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Sustainability thoughts 196: How to transform and apply the general structural falsification theorem to the Karl Marx's deep socialism based development model? What are the implications of doing this?

By

Lucio Muñoz*

* Independent Qualitative Comparative Researcher / Consultant, Vancouver, BC, Canada Email: munoz@interchange.ubc.ca

Abstract

Any framework based on unilateral maximization is structurally falsified whenever the system it represents is inherently conjunctural ($K = L$). And this means that development frameworks based on unilateral maximization under independent assumptions such as for example the traditional economic development framework or deep economic model ($DE = B$), the red Marxism framework or deep socialism ($DS = A$), the deep environmentalism or the environment only framework ($ENV = C$) and so on can be structurally falsified whenever the system's component that drives them is shown to be inherent conjunctural, which means that the maximization of this system breaks conjunctural equality.

This paper starts from a simple but often overlooked observation: in practice, social, economic, and environmental outcomes are empirically interdependent. Changes in one dimension systematically affect the others, indicating that these components are not separable but co-determined. However, most deep development frameworks—whether associated with Adam Smith, Karl Marx, or environment-only approaches—are structurally formulated as if these dimensions were separable, either by assuming externality neutrality or by treating interdependencies as secondary adjustments. This creates a mismatch between how reality behaves and how it is modeled. The analysis that follows formalizes this mismatch: it shows that when inherently interdependent (conjunctural) systems are treated through additive, separable structures, structural inconsistencies necessarily emerge, and these inconsistencies manifest as sustainability gaps. The purpose of this paper is to make this structural issue explicit and to demonstrate, through the general structural falsification theorem and its application, how frameworks like the red socialism development model of Karl Marx or red Marxism fully active from 1848 when it was born with the socialist manifesto to 1991 when the soviet bloc fell can be invalidated on structural grounds before empirical testing knowing they worked or work on non-

market-based separability, which allowed or allows them to treat economic and environmental issues as externality tradeoffs that can be administered at will.

Relevant concepts within the text

Structural falsification, Maximization, Optimization, Independent components, Codependent components, Externality neutrality assumptions, No externality neutrality assumptions, Sustainability gaps, General structural falsification theorems, General structural validation theorems, red socialism based development falsification theorems, red socialism based development optimization inconsistency theorem

Introduction

Karl Popper held the view that valid paradigms can be refuted by future observation and/or experiment (Popper 1965) to ensure the growth of scientific knowledge taking those valid paradigms as paradigms without structural inconsistencies that can generate predictions that can be tested in future events, however if a valid paradigm contains structural inefficiencies, then the negative impacts and accumulation of negative impacts driven by those structural inefficiencies should be expected and predicted to later in the future to corroborate themselves, leading to the world of structural falsification. These structural inconsistencies generate sustainability gaps that drive paradigm death, shift and paradigm evolution (Muñoz 2019a). Then Thomas Kuhn gave us the scientific paradigm evolution loop (Kuhn 1970) governing how new ideas that address the weaknesses of old ideas after consensus for change take over as the new status quo paradigm, however Kuhn's ideas are not made from the point of view of the need for conjunctural paradigm evolution as old non-conjunctural ideas with structural embedded inefficiencies in them cannot be fixed from the inside, only managed; and when we think or assume that we can treat conjunctural problems as additive problems then we fall into the critical problem-solving impossibility zone as the case of the 1987 sustainable development idea shows (Muñoz 2025a) as the critical socio-environmental problems have continue to expand despite a world under sustainable development thinking and goals since then (1987-2026).

As Popper and Kuhn apparently placed their focus on the growth of scientific knowledge that comes from falsifying and evolving non-conjunctural ways of thinking, then they missed the possibility of structural falsification and validation and possibility conjunctural paradigm shifts as the full fixed for the structural inefficiencies embedded in non-conjunctural systems, for example when you move from non-conjunctural thinking to conjunctural thinking then the knowledge base of non-conjunctural thinking no longer works for example a move to true sustainability thinking leaves icons like the arrow impossibility theorem behind (Muñoz 2016a). This means that a link is missing and has been missing since the work of Popper in 1965 and Kuhn in 1970, which is structural falsification and the conjunctural paradigm evolution thought that goes with it as for example the shift from traditional market thinking/non-conjunctural

thinking to true sustainability thinking/fully conjunctural thinking requires the fixing of the structural abnormalities embedded in traditional markets through cost internalization to shift it to true sustainability thinking, step by step or in one step (Muñoz 2025b) since only conjunctural thinking works under true sustainability (Muñoz 2026a). This paper is focused on the application of the same general structural falsification theorem used to falsify the traditional economic thinking of Adam Smith on structural flaw ground to structurally falsify this time the red socialism model of Karl Marx or red Marxism which was fully active from 1848 when it was born with the socialist manifesto (Marx and Engels 1848) to 1991 when the soviet bloc fell (Longley 20190) based on the similar structural flaw grounds.

