

Toward a Pathology of Value Circulation: A Typed Lifecycle Diagnostic

Wanhong HUANG
huangwanhong@serendip.ngo

Abstract

One recurrent inferential risk in arguments about value circulation is movement from an observed stock, flow, blockage, or return to a judgment about the condition of a social system. This paper proposes a more restrained diagnostic architecture. Within this architecture, a complete circulation report requires *double localization*: first in a typed lifecycle of conditions, generation, value, recognition, transmission, allocation, feedback, and later conditions; then in an evaluative layer that separates functional pathology, capability effect, harm, injustice, exploitation, responsibility, and legal wrong. The proposal preserves a researcher-origin seven-type taxonomy while identifying the lifecycle graph, formalization, countermodels, and manuscript architecture as later reconstructions. Formally, a fixed-environment deletion of a component weakly contracts the supported path set and does so strictly whenever a supported path uses that component. Material loss at the declared target additionally requires the absence of an adequate substitute. A consequence for later conditions requires an identified return coordinate and a coordinate-specific monotone update relation. Two countermodels separate throughput from regenerative reach: arbitrarily high activity can coexist with absent return to later generative conditions, while zero current outward flow can preserve an enforceable future-use route. Four further constructed configurations involving adequate substitution, privacy- or ecology-preserving restriction, constitutive recognition, and cross-carrier burden show how the diagnostic can return negative, mixed, and unresolved results. The paper remains an analytic and formal proposal. Empirical prevalence, a scalar measure of circulation health, and a theory of injustice remain open research tasks. Its contribution is an analytic instrument and a set of stopping rules whose empirical usefulness, normative significance, and originality remain open to testing.

Keywords: value circulation; generative justice; lifecycle diagnosis; recognition; regenerative reach; typed temporal graph; functional pathology.

Discussion Paper Note

This paper is a preliminary discussion paper intended to share an evolving idea and invite further dialogue, criticism, revision, and independent development. Its definitions, distinctions, and formal constructions remain provisional. Circulation across scholarly and practical communities is part of the purpose of releasing the manuscript at this stage.

The author treats the viewpoints, concepts, and lines of reasoning presented here as contributions to a shared field of inquiry. Similar or related ideas may have appeared in other intellectual, cultural, and disciplinary traditions. The manuscript therefore states its known antecedents, separates researcher-origin material from later formal reconstruction, and leaves historical priority open pending a systematic originality review.

The arguments should be understood as provisional and historically situated. Readers are encouraged to question, test, revise, extend, reinterpret, or independently develop the ideas presented here. Where appropriate, acknowledgment of this paper as one point of encounter in the development of a related idea is appreciated. Such acknowledgment records an intellectual route; the ideas themselves remain available for criticism, revision, and independent development.

Responsible Use and Rights Reservation

This section separates requested scholarly conduct from the legal permissions stated on the following page. It records an ethical request for responsible use and then defines the narrower scope of retained legal rights.

The author encourages good-faith discussion, criticism, independent inquiry, and responsible use of the material in this work. Separately from the licence's terms, the author asks users to consider foreseeable harms when adapting or applying the proposed diagnostic. This non-binding ethical request leaves the licence's permissions and legally authorized uses unchanged.

The author retains the rights preserved under CC BY-NC 4.0 and may pursue remedies to which the author is legally entitled for breach of the licence or violation of the author's independently applicable rights. Reuse remains independent from authorial endorsement. Third-party rights require authorization from their respective holders where applicable. Copyright exceptions and limitations, including applicable forms of fair use or fair dealing, remain fully available.

Notices

This page consolidates the manuscript’s publication status, licence, development disclosure, research-programme relation, and suggested citation.

Status. This working draft records an evolving stage of the author’s position and is circulated for discussion. Definitions, section structure, formal statements, and numbering remain subject to revision. Empirical prevalence, moral evaluation, legal analysis, and policy design remain outside its present scope.

Licence. Except where otherwise indicated, copyright 2026 Wanhong Huang. This work is made available under the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0). Subject to its terms, the licence permits sharing and adaptation for noncommercial purposes with appropriate attribution, a link to the licence, an indication of changes, and attribution that preserves the licensor’s independence from the reuse. Reuse is governed solely by that licence; the responsible-use request on the preceding page remains separate from its terms. The licence deed and legal-code link are available at <https://creativecommons.org/licenses/by-nc/4.0/>. The licence governs in case of conflict with this summary. Third-party material remains subject to the rights held by its respective rights holders.

Statement on the use of language models. The exploratory discussions and preparation of this paper involved OpenAI’s Codex. Codex supported exploratory dialogue, formal reconstruction, source discovery followed by website verification, argumentative criticism, and drafting in L^AT_EX. The author selected the research questions, directed and approved the theoretical commitments and epistemic status of the claims, and bears sole responsibility for the manuscript, including its definitions, formal constructions, taxonomy, arguments, conclusions, and errors. Authorship credit remains with the human author. The access level and claim limit for every cited source are recorded in the accompanying literature audit.

Related research programme. This paper is project P015 and the first promoted paper in the research-stage *Generative Injustice* programme. Earlier P005–P014 manuscripts provide revisable companion analyses of generativity exploitation, propagation, identification, cycles, commons, expansion, dependency, AI mediation, recovery, and legal relations. They function as related, revisable project states; the present argument states its own premises.

Suggested citation. Huang, Wanhong. “Toward a Pathology of Value Circulation: A Typed Lifecycle Diagnostic.” Working discussion paper, 2026.

1 Introduction

This section establishes the paper’s role, objective, and inferential boundary. It first identifies the ambiguity in ordinary circulation language, then states the double-localization proposal, its provenance, and its limited contribution, and closes with the structure of the argument.

Circulation language compresses several questions that should remain separate. A statement that “value circulates” may refer to production, exchange, visibility, monetary payment, attribution, information, social recognition, material support, or the renewal of conditions for later activity. The carrier may be a person, group, organization, practice, ecosystem, or generation. The value may be monetary, material, epistemic, expressive, recognitional, ecological, or capability-related. The relevant horizon may cover one transaction or several generations. These declarations distinguish the incompatible readings that high and low circulation can otherwise support.

The paper addresses the following bounded question: how can a typed lifecycle model distinguish candidate failures in generation, recognition, transmission, allocation, feedback, and renewal while preserving alternative routes, criterion-consistent retention, plural value, and the separation between functional and normative judgment? The response is a double localization rule.

Definition 1.1 (Double localization). A proposed circulation diagnosis is *doubly localized* when it identifies (i) the typed lifecycle component or configuration in which a declared functional criterion is affected and (ii) the evaluative layer for which the available evidence supplies an independent warrant.

Lifecycle localization distinguishes a condition, activity, value relation, recognition mechanism, transmission or allocation relation, feedback path, stock–flow configuration, and topology. Evaluative localization distinguishes a functional anomaly from an effect on capability, harm, injustice, exploitation, responsibility, and a legal wrong. Each evaluative localization requires its own evidential warrant.

The genealogical basis is a seven-type taxonomy proposed by Wanhong Huang in a research-note discussion dated 23 August 2026: missing conditions or obstruction; recognition failure; contamination of generativity; exploitation of generativity; appropriation of produced value; interruption of a generative path; and absence of a circulation route. The examples of unavailable organizational deployment and difficult recognition of specialized research also belong to that researcher-origin proposal. The English title, typed lifecycle, notation, expanded labels, countermodels, audit method, and present architecture were developed through AI-assisted reconstruction under the author’s direction. The author retains responsibility for their use and revision. Bibliographic identities and the bounded literature roles reported in Section 2 were checked against linked journal, publisher, repository, or DOI pages on the same date. This disclosure records provenance; evidential support and originality require separate analyses.

