inconsistency of optimal economic, social, and environmental components when at their maximum.

In general, first it was shown that only fully non-distorted conjunctural thinking can capture the nature of sustainability thinking when maximized as this thinking is the only one that reflects internal optimization and external optimization consistency equal the maximum since additive thinking fully distorted or not and fully distorted conjunctural thinking both break down under maximization thinking and system optimality consistent requirements. Second, it was mentioned that this over-all system optimality requirement-maximization consistency is met by red markets, green markets, and true sustainability markets only when they are under fully non-distorted conjunctural forms. Third, in other words it is indicated that sustainability requires conjunctural (non-separable) optimality, be it red market or green market or true sustainability market sustainability and when these requirements exist, the maximization of these conjunctural structures lead to the maximum becoming the true optimal balance point achieving system optimality conditions in each of them. Fourth, however, it was indicated that when conjunctural systems are made up by fully distorted interacting components or when additive structures are implemented under externality neutrality assumptions, and hence distorted or when they are maximized under no externality neutrality assumptions

and hence again, distorted they lead to unsustainability conditions and sustainability gaps as the maximum will be inconsistent with system optimality requirement conditions at the minimum balance level. Fifth, therefore it can be stressed that the key lessons here are the following i) Maximizing conjunctural thinking [MAX (CT) = MAX (LM) = S] holds only when fully non-distorted conjunctural conditions exist in those markets; ii) Maximizing conjunctural red markets [MAX (RM) = MAX (BA) = S] holds only when fully non-distorted conjunctural socio-economic conditions exist in red markets(RM); iii) Maximizing green markets [MAX (GM) = MAX (BC) = S] holds only when fully non-distorted conjunctural eco-economic conditions exist in green markets (GM); and iv) Maximizing true sustainability markets [MAX (TSM) = MAX (BAC) = S] holds only when fully non-distorted conjunctural socio-eco- economic conditions exist in true sustainability markets (TSM). Sixth, in other words, it was shown that additive systems, maximization and optimality are structurally incompatible, be it in additive general form or in additive red market or additive green market or in additive true sustainability forms. Seventh, but in the case of conjunctural systems, maximization, and optimality it is pointed out that they are structurally compatible, but only when they are under non-distorted conditions, be it general conjunctural systems or conjunctural red markets or conjunctural green markets or conjunctural true sustainability markets. And finally eight, it was stressed in the paper that sustainability gaps are not accidental outcomes, but structural consequences of the underlying assumption set: inevitable under additive independence, conditional under conjunctural codependence, and absent only under fully non-distorted conjunctural integration.

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