Goals of this paper

1) To point out the summary application of the general structural falsification theorem; 2) To transform it into the summary application of the red socialism based development structural falsification theorem; 3) To expand the summary application of the red socialism based development structural falsification theorem into the general red socialism based development falsification theorem step by step; and 4) To stress in the process how the red socialism based development structural falsification theorem works,

Key operators and concepts

- 1) **Optimization** = *, *a joint operator process that fails under non-conjunctural assumptions or conditions.*
- 2) **Maximization** = MAX, *a unilateral operator process that breaks conjunctural systems*
- 3) **Structural flaw**, *the presence of abnormalities in the structure of the system or a system with abnormalities embedded in it.*
- 4) **Structural consistency**, *the absence of abnormalities in the structure of the system or a system without abnormalities embedded in it.*
- 4) **Structural falsification**, *the refutation of theories solely on the basis that they are not valid theories structurally, and therefore, this structural flaw invalidates them using maximization operators and optimization operators.*
- 5) **Structural validation**, *the verification of theories solely on the basis that they are valid theories structurally, and therefore, this structural consistency validates them using maximization operators and optimization operators.*
- 6) **Truly conjunctural systems**, *the ones with structural consistency.*
- 7) **Distorted conjunctural systems**, *conjunctural systems with inconsistencies.*
- 8) **Truly independent systems**, *the ones where there is component separability or independence.*
- 9) **Distorted independent systems**, *the ones where there is distorted component separability or independence.*
- 10) **Non-distorted independent systems**, *the ones where there is truly no distorted component separability or independence in reality or by assumption.*
- 11) **Red socialism**, *the society only model.*

12) Capitalism, *the economy only development model.*

The general structural paradigm falsification theorem

The ideas of the existence of the structural paradigm falsification tools based on maximizing and optimizing inherently conjunctural systems such as $K = L$ was recently shared (Muñoz 2026b), where maximization breaks the conjuncturally balanced equality so that then $K \neq L$ as K and L are here codependent components, not independent ones, and this leads to the creation of sustainability gaps due to maximization driven distortions; and later this idea was used to structurally invalidate the traditional economic development model of Adam Smith which is inherently a conjunctural type system with structure $D = B$, where D = traditional economic development and B = the traditional economy and here when we maximize for example economic activity $MAX(B)$ then the balanced equality breaks so that $D \neq B$ as D and B are codependent component, not independent ones so that socio-environmental sustainability gaps are created due to maximization induced distortions.

Summary application of the general structural falsification theorem can be formally stated as follows:

If we have an inherently conjunctural development system such as $K = L$, where K and L are codependent components, not independent ones, then:

If development K is pursued through the factor L -only model, then:

(1) Under maximization behavior:

L is maximized independently

Which implies?

$$K \neq L$$

(2) Structural implication

The equality $K = L$ is broken,

Therefore:

Development type K , as defined within L - only framework, is structurally falsified.

(3) Gap interpretation

The resulting gap:

$$|K - L| > 0$$

Represents:

--Ignored costs or cost externalization

And this explains the emergence of sustainability gaps or distortions gaps under non-conjunctural development thinking.

(4) Two-lines conclusion

Development type K cannot be validly represented or achieved within an L-only maximization framework without structural falsification. In other words, when a conjunctural reality ($K \leftrightarrow L$) is modeled as a separable system ($K \rightarrow L$) or ($K \leftarrow L$), any maximization or optimization procedure will generate structural inconsistency.

Implication 1:

A theory such that $K = L$ can be invalid before testing, due to internal structure. And if an invalid theory such as $K = L$ is tested through maximization and/or optimization it can be shown to be structurally falsifiable, and the nature of the sustainability gaps created by such a theory is explained; and then the need for the correction of those sustainability gaps or the existence of conjunctural paradigm shift avoidance behavior can be amplified or called for to allow for the growth of science based knowledge and practice.