The paper defends a deliberately limited position. A typed lifecycle can locate candidate failures more precisely than an untyped flow metaphor. Under fixed environmental assumptions, component deletion weakly contracts the supported path set. Material target loss requires a separately declared adequacy rule and the absence of an adequate substitute. Positive current throughput and positive regenerative reach remain logically independent in both directions. These results are elementary and conditional. Their contribution lies in inferential discipline; their mathematics is elementary. Empirical frequency, moral evaluation, legal rules, and policy recommendations remain outside the results.

Section 2 positions the proposal against verified antecedents and states its attribution boundary. Section 3 defines the analytical vocabulary and preserves the seven-type genealogy. Section 4 constructs the typed lifecycle in the order of symbols, assumptions, transitions, stocks, recognition,

paths, and observables. Section 5 derives the conditional results. Section 6 applies the diagnostic to six constructed configurations. Section 7 specifies the evaluative layers and stopping point. Section 8 records objections and defeat conditions, and Section 9 states the remaining research obligations and conservative conclusion.

2 Antecedent Positioning and Attribution Boundary

This section locates the proposal within a bounded set of verified literatures. Its objective is to identify antecedent concepts, constrain attribution, and clarify what each comparison can support. The discussion proceeds from the named generative-justice corpus to circulation, valuation, reproduction, commons, and model-transfer traditions.

Each bibliography entry includes a checked web location. Bibliographic identity was verified for every item; position claims were limited to the metadata, abstract, preview, repository text, or full text actually inspected. This procedure verifies bibliographic identity at declared access levels; interpretation and literature-wide originality require separate audits.

2.1 Generative-Justice Antecedent

This subsection establishes the nearest named antecedent and the associated priority boundary. It summarizes only the roles supported by the verified Eglash corpus and records the evidential status of an unlocated sentence from the source discussion.

Eglash’s account of generative justice develops a bottom-up response to alienation organized around the circulation of unalienated labor, ecological, and expressive value [2]. The later mathematical toolkit connects generative justice with value circulation, self-organization, and nonlinear analysis [3]; work on basins of attraction places attractor language within this program [4]. Recent work on computational reparations further emphasizes generator control and circular value flow while describing its reported outcomes as primarily micro- and meso-level [5]. These works supply antecedents for the name *generative justice*, plural circular value, generator control, and formal or nonlinear modeling. Priority for these concepts belongs to the cited antecedents.

The source discussion included a sentence attributed to Eglash concerning diminished circulation in hydrological and sociological systems. Its exact source and wording remain pending in the verified corpus, so the manuscript reserves it for future source work. The cited works independently establish circulation as a central feature of the generative-justice program. A close precedent for the seven-type taxonomy, double localization, or their combination remains an open literature question.

2.2 Circulation, Valuation, and Reproduction Traditions

This subsection supplies conceptual comparisons for the lifecycle stages. It uses the sources as constraints on the proposal and keeps their distinct objects and methods visible.

Marx’s analysis of the circulation process of capital and social reproduction already prevents the identification of production with a completed circuit [10]. The present proposal addresses a distinct object: heterogeneous social values across a typed lifecycle. Its borrowing is limited to the discipline of distinguishing stages and conditions. Fraser’s account of production as dependent on background conditions of social reproduction and care supplies a further warning against treating visible production as a self-sufficient process [7]. Generative renewal may include maintenance and reproduction, while the terms remain analytically distinct because generation can also diversify or transform what later activity makes possible.

Table 1: Verified antecedent roles and transfer limits

Literature cluster	Admissible role in this paper	Transfer limit
Generative justice	Bottom-up value circulation, unalienated plural value, generator control, and nonlinear generative-justice modeling	The present lifecycle taxonomy and formal diagnostic require separate attribution and an originality audit
Capital circulation and reproduction	Distinctions among production, circulation, realization, and reproduction	Transfer to a general conserved measure of social value requires a separate argument
Valuation and commodity trajectories	Institutionally organized evaluation and changing careers of valued objects	Regenerative return requires evidence beyond movement and valuation
Social reproduction	Dependence of production on background reproductive conditions	Reproduction and generativity remain distinguishable analytical objects
Commons governance	Institutional diversity in common-pool resource governance	Transfer beyond subtractable resources requires a new resource ontology
Circular economy	Evidence of heterogeneous circulation vocabularies and system boundaries	A social-value ontology and justice criterion require separate arguments
Model-transfer methodology	Purpose-relative mapping, idealization, and similarity discipline	Target-domain evidence requires explicit bridge assumptions

Appadurai’s account directs analysis toward commodity trajectories and the politics through which value judgments attach to exchange and circulation [1]. Lamont’s comparative sociology of valuation and evaluation emphasizes categorization, legitimation, heterarchies, and institutional evaluative practices [9]. Together these traditions constrain any simple picture in which independently given value merely awaits accurate recognition. Section 4.5 therefore preserves detection, constitution, and hybrid semantics.

Ostrom’s comparative work documents diverse institutional arrangements for governing common-pool resources [11]. P015 takes this as a prompt to examine how institutional arrangements shape routes and renewal. P015 formulates this transfer question as a separate development from Ostrom’s result. The focal resource problems also warn against transferring subtractability to knowledge, expression, or relational capability. Kirchherr, Reike, and Hekkert’s analysis of 114 circular-economy definitions demonstrates substantial heterogeneity in the meaning and scope of circularity and limited integration of social equity and future generations [8]. Table 1 records these admissible roles and limits. The table organizes the literature; originality evaluation remains a separate audit.

2.3 Model-Transfer Discipline

This subsection fixes the status of the lifecycle model and its relation to physical circulation. Its objective is to require explicit bridge assumptions for conservation, substance identity, and evidential transfer.

Weisberg’s target-directed account of modeling makes the purpose of a model, the features represented, the idealizations made, and the model–target similarity relation explicit [12]. That discipline is especially important here. Water has physical conservation and transformation properties under specified boundaries. Social value can be created, copied, contested, constituted, consumed, degraded, or destroyed. The formal construction below is therefore an open typed lifecycle. It contains sources, sinks, use, loss, and conversion. Hydrological resemblance functions as a purpose-relative analogy. Material-flow analysis itself requires explicit system boundaries, levels, and flow types [6]; that operational discipline transfers here. Its physical ontology and conservation relations remain confined to the source domain.

3 Analytical Vocabulary and Taxonomic Genealogy

This section defines the paper’s diagnostic objects and preserves their source genealogy. It begins with the scope required for any application, then defines generative circulation and candidate pathology, and finally maps the seven source types to lifecycle loci and counterconditions.