Implication 2

There is structural inconsistency across all non-conjunctural frameworks or assumed conjunctural frameworks when they are not such as the framework $K = L$, and therefore when tested, all non-conjunctural systems or conjunctural systems by assumption such as $K = L$ fail structurally. As an example in practice, if social, economic, and environmental outcomes are empirically interdependent, then any model that treats them as separable components is structurally mis-specified, regardless of whether externalities are assumed away or internalized, and that includes model $K = L$ under separability.

The Thomas Kuhn's on structurally flawed or structurally inconsistent paradigms

Keeping in mind, that structurally flawed paradigms have embedded abnormalities which sooner or later will tend towards full unsustainability as pressures from the expansions of these structural flaws or sustainability gaps will drive them to that full unsustainability point and the only way they will keep their core paradigm values is if they follow vertical paradigm evolution routes available before collapse; otherwise they will be subjected to paradigm death and flip or paradigm death and flip-back depending on the origin of the structurally flawed

paradigm reflecting the Thomas Kuhn's curse for structurally flawed paradigms in terms of science based paradigm evolution.

Summary of general food for thoughts

1) In terms of policy implication

Models at play that are based on unilateral maximization applied to an inherently conjunctural system such as $K = L$ will tend to underestimate feedback effects and generate policy resistance even as unintended consequences pile up as these negative consequences are not expected since a distorted paradigm has been assumed to be a valid paradigm.

2) In terms of sustainability implication

Model gains in systems such as $K = L$ lead to distortions, which lead to rebound pressures, which undermine the model goals themselves and accumulate unsustainability.

3) In terms of paradigm implications a la Thomas Kuhn

A model such as $K = L$ is not just empirically incomplete—it is structurally unstable and therefore subject to inevitable paradigm pressure. And these pressures push this model towards vertical paradigm evolution a la Thomas Kuhn if saving its core responsibility value is the aim or they push this model towards horizontal paradigm evolution where it loses its core responsibility value.

4) In terms of paradigm testing implications a la Karl Popper

A model such as $K = L$ is then a paradigm which known structural flaws, which allows us to predict the coming of crises based on these specific structural flaws before testing, which can then be tested by observation and/or experiment a la Karl Popper to corroborate the negative impact associated with those structural flaws, but since the practice has been to test any theory without a structural consistency test first this has created the possible paradigm testing inconsistency principle affecting a world that is focused on empirical testing only.

5) In terms of the paradigm testing inconsistency principle

A condition in which a model such as $K = L$ is empirically tested using methods that are not structurally consistent with the nature of the system the model represents, leading to misleading or delayed falsification.

6) One-line conclusion

These implications above are not model-specific; they are structural consequences of applying unilateral reasoning to inherently conjunctural systems.

Summary application of the general theorem to the Karl Marx's red socialism model

If we have an inherently conjunctural development system such as $M = A$, where M = Red socialism based development and A = society, where M and A are codependent components, not independent ones, then:

If development M is pursued through the factor A -only model, then:

(1) Under maximization behavior:

M is maximized independently

Which implies?

$$M \neq A$$

(2) Structural implication

The equality $M = A$ is broken,

Therefore:

Development type M or red socialism, as defined within A = society - only framework, is structurally falsified.

(3) Gap interpretation

The resulting gap:

$$|M - A| > 0$$

Represents:

--Ignored economic and environmental costs or eco-economic cost externalization

And this explains the emergence of sustainability gaps or distortions gaps under non-conjunctural development thinking such as eco-economic sustainability gaps.

(4) Two-lines conclusion

Development type M or red socialism based development cannot be validly represented or achieved within a society (A)-only maximization framework without structural falsification. In other words, when a conjunctural reality ($M \leftrightarrow A$) is modeled as a separable system ($M \rightarrow A$) or ($M \leftarrow A$), any maximization or optimization procedure will generate structural inconsistency.

Implication 3:

A theory such that $M = A$ can be invalid before testing, due to internal structure. And if an invalid theory such as $M = A$ is tested through maximization and/or optimization it can be shown to be structurally falsifiable, and the nature of the sustainability gaps created by such a theory such as eco-economic sustainability gaps is explained; and then the need for the correction of those sustainability gaps or the existence of conjunctural paradigm shift avoidance behavior can be amplified or called for to allow for the growth of science based knowledge and practice.

Implication 4

There is structural inconsistency across all non-conjunctural frameworks or assumed conjunctural frameworks when they are not such as the framework $M = A$, and therefore when tested, all non-conjunctural systems or conjunctural systems by assumption such as $M = A$ fail structurally.

Constructing The Red Socialism Based Development Structural Falsification Theorem

The theorem building process

Let's assume that $K = M =$ Red socialism based development and $L = A =$ Society-only model of Karl Marx so now the system has the following conjunctural structural condition:

$$M = A$$

Where M and A are the codependent components that define the integral structure of the system. Please, notice that this is a balance condition — a conjunctural equality. It tells us the system is in a state where two components are co-determined

1) The conjunctural consistency requirement

A red socialism based development method is structurally valid if and only if: it preserves or restores the requirement $M = A$ through joint adjustments of M and A .

2) The structural falsification requirement

A red socialism based development method is structurally falsified if: It imposes unilateral change (e.g., maximization) on M or A such that $M \neq A$, thereby violating the defining conjunctural requirement.

3) The necessary Outcome of Falsification

If $M \neq A$, then: a structural gap necessarily emerges, defined by $|M - A| > 0$ or by $|A - M| > 0$, depending on where the unilateral change is applied indicating system distortion or sustainability gap (SG).

4) The expected overall result

Therefore: Any red socialism based development framework relying on unilateral maximization is structurally falsified whenever the system it represents is inherently conjunctural ($M = A$).

5) Elucidation

You can optimize a conjunctural red Marxism based development system, but you cannot maximize within it without structurally falsifying it. Notice in the method described above $M = A$ before falsification there is structural admissibility, whether the red social development paradigm structure is valid or not. If valid the red socialism development paradigm is structurally consistent, and if invalid the red socialism development paradigm is structurally flawed. If the red socialism development paradigm is invalid, but it is assumed valid it is structurally flawed. Karl Marx's red socialism based on society only based model (Marx and Engels 1848) had structural flaws embedded in it in economic and environmental terms, which were assumed away. As red socialism expanding from 1848 to 1991 its economic and environmental flaws worsen, where the worsening of these eco-economic sustainability gaps or deficits is what drove it towards collapse, and in 1991 it totally collapsed (Longley 2019). As environmental issues were not considered critical issues during red socialism's life, but economic issues were, its collapse is attributed to the accumulation of binding economic sustainability gaps that it could no longer hide or escape (Muñoz 2016b). As a practical example consistent with the discussion above, if social, economic, and environmental outcomes are empirically interdependent, then any model that treats them as separable components is structurally mis-specified, regardless of whether externalities are assumed away or internalized, and this is the case in practice with red socialism based development thinking eco-economic issues are treated as separate or external or non-limiting issues when assumed away or not and this is because the red socialism model which assumed or assume social supremacy and eco-economic component separability.

6) The maximization paradigm inconsistency and demonstration

Maximization is at the heart of additive red socialism development thinking, let's pick side A, then we treat M as a constraint or left over and what we see in this case is that the equality breaks analytically when we maximize A as A is maximized subject M. Therefore, the system is no longer $M = A$ as maximizing A while holding M as fixed or adjustable term leads to losing the conjunctural balance and to transforming the system into a directional system or one sided pressure system; and since A increases without jointly adjusting M, then a distortion gap or sustainability gap is created ($|M - A| > 0$).

Implication 5:

Maximization is a special case of red socialism development system distortion, not a neutral analytical tool as its application leads to the breaking of the balance $M = A$ creating distortions gaps or sustainability gaps. Hence, maximization of A breaks or distorts $M = A$ balance as maximization breaks conjunctural systems.

7) The optimization paradigm consistency and demonstration

Optimization in the conjunctural sense reflects the joint determination of M and A as it aims at seeking a best configuration of the system as a whole; and therefore when the equality is optimized $[(M = A)^*]$ the equality is maintained or rebalanced $(M^* = A^*)$, and this means that optimization is not a directional process as it seeks the best combination (M,A) such that the system works best given their interdependence, which leads to no distortion gaps or sustainability gap creation since $[(|M - A|) = (|M - A|)^* = (|M^* - A^*|) = 0]$. Therefore, the result of optimizing a conjunctural equality such as $M = A$ is that the system remain coherent as there is component and system optimality consistency $(S = (M = A)^* = M^* = A^*)$, adjustments are mutual, not unidirectional, and balance equality is maintained as systems expand or contract.