Definition 3.1 (Scope specification). A circulation inquiry has a scope specification

$$\Sigma = (\mathcal{A}, \mathcal{K}, \nu, \mathcal{M}, H; a, \mathcal{B}; \chi, \vartheta; \mathcal{I}, \mathcal{S}; \mathcal{U}), \quad (1)$$

where $\mathcal{A}$ contains declared carriers, $\mathcal{K}$ value kinds, ν an evaluative standpoint, $\mathcal{M}$ recognition mechanisms, H an evaluation horizon, a the focal arrangement, and $\mathcal{B}$ a nonempty family of feasible comparison arrangements. The symbol χ denotes a functional criterion, ϑ records who selected it and under which claimed authority, $\mathcal{I}$ declares admissible intervention semantics, $\mathcal{S}$ fixes the searched substitute-route boundary, and $\mathcal{U}$ supplies units or qualitative semantics for represented variables.

The scope specification makes the selector of the functional criterion visible. It also prevents a monetary flow, recognition count, ecological burden, and capability change from entering a single quantity merely because each has been called value.

Definition 3.2 (Generative circulation). Relative to Σ , *generative circulation* is the temporally extended movement and transformation through which generated value, recognition, material return, information, access, or another declared output helps sustain, restore, diversify, or enlarge future realization conditions or effective generative capabilities.

Production, movement, allocation, and renewal are distinct analytical roles. A movement counts as generative circulation only through an identified relation to later conditions under the declared horizon. This definition provides a research target while leaving the necessity and desirability of return open.

Definition 3.3 (Candidate circulation pathology). A *candidate circulation pathology* is a supported degradation, obstruction, capture, distortion, interruption, starvation, or closure affecting a typed lifecycle component or configuration in focal arrangement a relative to (b, χ, H) , for some $b \in \mathcal{B}$, after substitutes in $\mathcal{S}$, delays, criterion-consistent use or retention, and measurement uncertainty have been considered.

The qualifier *candidate* records the normative loading of the word *pathology*. A positive functional report means that a declared criterion is materially impaired under a declared comparison. Moral authority and wrongfulness require independent warrants.

Definition 3.4 (Functional report status). For a component or configuration z and $b \in \mathcal{B}$, let $\text{Stat}_\chi^\Sigma(z; b) \in \{+, -, \pm, ?\}$. The value $+$ records supported material impairment of χ in a relative to b under the declared mechanism, intervention, and substitute boundary. The value $-$ records supported absence of that impairment under the same declarations. The value $\pm$ preserves positive and negative component- or carrier-specific statuses while an aggregation rule remains undeveloped. The value $?$ records insufficient, incompatible, or unidentified premises. A profile is *baseline-sensitive* when supported statuses differ across two members of $\mathcal{B}$.

These statuses evaluate the declared candidate only. A negative status remains local to the declared criterion, and a positive status reaches the functional layer. Every further inference requires an independent bridge.

Table 2: Researcher-origin taxonomy and diagnostic translation

Type	Source category	Lifecycle locus	Minimum diagnostic content	Central countercondition
I	Production blockage through missing conditions or obstruction	Conditions and condition-activity transitions	Required resource, relation, permission, or active blocking mechanism under a feasible comparison	Another viable deployment route exists, or the condition is irrelevant
II	Recognition blockage	Value-recognition relation	Value standpoint, recognition semantics, evidence channel, translation, and horizon	Alternative evaluative specification or constitutive difference
III	Generativity contamination	Activity, transition rule, incentive, or feedback	Mechanism changing direction, objective, or process integrity	Change matches the declared process objective or focal specification
IV	Generativity exploitation	Capability across cycles	Capability effect plus the separate standing, comparison, and benefit-through test	Depletion alone; beneficiary-through or affected capability remains unsupported
V	Produced-value exploitation	Allocation, attribution, or appropriation	Contribution, entitlement, procedure, transfer, and beneficiary	Declared gift, commons, contractual, or allocation rule matches the observed transfer; its validity remains a later-layer question
VI	Generative-process interruption	Any essential temporal path	Removed viable route, timing, substitutes, materiality, and target relevance	Delay or rerouting preserves the relevant target
VII	Circulation-route absence	Transmission, feedback, renewal, or topology	Route, capacity, compatibility, access, and future-condition linkage	Retention, privacy, maintenance, incubation, or an ecological constraint preserves viability

Table 2 preserves the source taxonomy through translation and extension. Type I contains both condition deficiency and active obstruction because the source proposal placed them together; applications should separate them because their mechanisms and responses differ. Types IV and V retain the researcher’s wording in the genealogy. In application, the functional stage should first report capability depletion or output appropriation. The stronger term *exploitation* is reserved for a separate diagnostic that includes participant standing, an admissible comparison, affected capability, and a benefit-through relation.

Those four exploitation conditions are imported from the author’s unpublished companion project P005, an active and revisable theoretical draft whose empirical validation remains pending. They delimit the exploitation coordinate; P005 retains responsibility for their derivation and sufficiency.

The seven types overlap. An attribution rule can produce recognition failure, appropriation, feedback starvation, and later capability contraction in one case. Overlap is informative only when each label identifies an independently specified mechanism. Exhaustiveness and mutual exclusion remain open classification questions.

Table 3: Principal symbols and application-level semantic obligations

Symbol family	Formal role	Required declaration
Σ	Scope specification	Carriers, value kinds, standpoint, mechanisms, horizon, focal and comparison arrangements, criterion and selector, interventions, substitutes, and semantics
$C, G, V, \widehat{V}$	Conditions, generative activity, value relation, and assessment	Carrier association, temporal index, value ontology, and observation status
$\mathcal{L}^\Sigma(x)$ and component maps	Typed temporal multigraph, components, times, types, and carrier association	Node and edge semantics, temporal order, and included system boundary
s, f, q	Typed stocks, flows, generation, use, loss, and conversion	Units, source and sink boundary, and cross-kind conversion rule
$\mathcal{O}_{m,\nu}, \Omega_{m,\nu}$	Detection and constitution mechanisms	Selected recognition branch and the evidence or institutions on which it depends
$\mathcal{R}_H^\Sigma, w_\Sigma, A_\chi^\Sigma$	Supported viable paths, three-valued viability, and target adequacy	Compatibility, capacity, timing, probability, feasibility, adequacy, and unknown-status rule
$\mathcal{R}^{\text{Reg}}, \text{Thru}_{J,k}^\Sigma$	Regenerative reach and typed current throughput	Target condition, commensurable counted edges, interval, and units
$\Pi_{z,b}^\Sigma$	Layered diagnostic profile	Independent warrant and status vocabulary for every evaluative coordinate

4 Typed Lifecycle Construction

This section constructs the formal instrument in a continuous order. It first declares symbols and assumptions, then defines the temporal multigraph, an optional typed stock–flow module, alternative recognition semantics, viable paths, regenerative reach, and throughput. Each quantitative object is conditional on operational semantics supplied by an application.

Table 3 groups the principal symbols by formal role. The final column records the declaration that prevents a symbol from acquiring meaning through notation alone.

4.1 Symbols and Carrier Association

This subsection distinguishes carriers from graph components and registers the objects used by later results. The distinction prevents a person, institution, event, lifecycle role, and value stock from becoming interchangeable graph nodes.

Let $i, j \in \mathcal{A}$ denote typed carriers, $k, \ell \in \mathcal{K}$ value kinds, $m \in \mathcal{M}$ a recognition mechanism, and $t \in [0, H]$ time. Let $C_{i,t}$ be a possibly vector-valued realization condition, $G_{i,t}$ a typed generative activity, $V_{i,k,t}^{(\nu)}$ a value relation under standpoint ν , and $\widehat{V}_{i,k,t}^{(m,\nu)}$ an assessment under mechanism m . Where units exist, $s_{i,k,t}$ denotes a stock and $f_{ij,k,t} \geq 0$ a directed flow. A graph node represents a typed state or event; a carrier-association map identifies the carriers implicated in it.

4.2 Structural Assumptions

This subsection states the assumptions that make the construction interpretable and the later derivations valid. The assumptions are application obligations; target-case support remains an empirical obligation.

Assumption 4.1 (Declared semantics). The carriers, value kinds, standpoint, recognition semantics, horizon, focal arrangement, comparison family, criterion and selector, intervention semantics, substitute boundary, and units in Σ are declared before a diagnosis. Quantitative variables share units only when an operational conversion has been specified.

Assumption 4.2 (Typed temporal roles). Lifecycle stages are analytical roles in a temporal multigraph. They may branch, merge, recur, overlap, or remain absent. The displayed lifecycle treats a linear sequence as one possible configuration.

Assumption 4.3 (Predeclared viability). A path's compatibility, capacity, timing, probability, and feasibility rules are declared independently of the desired diagnostic result. Unknown viability is reported as unknown.

Assumption 4.4 (Coherent comparison). Every $b \in \mathcal{B}$ is feasible over the same carriers, value kinds, and horizon as focal arrangement a . An intervention identifies a rule or mechanism independently from the evaluated outcome.

Assumption 4.5 (Intervention and substitute declaration). Deletion, distortion, capture, capacity change, and adaptive rerouting are distinct interventions. Materially available substitute routes within declared boundary $\mathcal{S}$ are included in the graph; an incomplete substitute search produces an unresolved report.

Assumption 4.6 (Later-condition linkage). Any regenerative claim identifies a return or feedback coordinate, its target condition coordinate, and the update relation connecting them. A later-condition conclusion requires an explicit link to its target coordinate.

Assumption 4.7 (Evaluative independence). Functional pathology, capability effect, harm, injustice, exploitation, responsibility, and legal wrong receive separate warrants. A positive value in one coordinate reaches another coordinate only through an explicit bridge.

4.3 Temporal Lifecycle Graph

This subsection defines the structural object used for lifecycle localization. It presents the familiar chain as a role register and assigns formal work to the temporal multigraph. The chain remains a compact role register.

For every represented arrangement x , let

$$\mathcal{L}^\Sigma(x) = (N_x, E_x, \tau_x, \kappa_{N,x}, \kappa_{E,x}, \alpha_x) \quad (2)$$

be a directed temporal multigraph. The maps $\kappa_{N,x}$ and $\kappa_{E,x}$ type nodes and edges, τ_x assigns times or intervals, and $\alpha_x : N_x \cup E_x \rightarrow 2^{\mathcal{A}}$ associates components with carriers. Node and edge roles can be drawn schematically as

$$C_t \longrightarrow G_t \longrightarrow V_t \longrightarrow R_t \longrightarrow T_t \longrightarrow D_t \longrightarrow F_t \longrightarrow C_{t+1}, \quad (3)$$

where the roles are conditions, generation, value, recognition, transmission, distribution or return, feedback, and later conditions. Recognition may affect generation before distribution is complete;

several value kinds may branch from one activity; and feedback may alter any later transition. Equation (3) therefore names roles. Temporal linearity and cycle completion remain additional hypotheses.

For a quantitative application, an edge may have a transition kernel $K_{e,x}(y' \mid y, h_t, u_t)$ only after its state spaces and probability semantics are supplied. The general construction uses a typed transition relation $y \rightsquigarrow_{e,x} y'$, allowing deterministic, institutional, constitutive, and qualitative edges. A stochastic kernel remains optional.

4.4 Typed Stock–Flow Module

This subsection provides an optional accounting module for value kinds with meaningful units. Its objective is to represent creation, movement, use, loss, and conversion while preserving cross-kind typing and an open-system boundary.

For such a value kind, define

$$\begin{aligned} s_{i,k,t+1} = & s_{i,k,t} + q_{i,k,t}^{\text{gen}} + \sum_j f_{ji,k,t} - \sum_j f_{ij,k,t} - q_{i,k,t}^{\text{use}} - q_{i,k,t}^{\text{loss}} \\ & + \sum_{\ell \neq k} q_{i,k,t}^{\ell \rightarrow k} - \sum_{\ell \neq k} q_{i,k,t}^{k \rightarrow \ell}. \end{aligned} \quad (4)$$

Every term in Equation (4) is expressed in the units of kind k . The conversion output $q_{i,k,t}^{\ell \rightarrow k}$ and the corresponding loss from kind ℓ require separate measurement. A conservation law across carriers or kinds requires independent assumptions.

Later realization conditions follow a separate, potentially vector-valued mapping

$$C_{i,t+1} = \Psi_i(C_{i,t}, r_{i,t}, \hat{V}_{i,t}, F_{i,t}, \delta_{i,t}, X_{i,t}), \quad (5)$$

where r is a declared return, F feedback, δ depletion or burden, and X external conditions. The update map determines the sign of every coordinate of $C_{i,t+1}$. Crowding, dependency, contamination, and external burden remain possible.

4.5 Recognition Semantics

This subsection preserves the unresolved relation between value and recognition. It presents detection, constitution, and hybrid branches so that disagreement between evaluators remains distinct from measurement error.

Under a detection interpretation,

$$\hat{V}_{i,k,t}^{(m,\nu)} \in \mathcal{O}_{m,\nu}(V_{i,k,t}^{(\nu)}, Z_{i,t}, R_t^{\text{soc}}, I_t), \quad (6)$$

where Z is available evidence, R^{soc} a recognition network, and I an institutional setting. The set-valued observation relation $\mathcal{O}_{m,\nu}$ returns admissible assessments under the declared evidence and mechanism; a probabilistic application must additionally supply measurable state spaces and a probability kernel. This branch assumes that $V^{(\nu)}$ is meaningful independently of m .

Under a constitution interpretation,

$$V_{i,k,t}^{(m,\nu)} = \Omega_{m,\nu}(Z_{i,t}, R_t^{\text{soc}}, I_t), \quad (7)$$

so a difference between mechanisms can constitute different social or institutional values. A hybrid model may allow an independently assessed dimension to enter $\Omega_{m,\nu}$ while recognition changes another dimension. The branch must be selected by value kind and defended; the notation leaves the underlying value theory as a separate commitment.

4.6 Viable Paths, Regenerative Reach, and Throughput

This subsection defines the structural observables used in the results. It separates practical reach from imaginable paths and separates current traffic from a route to later realization conditions.

For temporally ordered nodes s, v in arrangement x , let $p = (n_0, e_1, n_1, \dots, e_r, n_r)$ be a typed directed path in $\mathcal{L}^\Sigma(x)$ with $n_0 = s$, $n_r = v$, and times within H . Let $w_\Sigma(p; x) \in \{1, 0, ?\}$ report supported viability, supported failure, or unresolved viability. Define

$$\mathcal{R}_H^\Sigma(s, v; x) = \{p : p \text{ is typed and temporally admissible in } x, w_\Sigma(p; x) = 1\}. \quad (8)$$

The uncertainty report retains unknown paths; the supported set in Equation (8) contains paths with supported viability.