Implication 6:

Optimization is a special case of non-distorted system or true conjunctural systems, a neutral analytical tool as its application leads to maintaining the balance $M = A$ without creating distortions gaps or sustainability gaps. Hence, optimization of the non-distorted conjunctural system preserves or restores $M = A$ balance; and this means that optimization fails in non-conjunctural systems and in distorted conjunctural systems.

8) Comparing the nature of structural falsification-structural validation

The implications of comparing the nature of structural falsification and structural validation in the case of the red socialism model $(M = A)$ are summarized in the table below:

Table 1

Maximization → creates divergence:

$M \neq A$

And this is the requirement for structural falsification

Optimization → manages convergence:

$M \leftrightarrow A$

And this is the requirement for structural validation

The comparison points out the gap-generating mechanism at play when maximizing goals and a gap fixing or elimination mechanism at work when optimizing goals.

We can see in table 1 above that while maximization creates distortions in the conjunctural system $M = A$ or sustainability gaps optimization eliminates distortions or sustainability gaps in $M = A$. The relevant implications of Table 1 above are: 1) with respect to maximization: the social component A grows $= A \uparrow$, the component M deteriorates $M \neq A$, and an eco-economic gap emerges = socio-economic sustainability gap; and 2) with respect to optimization: the component M and A cannot be jointly optimize (*) as M and A are independent in standard red socialism thinking so that $(M = A)^* \neq M^* = A^* = S$, and hence, independent components cannot be optimized in ways that satisfy system optimality consistent requirements (S), and therefore an eco-economic gap emerges = eco-economic sustainability gap.

9) The general structural falsification theorem through maximization in the case of non-conjunctural red socialism based development systems

You cannot maximize (MAX) a method that is inherently conjunctural without leaving $M = A$ as if you MAX (A) subject to M or if you MAX (M) subject to A or when you maximize them separately, then $M \neq A$ and structural gaps or sustainability gaps are created since then $|\text{MAX}(M) - A| > 0$ and $|M - \text{MAX}(A)| > 0$, and therefore, that method is structurally falsified through maximization as balanced equality is broken. It is known that red socialism based development is linked to the creation and expansion of eco-economic sustainability gaps, which when approaching unsustainability under win-win situations or not, it leads to paradigm evolution (Muñoz 2019a) such as paradigm death (Muñoz 2016b) and/or paradigm flip backs (Muñoz 2019b) trading social responsibility again for economic responsibility (Muñoz 2019c).

Implication 7:

If the system's component that drives them is shown to be inherently conjunctural this means that the maximization of this system breaks conjunctural equality, and structural falsification occurs. In other words, you can optimize within $M = A$, but you cannot maximize without leaving $M = A$. As market maximization is based on the idea of state based independent choices and so the maximization of independent choices even state based leads to the creation of sustainability gaps and their expansions, and therefore it is structurally invalidated by maximization as it has a structural inefficiency embedded in its pricing mechanism.

10) The structural validation theorem through optimization in the case of conjunctural red socialism based development systems

You can optimize () a method that is inherently conjunctural without leaving $M = A$ as if you optimize M and A jointly $[(M=A)^*]$, then method optimality consistency exist and no sustainability gaps are created since $|M^* - A^*| = 0$, and therefore, that method is structurally*

validated. However, as red socialism based development or society only model is based on the core value of component independence or separability, it cannot be jointly optimized, again creating expanding sustainability gap pressures or expanding eco-economic gap pressures, and hence, it is also structurally invalidated by optimization as it has structural optimality inefficiency embedded in it.

Implication 8:

If the system's component that drives them is shown to be inherent conjunctural this means that the optimization of this system keeps conjunctural equality. In other words, if you can optimize within $M = A$, then structural validation exist, but you cannot maximize without leaving $M = A$. And therefore, if red socialism development thinking was based on conjunctural thinking it would be validated here, but since it is not, then it cannot be optimized in ways that meets system consistency optimality requirements (S), and therefore, failure to be validated through optimization is another way of structural falsification in the case of red socialism based development thinking.

11) The general structural falsification theorem through optimization in the case of red socialism based development systems

If you have a system $M = A$ that is not inherently conjunctural, and hence it is a system that has component independency and component fixing properties or it is assumed to have component independency and component fixing properties to allow for the method to work, as red socialism thinking did and does, that method cannot be optimized in a way that results in system consistent optimality conditions [$S = (M = A)^$] so that $M = A \neq S = (M = A)^*$, and this optimality inconsistency leads to the creation of structural gaps or sustainability gaps since then $|M - A| > 0 = M^* - A^* = 0$ and $|A - M| > 0 = A^* - M^* = 0$; and therefore, that method is structurally falsified through optimization as balance equality is violated.*

Implication 9:

If the system's component that drives them is shown not to be inherent conjunctural or it is independent, then maximization can take place but not in ways consistent with system optimality consistency (S), which means that the maximization of this system breaks conjunctural equality as the system cannot be maximized without leaving $M = A$, and hence, it is structurally invalidated.

The Thomas Kuhn's on structurally flawed or structurally inconsistent red socialism based development paradigms

Keeping in mind, that structurally flawed red socialism based development paradigms have embedded eco-economic abnormalities which sooner or later will tend towards full unsustainability as pressures from the expansions of these eco-economic structural flaws or eco-economic sustainability gaps will drive them to that full unsustainability point and the only way

they will keep their core paradigm values of social responsibility is if red socialism based development paradigms follow vertical paradigm evolution routes available before collapse; otherwise they will be subjected to paradigm death and flip or paradigm death and flip-back depending on the origin of the structurally flawed red socialism paradigm reflecting the Thomas Kuhn's curse for structurally flawed red socialism paradigms in terms of science based paradigm evolution. It has been pointed out recently that red socialism or deep social thinking when approaching full unsustainability has the routes of vertical paradigm evolution or of horizontal paradigm evolution (Muñoz 2026c), the first option if available keeps the core values of red socialism of social responsibility in the higher level paradigm and the second option leads to the lost of the core values of red socialism or the lost of social responsibility as a core value, due to paradigm shift knowledge gaps the vertical evolution option could not be seen towards 1991 when red socialism fell, and hence the fall of red socialism in 1991 led to paradigm flip-backs towards capitalism as indicated above.

Summary of specific food for thoughts

1) In terms of policy implication

Deep red socialism models at play that are based on unilateral maximization applied to an inherently conjunctural system such as $M = A$ will tend to underestimate feedback effects and generate policy resistance even as unintended eco-economic consequences pile up as these negative consequences are not expected since a distorted deep red socialism paradigm has been assumed to be a valid paradigm.

2) In terms of sustainability implication

The deep red socialism model gains in systems such as $M = A$ lead to eco-economic distortions, which lead to rebound pressures, which undermine the model goals themselves and accumulate unsustainability.

3) In terms of paradigm implications a la Thomas Kuhn

A deep red socialism model such as $M = A$ is not just empirically incomplete—it is structurally unstable in eco-economic terms and therefore subject to inevitable paradigm pressure. And these eco-economic pressures push this model towards vertical paradigm evolution a la Thomas Kuhn if saving its core value of social responsibility is the aim or they push this model towards horizontal paradigm evolution where it loses its core social responsibility value.

4) In terms of paradigm testing implications a la Karl Popper

A deep red socialism model such as $M = A$ is then a paradigm with known eco-economic structural flaws, which allows us to predict the coming of eco-economic crises based on these specific structural flaws before testing, which can then be tested by observation

and/or experiment a la Karl Popper to corroborate the negative impact associated with those eco-economic structural flaws, but since the practice has been to test any theory without a structural consistency test first this has created the possible paradigm testing inconsistency principle affecting a world that is focused on empirical testing only.

5) In terms of the paradigm testing inconsistency principle

A condition in which a deep red socialism model such as $M = A$ is empirically tested using methods that are not structurally consistent with the nature of the system the model represents, leading to misleading or delayed falsification.

6) One-line conclusion

These implications above are not deep red socialism model-specific; they are structural consequences of applying unilateral reasoning to inherently conjunctural systems so they apply for example to the deep economy model $D = B$ of Adam Smith and to deep environmentalism models or green Marxism models $E = C$.