For carrier i and a condition coordinate c , regenerative reach is the supported set

$$\mathcal{R}_{i,c,H}^{\text{Reg}}(x) = \bigcup_{u \in N_x^{\text{out}}} \mathcal{R}_H^\Sigma(u, C_{i,c,t+H}^x; x), \quad (9)$$

where N_x^{out} contains the declared output, return, or feedback nodes. A path belongs to this set only when its target relation to the condition coordinate has been specified.

Path-set loss and target-level material loss require separate objects. Define

$$P_\chi^\Sigma(s, v; x) = \Phi_\chi^\Sigma(\mathcal{R}_H^\Sigma(s, v; x)) \in \mathcal{D}_\chi, \quad (10)$$

where $\mathcal{D}_\chi$ is an application-declared performance space. Let $\mathcal{Q}_\chi \subseteq \mathcal{D}_\chi$ be the declared adequacy region. Define

$$A_\chi^\Sigma(s, v; x) = \mathbf{1}[P_\chi^\Sigma(s, v; x) \in \mathcal{Q}_\chi]. \quad (11)$$

A change from arrangement x to y produces *material target loss* only when $A_\chi^\Sigma(s, v; x) = 1$ and $A_\chi^\Sigma(s, v; y) = 0$. The functional Φ_χ^Σ can incorporate capacity, timing, destination, quality, and carrier coverage; the application supplies all of those semantics.

For a declared set $J \subseteq E_x$ whose edges carry one commensurable value kind k in a common unit over interval $[t_0, t_1]$, define current throughput as

$$\text{Thru}_{J,k}^\Sigma(x; [t_0, t_1]) = \frac{1}{t_1 - t_0} \sum_{e \in J} \int_{t_0}^{t_1} f_{e,k}^x(t) dt. \quad (12)$$

The choice of J , k , units, arrangement, and interval is part of the application record. Edges with unlike units receive a vector report or remain separate. Typed throughput is one observable; system ordering requires an additional rule.

5 Localization and Conditional Results

This section derives the formal consequences in dependency order. It begins with a fixed-environment component intervention, adds a separate bridge to later conditions, and then constructs high- and low-flow countermodels. Table 4 records the mathematical status and inferential limit of each result.

Table 4: Formal result status and inferential boundary

Result	Mathematical status	Required dependence	Inferential boundary
Path-set contraction	Elementary conditional graph result	Fixed environment, predeclared viability, coherent deletion	Target loss additionally requires a declared adequacy failure
Weak condition non-increase	Conditional model consequence	Identified return, fixed co-arguments, coordinate order, local weak monotonicity	Strict change, non-monotone effects, burden, and conflict remain open
High-throughput configuration	Logical countermodel	Declared counted edges and absent regenerative path	Prevalence remains an empirical question
Protected-reserve configuration	Temporal countermodel	Enforceable future-use route and declared horizon	Retention evaluation remains case-specific
Layer separation	Reporting rule	Independent warrants for each coordinate	Normative inference requires an independent warrant

5.1 Fixed-Environment Component Intervention

This subsection isolates the fixed-environment setting analyzed here. It defines the intervention, derives weak and strict path-set contraction, and records adaptation as a different model.

For $e \in E_a$, let the pure deletion intervention form arrangement $a^{-e} = I_e^{\text{del}}(a)$, with $\mathcal{L}^\Sigma(a^{-e}) = (N_a, E_a \setminus \{e\}, \tau_a, \kappa_{N,a}, \kappa_{E,a}, \alpha_a)$. The intervention is *fixed-environment*: all remaining nodes, edges, timings, capacities, and viability assignments stay fixed. Congestion relief, innovation, institutional response, and strategic rerouting define another intervention and must be analyzed by recomputing the graph.

Proposition 5.1 (Fixed-environment path-set contraction). *Under Assumptions 4.1–4.5 and a fixed-environment deletion,*

$$\mathcal{R}_H^\Sigma(s, v; a^{-e}) \subseteq \mathcal{R}_H^\Sigma(s, v; a). \quad (13)$$

The inclusion is strict exactly when at least one supported viable s – v path uses e .

Proof. Every path in $\mathcal{L}^\Sigma(a^{-e})$ uses edges in $E_a \setminus \{e\}$, hence is also a path in $\mathcal{L}^\Sigma(a)$. Fixed-environment viability gives it the same status in both graphs, which proves Equation (13). If a supported viable path uses e , that path is absent after deletion and the inclusion is strict. Conversely, when every supported viable path avoids e , every element of the original viable-path set remains, so the sets are equal. $\square$

Proposition 5.1 is elementary. Its diagnostic value lies in the assumptions it forces into view. A blocked edge is insufficient for material target failure when an adequate substitute remains; an observed route outside the horizon is insufficient when timing matters; and an unobserved alternative leaves the result unresolved. Strict path loss and material importance remain distinct when the lost routes are redundant in destination, capacity, or quality. Formally, material target loss requires $A_\chi^\Sigma(s, v; a) = 1$ and $A_\chi^\Sigma(s, v; a^{-e}) = 0$. Both adequacy equalities require the application-level performance functional and adequacy region.

5.2 Later-Condition Bridge

This subsection states the additional premises required to move from path-set contraction to a condition effect. It uses a coordinate-specific order and local monotonicity; scalar ordering of whole systems remains outside the result.

Let $r_{i,c}^{a-e}$ and $r_{i,c}^a$ be a declared return coordinate under the deletion and focal arrangements. Let $\preceq_c$ order only condition coordinate c .

Proposition 5.2 (Conditional weak condition non-increase). *Under Assumption 4.6, suppose $r_{i,c}^{a-e} < r_{i,c}^a$, every other argument of Ψ_i is held fixed across the two arrangements, and Ψ_i is weakly increasing in that return over the relevant range. Then*

$$\Psi_i(C_i, r_{i,c}^{a-e}, \hat{V}_i, F_i, \delta_i, X_i) \preceq_c \Psi_i(C_i, r_{i,c}^a, \hat{V}_i, F_i, \delta_i, X_i). \quad (14)$$

Proof. The first premise orders the identified return coordinate, and the second fixes the remaining arguments of the update map. Local weak monotonicity in $r_{i,c}$ then yields Equation (14) by the definition of monotonicity. $\square$

The lower-return premise remains application-specific. An application connecting Proposition 5.1 to this result must separately identify how the deleted paths change $r_{i,c}$. Threshold, crowding, contamination, dependency, and burden effects that reverse the local order define counterconditions. Every additional condition coordinate and carrier requires separate analysis. These are substantive features, and Configuration 6.4 exhibits one.

5.3 Throughput and Regenerative Reach

This subsection separates current traffic from future-condition reach. It uses two constructed systems to show that the observable in Equation (12) is insufficient to identify the set in Equation (9).

Constructed Configuration 5.3 (Active loop with empty regenerative reach). In focal arrangement a , let $J \subseteq E_a$ contain a closed loop of edges that carry one commensurable value kind k , with constant flow $M > 0$ on every counted edge. Let every path from the loop's output or feedback nodes to $C_{i,c,t+H}^a$ be absent. Then

$$\text{Thru}_{J,k}^\Sigma(a; [t_0, t_1]) = |J|M, \quad \mathcal{R}_{i,c,H}^{\text{Reg}}(a) = \emptyset. \quad (15)$$

Taking M arbitrarily large increases throughput while regenerative reach remains empty.