Conclusions

The idea of the existence of the general structural falsification theorem and its summary application was introduced. It indicates that both maximization and optimization procedures can be used to show that conjunctural systems cannot be handled without creating sustainability gaps as the maximization process breaks the balance between conjunctural components such as $K = L$ and as the optimization process shows that separability leads to system optimality inconsistencies, and hence it generate sustainability gap creation and expansion problems. It was shown that optimization can be used to structurally falsify non-conjunctural structures since they cannot be optimized in ways that respect the system consistency optimality requirements, including non-conjunctural structures assumed to be conjunctural structures under externality production neutrality assumptions or component fixation. Specifically, it was pointed out that maximization leads to the breaking of the conjunctural system $K = L$, so that $K \neq L$ leads to sustainability gap creation of the form $|K - L| > 0$; and hence, development K depending solely on the maximization of L cannot be validly stated without structural falsifying itself. Only conjunctural systems can be structurally validated through maximization and optimization following this framework as in both cases conjunctural balance is maintained while all non-conjunctural systems can be structurally falsified through maximization and optimization. In summary, what these theorems change is the non-structural view of paradigm falsification a la Karl Popper and non-structural view of paradigm evolution a la Thomas Kuhn as now both falsification and vertical paradigm evolution are both structural. These theorems invalidate using maximization and optimization thinking that you can maximize and optimize component independent-based systems in ways consistent with system consistent optimality requirements. These theorems show that you cannot invalidate or falsify non-distorted conjunctural systems using maximization and optimization thinking as conjunctural equality remains balanced, at the point where the maximum is the minimum optimal balance, and at the point of optimal system consistency respectively. However, these theorems show that you can invalidate or falsify

distorted conjunctural systems. Therefore, these theorems open the door to look at critical development thinking from the embedded structural inconsistent point of view instead of the standard non-conjunctural view. And finally it was stated that when development models approach the point of full unsustainability they have two routes to follow, to evolve vertically and keep the core value of responsibility or evolve horizontally and lose its core value of responsibility.

On the other hands, the red socialism based development structural falsification theorem was built step by step based on the general structural falsification theorem. It indicates that both maximization and optimization procedures can be used to show that conjunctural development systems cannot be handled without creating sustainability gaps as the maximization process breaks the balance between conjunctural components such as $M = A$ and as the optimization process shows that separability in red socialism based development systems leads to system optimality inconsistencies, and hence it generate sustainability gap creation and expansion problems in the form of eco-economic sustainability gaps. It was shown that optimization can be used to structural falsify non-conjunctural development structures since they cannot be optimized in ways that respect the system consistency optimality requirements, including non-conjunctural red socialism structures assumed to be conjunctural structures under eco-economic externality production neutrality assumptions or eco-economic component fixation assumptions. Specifically, it was pointed out that maximization leads to the breaking of the conjunctural system $M = A$, so that $M \neq A$ leads to eco-economic sustainability gap creation of the form $|M - A| > 0$; and hence, red socialism based development M depending solely on the maximization of A cannot be validly stated without structural falsifying itself. Only conjunctural red socialism systems can be structurally validated through maximization and optimization as in both cases conjunctural balance is maintained while all non-conjunctural red socialism based development systems can be structurally falsified through maximization and optimization. In summary, what these red socialism based development theorems change is the non-structural view of red socialism based development paradigm falsification a la Karl Popper and the non-structural view of red socialism based paradigm evolution a la Thomas Kuhn as now both falsification and vertical paradigm evolution for distorted red socialism based development systems are both structural, These theorems invalidate using maximization and optimization thinking that you can maximize and optimize component independent based red socialism based development systems in ways consistent with system consistent optimality requirements. These theorems show that you cannot invalidate or falsify non-distorted conjunctural red socialism based development systems using maximization and optimization thinking as conjunctural equality remains balanced, at the point where the maximum red socialism development is the minimum optimal social balance, and at the point of optimal social development system consistency respectively. However, these theorems show that you can invalidate or falsify distorted conjunctural red socialism based development systems. Hence, these red socialism based development theorems open the door to look at red socialism based development thinking from the embedded structural inconsistent point of view instead of the standard non-conjunctural view. And finally, it was indicated that when red socialism based development models approach the point of full unsustainability they have two routes to follow, to evolve vertically and keep the core value of social responsibility or evolve horizontally and lose its core value of social responsibility, and in 1991 when red socialism fell, the option of evolving vertically was not available due to higher level red socialism paradigm shift knowledge gaps so they followed the

flip-back route and traded social responsibility for economic responsibility to take again the of the pure capitalism model. In general it can be said that the red socialism model does not fail or did not fail because it prioritizes the society, but because it attempts or attempted to do so within a structurally separable framework in a world that is inherently conjunctural in social, environmental, and economic terms.

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