Constructed Configuration 5.4 (Temporally protected reserve). At time t , let a retained stock have zero outward flow on the counted edge set J for declared kind k . Let a binding governance rule create a future-use edge at $t + \Delta \leq t + H$ from the reserve to a required condition node, and let that edge complete a viable route to $C_{i,c,t+H}^a$. Then

$$\text{Thru}_{J,k}^\Sigma(a; [t, t + \epsilon]) = 0, \quad \mathcal{R}_{i,c,H}^{\text{Reg}}(a) \neq \emptyset. \quad (16)$$

Current low flow coexists with supported future regenerative reach.

Proposition 5.5 (Throughput–reach non-implications). *Within the typed lifecycle construction,*

$$\text{Thru}_{J,k}^\Sigma(a; [t_0, t_1]) > 0 \not\Rightarrow \mathcal{R}_{i,c,H}^{\text{Reg}}(a) \neq \emptyset, \quad \mathcal{R}_{i,c,H}^{\text{Reg}}(a) \neq \emptyset \not\Rightarrow \text{Thru}_{J,k}^\Sigma(a; [t_0, t_1]) > 0. \quad (17)$$

Proof. Configuration 5.3 supplies arbitrarily high throughput with empty regenerative reach. Configuration 5.4 supplies zero current throughput with nonempty future regenerative reach. The two configurations defeat the implications in opposite directions. $\square$

The conclusion concerns logical implication within the construction. General harm and benefit classifications require evidence about duration, control, access, use, loss, substitutes, and affected carriers.

6 Diagnostic Configurations and Audit Method

This section tests structural implications and the reporting behavior of the diagnostic. It first presents a reproducible audit sequence and then examines the two formal countermodels and four additional constructed configurations. The configurations fix only the fields needed for each logical point; they are partial structural templates. Empirical cases and completed double-localized audits require the remaining declarations.

6.1 Lifecycle Audit Sequence

This subsection turns double localization into a reusable sequence. Its objective is to expose the declarations and counterconditions that must precede a report.

The audit proceeds as follows:

1. declare Σ , including carrier, value kind, standpoint, recognition semantics, horizon, focal arrangement, comparison family, criterion and selector, intervention, substitute boundary, and units;
2. construct the typed temporal lifecycle and associate its components with carriers;
3. locate the proposed anomaly at a node, edge, path, loop, stock–flow configuration, or topology;
4. specify the intervention or mechanism and test substitutes, delays, buffers, criterion-consistent use, retention, maintenance, privacy, and measurement error;
5. report affected capability, continuity, autonomy, recognition, distribution, plurality, and ecological burden while preserving coordinate-specific outputs;
6. complete each evaluative coordinate separately and preserve negative, mixed, baseline-sensitive, or unresolved statuses.

Table 5 summarizes the partial outputs and the declarations still required. A row records a structural template; occurrence in a particular institution remains an empirical question.

6.2 Proxy and Substitute Configurations

This subsection applies the audit to throughput, retention, and route redundancy. Its objective is to demonstrate that prominent indicators can support opposite diagnoses after timing and alternatives are represented.

Configuration 5.3 establishes empty regenerative reach alongside positive typed throughput. It therefore blocks an inference from current traffic to regeneration. Its full functional status remains unresolved until a comparison, adequacy rule, and materiality threshold are supplied. Harm and

Table 5: Constructed structural templates and remaining audit declarations

Configuration	Lifecycle localization	Structural consequence	Required completion
Active loop	Renewal topology	Positive typed throughput with empty regenerative reach	Comparison, materiality, harm, and injustice unresolved
Protected reserve	Stock-flow timing	Zero current outward flow with a viable future route	Adequacy, control, present claims, and legitimacy remain open
Adequate substitute	Path redundancy	Negative for material target loss	Distribution and switching burden remain open
Protected restriction	Transmission and ecological or privacy constraint	Mixed across output and protected-condition coordinates	Aggregate verdict withheld
Constitutive recognition	Recognition mechanism	Unresolved as detection failure	Value theory and institutional legitimacy required
Cross-carrier burden	Return and external condition	Positive for one carrier, negative for another	Harm, standing, distribution, and injustice unresolved

injustice remain unresolved because standing, protected-interest, and wrongfulness premises remain undeclared.

Configuration 5.4 defeats a low-flow proxy under the declared horizon because the future-use edge preserves a target route. A full functional report additionally depends on the rule’s enforceability, the reserve’s adequacy, and present claims that may defeat the retention arrangement. The structural template leaves the evaluation of saving or hoarding open.

Constructed Configuration 6.1 (Blocked component with adequate substitution). Let two edge-disjoint viable paths p_1, p_2 in arrangement a connect source s with target v , and let both satisfy the same timing, capacity, compatibility, and target requirements. Delete an edge used only by p_1 to form a^{-e} . The path set strictly contracts, yet p_2 preserves the declared target at the required capacity, so $A_\chi^\Sigma(s, v; a) = A_\chi^\Sigma(s, v; a^{-e}) = 1$. The report is negative for material target loss even though Proposition 5.1 records strict path-set contraction.

Configuration 6.1 separates structural loss from material functional loss. A real application would still examine switching cost, congestion, distribution, and whether the substitute serves the same carriers. Those questions show why path counting alone is an inadequate metric.

6.3 Protected-Condition and Recognition Configurations

This subsection tests two cases in which the apparent failure depends on the criterion or ontology chosen. It preserves mixed and unresolved results and maintains criterion and ontology plurality.

Constructed Configuration 6.2 (Privacy- or ecology-preserving restriction). Let a rule remove a transmission edge that would increase an output coordinate o , with $\chi = (\chi_o, \chi_c)$ a two-coordinate criterion whose aggregation rule remains unspecified. The same edge would disclose protected information or reduce an ecological condition c below a declared viability threshold. Relative to χ_o , reach contracts; relative to χ_c , the restriction preserves the required condition. The coordinate-specific structural report is mixed, and aggregation remains unspecified.

The normative status of privacy or ecological restriction remains a separate question. The configuration shows that a criterion limited to outward movement hides a protected dimension. Standing, proportionality, alternatives, and burden distribution belong to the later evaluative audit.

Constructed Configuration 6.3 (Constitutive recognition). Let mechanisms m_1 and m_2 organize different institutional forms of a social value through Equation (7). A candidate artifact receives a position under m_2 and none under m_1 . Because the value kind is partly constituted by each mechanism, the divergence between $V^{(m_2, \nu)}$ and $V^{(m_1, \nu)}$ remains distinct from a measurement-error term until an independently defended standard supplies the relevant relation. A recognition- failure report remains unresolved until an independently defended standard specifies what m_1 failed to recognize or wrongfully prevented.

Configuration 6.3 blocks a common inference from nonrecognition to detection failure. It also blocks the opposite inference that existing recognition practices are self-validating. A hybrid account can identify dimensions for which evidence supports detection and dimensions whose social existence depends on institutional recognition.

6.4 Plural-Carrier Configuration

This subsection tests a return that satisfies the formal regeneration relation for one carrier while burdening another. Its objective is to preserve distribution and ecological or intergenerational conflict inside the report.

Constructed Configuration 6.4 (Regenerative return with cross-carrier burden). For some $b \in \mathcal{B}$, let focal arrangement a contain a return r_A that increases carrier A 's condition coordinate under Equation (5). Let production of that return impose an external burden δ_B that lowers carrier B 's nonfungible condition coordinate. Then

$$C_{A, c_A, t+1}^a \succ_{c_A} C_{A, c_A, t+1}^b, \quad C_{B, c_B, t+1}^a \prec_{c_B} C_{B, c_B, t+1}^b. \quad (18)$$

The circulation is regenerative for A in coordinate d and degenerative for B in coordinate e . Aggregate ranking requires a separate rule.

The configuration prevents “regenerative” from becoming a global honorific. An evaluative conclusion requires an account of both carriers' standing, distribution, nonfungibility, ecological or intergenerational limits, procedure, and available alternatives. The functional profile can preserve the conflict while leaving its resolution to an independent evaluative argument.

7 Evaluative Layers and Inferential Stopping Point

This section completes double localization by specifying the evaluative report. Its objective is to maintain separation between functional results and moral, economic, responsibility, or legal conclusions.

For component or configuration z , define the report

$$\Pi_{z,b}^\Sigma = \langle \widehat{\text{Stat}}_\chi^\Sigma(z; b), \widehat{\text{Capability}}, \widehat{\text{Effect}}, \widehat{\text{Harm}}, \widehat{\text{Injustice}}, \widehat{\text{GEX}}, \widehat{\text{Responsibility}}, \widehat{\text{LegalWrong}} \rangle_{z,b}, \quad (19)$$

where $b \in \mathcal{B}$ and each coordinate takes the fixed-comparison statuses positive, negative, mixed, or unresolved defined in Definition 3.4. Baseline sensitivity is a property of the family $\{\Pi_{z,b}^\Sigma : b \in \mathcal{B}\}$ when a coordinate's supported status changes with b . Table 6 states the minimum kind of warrant required at each layer. The layers form an audit sequence; scalar ordering remains outside the construction.

Claim 7.1 (Diagnostic stopping point). A lifecycle localization supports only the functional coordinate for which its criterion and evidence were specified. Every additional evaluative coordinate remains open until its independent warrant is supplied.

Table 6: Evaluative layers and independent warrant requirements

Evaluative layer	Required warrant	Inferential boundary
Functional pathology	Typed mechanism, criterion, comparison, horizon, substitutes, and uncertainty	Harm requires a further warrant beyond functional loss
Capability effect	Carrier, affected repertoire or condition, materiality, and comparison	Wrongfulness requires a further warrant beyond capability contraction
Harm	Defended interest or well-being relation, causation or constitution, and materiality	Injustice and exploitation require further warrants beyond harm
Injustice	Standing, procedure, distribution, domination, recognition, or another defended principle	Beneficiary-through remains an independent exploitation requirement
Exploitation	Participant standing, admissible comparison, affected capability, and causal or constitutive benefit-through	Responsibility requires an independent allocation principle
Responsibility	Agency or contribution, knowledge where relevant, capacity, role, avoidability, and forward- or backward-looking principle	Legal duty requires jurisdiction-specific authority
Legal wrong	Jurisdiction, authority, protected interest, duty, causation, proof, defenses, and remedy	Legal status requires a jurisdiction-specific legal analysis

Claim 7.1 functions as a reporting rule. Substantive relations among harm, injustice, and exploitation require separate arguments. In a developed case, the same evidence may support several layers. The rule requires the inferential bridge to be stated. An effective circulation with an unjust procedure illustrates injustice alongside functional adequacy. A route contracted by a natural event or justified protective rule illustrates functional pathology alongside justified conduct.

The exploitation coordinate receives special protection from terminological drift. The source taxonomy uses exploitation for Types IV and V, while this paper’s functional model can establish only depletion, contraction, appropriation, or capture. A positive exploitation report additionally requires participant standing, an independently admitted comparison, material effect on generative capability, and a causal or constitutive benefit-through witness. Intention, consent, domination, wrongfulness, responsibility, and remedy remain further variables. Their full diagnostics remain future research tasks.

8 Objections and Defeat Conditions

This section subjects the proposal to ontological, formal, empirical, and normative objections. Its objective is to identify the conditions under which a component should be revised, narrowed, or abandoned. The responses emphasize discrimination and disclosure.

8.1 Value Ontology and Taxonomic Discrimination

This subsection examines value reification, recognition, and the possibility that the taxonomy merely collects familiar concepts. These objections remain substantive research obligations.

The first objection is that a lifecycle graph turns contested value into a thing that moves. The stock–flow module answers only part of the objection because it is optional and typed. Material, monetary, and some informational quantities may admit units; recognition, expressive importance, and capability may require relations, orders, or qualitative states. Equations (6) and (7) preserve

the further possibility that recognition helps constitute the value at issue. When an application lacks usable semantics, the value coordinate should remain qualitative or the application should suspend the model.

The second objection is taxonomic collage. Gatekeeping, nonrecognition, appropriation, reproduction, accumulation, and commons governance have extensive literatures. The paper treats them as established research domains. Its proposed gain is local: a shared lifecycle can distinguish their loci, show where mechanisms overlap, and enforce a common stopping rule. When the lifecycle duplicates an antecedent framework’s discrimination in a target domain, the antecedent framework should replace the redundant label.

The third objection concerns proliferation. Because tags are non-exclusive, any unfavorable case could receive many labels. The audit answers by requiring mechanism-specific evidence and counterconditions for every tag. A second label is informative only when it identifies a distinct intervention, evidence requirement, or consequence. Otherwise it is duplicate description.

8.2 Formal Scope and Empirical Identification

This subsection addresses linearization, elementary mathematics, adaptive rerouting, and unobserved paths. Its objective is to separate what the formalism proves from what an empirical application must identify.

Equation (3) invites a linear reading. The operative object in Equation (2) is a temporal multigraph precisely because recognition, generation, distribution, and feedback can be simultaneous, recursive, delayed, or constitutive. A case requiring collective production, joint transitions, or higher-order relations may require a hypergraph. This paper confines its results to the multigraph construction; hyperpath semantics remain an open extension.

The contraction result is mathematically elementary. Its content is the fixed-environment intervention and the distinction among edge loss, strict path loss, material target loss, and later-condition effect. Presenting set deletion as a social theorem would be an overstatement. The result loses application whenever the intervention changes other edges or viability assignments. Adaptive rerouting, congestion relief, innovation, and strategic response require a new graph and a comparative dynamic analysis.

Empirical identification supplies the strongest objection. Transition mechanisms, alternative paths, feasible comparisons, recognition semantics, and condition updates may remain unobserved. The paper’s response is three-valued viability, explicit unknown status, and sensitivity across plausible specifications. This provides a reporting discipline; an identification solution remains open. A method that returns unresolved results frequently may be honest and still prove too weak for practical use; comparative testing must decide that issue.

8.3 Criterion Authority and Plural Carriers

This subsection examines the normative loading of pathology, conflicts among carriers, and circulation’s physical imagery. Its objective is to preserve the proposal as a functional instrument while disclosing the evaluative choices inside that instrument.

Every functional criterion selects something to preserve or enable. Calling its failure a pathology can give that selection an undeserved medical authority. The scope specification therefore discloses the criterion, standpoint, comparison, and carrier, while Claim 7.1 blocks further promotion. A stronger response would require a theory of which functional criteria deserve public or moral authority; that theory remains an open task.

Carrier conflict prevents aggregate generativity from serving as a default maximand. Configuration 6.4 shows that one carrier’s regeneration can accompany another’s nonfungible loss. A partial profile retains that conflict. Any aggregation requires an independently defended account of standing, distribution, ecological limits, and intergenerational choice.

Hydrological imagery creates a final risk. A physical cycle concerns specified substances and conservation conditions; the present target contains sources, sinks, copying, use, conversion, loss, and constitutive recognition. Following the model-transfer discipline in Section 2.3, resemblance is purpose-relative. The lifecycle model survives only if its typed mappings increase target-domain discrimination. Evidence for the social mappings must come from the target domain.

9 Research Obligations and Conservative Conclusion

This section records the work required before the framework can support empirical, normative, or originality claims. It first states six research obligations and then closes with the analytic contribution that survives while those obligations remain open.

Research Obligation 9.1 (Generative-justice corpus audit). Complete a full-text, source-by-source comparison with the Eglash corpus. Record terminology, formal structure, and differences before making an originality claim. Admission of the unlocated circulation sentence requires verification of its exact source, wording, and context.

Research Obligation 9.2 (Value and recognition matrix). Compare realist, constructivist, relational, pluralist, and institutional value accounts, together with detection, constitution, and hybrid recognition models. Specify which value kinds admit each branch and which failures each branch can identify.

Research Obligation 9.3 (Comparative case dossier). Develop at least two supported positive cases, two boundary cases, and two negative cases. Each case must declare Σ , identify the mechanism and alternatives, report uncertainty, and separate the evaluative layers. The six constructed configurations in this paper function as test templates; an empirical dossier remains required.

Research Obligation 9.4 (Operational identification). Provide observable meanings, units or qualitative semantics, horizons, comparison families, intervention definitions, substitute-route searches, and condition-update evidence. Include sensitivity and at least one case in which the method withholds a diagnosis.

Research Obligation 9.5 (Normative bridge architecture). Develop independent accounts of standing, capability effect, harm, procedure, distribution, recognition, domination, exploitation, responsibility, ecological limits, and legal authority. Test functional pathology paired with justified conduct, and test injustice paired with an absent exploitation relation, as separate counterexamples.

Research Obligation 9.6 (Comparative advantage and revision). Compare the lifecycle diagnostic with domain-specific alternatives. Remove a category whose mechanism, evidence requirement, and consequence duplicate an existing framework; narrow the model when values lack usable semantics; and abandon the general framework if unresolved classifications dominate discriminating ones.

The conservative conclusion is correspondingly modest. Value production, current movement, and generative circulation are distinguishable because a system can generate traffic while regenerative reach remains empty and can preserve a later route during a period of current stillness. A typed lifecycle makes the location of a proposed failure explicit. A fixed-environment deletion contracts

viable paths only in the elementary sense proved here, and a consequence for later conditions requires additional empirical structure. The seven-type taxonomy offers a revisable genealogy of candidate loci; its value depends on whether applications can discriminate mechanisms and return negative, mixed, and unresolved results.

Double localization is the paper's stopping rule and its principal proposal. A circulation diagnosis should state where in the lifecycle the candidate problem occurs and which evaluative layer the evidence reaches. Everything beyond that point remains a separate argument. This rule supplies the entry conditions for a pathology-of-value-circulation research program with greater precision and restraint.

Acknowledgments

This section records the dialogue that supplied a human intellectual stimulus for the paper and assigns responsibility for the resulting manuscript.

The author thanks Ron Eglash for dialogue that stimulated reflection on the consequences of diminished value circulation. That exchange motivated the present effort to reconsider what a pathology of value circulation could mean and to develop a preliminary formal diagnostic. The author bears sole responsibility for the manuscript’s definitions, formal constructions, taxonomy, arguments, conclusions, and errors.

References

- [1] Arjun Appadurai. Introduction: Commodities and the politics of value. In Arjun Appadurai, editor, *The Social Life of Things: Commodities in Cultural Perspective*, pages 3–63. Cambridge University Press, 1986. URL: <https://www.cambridge.org/core/books/abs/social-life-of-things/introduction-commodities-and-the-politics-of-value/B93E149DA4FA8E92F342ABBF7302E1B4>, doi:10.1017/CB09780511819582.003.
- [2] Ron Eglash. Of marx and makers: An historical perspective on generative justice. *Teknokultura. Revista de Cultura Digital y Movimientos Sociales*, 13(1):245–269, 2016. URL: <https://revistas.ucm.es/index.php/TEKN/article/view/52096>, doi:10.5209/rev_TK.2016.v13.n1.52096.
- [3] Ron Eglash, Audrey Bennett, John Drazan, Michael Lachney, and William Babbitt. A mathematical tool kit for generative justice. *ETD – Educação Temática Digital*, 19(3):761–785, 2017. URL: <https://periodicos.sbu.unicamp.br/ojs/index.php/etd/article/view/8648374>, doi:10.20396/etd.v19i3.8648374.
- [4] Ron Eglash and Colin Garvey. Basins of attraction for generative justice. In Santo Banerjee, Şefika Şule Erçetin, and Ali Tekin, editors, *Chaos Theory in Politics*, Understanding Complex Systems, pages 75–88. Springer, 2014. doi:10.1007/978-94-017-8691-1_5.
- [5] Ron Eglash, Kwame P. Robinson, Audrey Bennett, Lionel Robert, and Mathew Garvin. Computational reparations as generative justice: Decolonial transitions to unalienated circular value flow. *Big Data & Society*, 11(1), 2024. URL: <https://journals.sagepub.com/doi/10.1177/20539517231221732>, doi:10.1177/20539517231221732.
- [6] Marina Fischer-Kowalski and Walter Hüttler. Society’s metabolism: The intellectual history of materials flow analysis, part II, 1970–1998. *Journal of Industrial Ecology*, 2(4):107–136, 1998. URL: <https://onlinelibrary.wiley.com/doi/10.1162/jiec.1998.2.4.107>, doi:10.1162/jiec.1998.2.4.107.
- [7] Nancy Fraser. Contradictions of capital and care. *New Left Review*, pages 99–117, July–August 2016. Second series, no. 100. URL: <https://newleftreview.org/issues/ii100/articles/nancy-fraser-contradictions-of-capital-and-care>, doi:10.64590/nt2.
- [8] Julian Kirchherr, Denise Reike, and Marko Hekkert. Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127:221–232, 2017. URL: <https://research-portal.uu.nl/en/publications/conceptualizing-the-circular-economy-an-analysis-of-114-definitio/>, doi:10.1016/j.resconrec.2017.09.005.

- [9] Michèle Lamont. Toward a comparative sociology of valuation and evaluation. *Annual Review of Sociology*, 38:201–221, 2012. URL: <https://www.annualreviews.org/content/journals/10.1146/annurev-soc-070308-120022>, doi:10.1146/annurev-soc-070308-120022.
- [10] Karl Marx. *Capital: A Critique of Political Economy*, volume 2. Penguin Classics, 2006. Translated by David Fernbach; introduction by Ernest Mandel. URL: <https://www.penguin.co.uk/books/35193/capital-by-karl-marx-trans-david-fernbach-introduction-by-ernest-mandel/9780140445695>.
- [11] Elinor Ostrom. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, 1990. URL: <https://www.cambridge.org/core/books/governing-the-commons/7AB7AE11BADA84409C34815CC288CD79>, doi:10.1017/CB09780511807763.
- [12] Michael Weisberg. *Simulation and Similarity: Using Models to Understand the World*. Oxford University Press, 2013. URL: <https://academic.oup.com/book/3141>, doi:10.1093/acprof:oso/9780199933662.001.0001.