

Chapter 25

Generative Relational Economics as an Open Research Programme

Programme Identity and Provisional Closure

Chapter 25 provides the book-level disciplinary return for Generative Relational Economics (GRE). The preceding chapters have constructed historical motivations, preliminary generative-relational foundations, research and applied praxis, substantive economic concepts, theoretical dialogues, cross-domain interfaces, and an explicit architecture of limitations and revision. The final chapter does not add another substantive domain on top of that sequence. Its role is to determine what kind of scholarly object has emerged from it: which parts of the framework presently function as substantive claims, which remain proposals or hypotheses, which operate as heuristics or representations, which commitments hold the programme together, and which forms of disagreement and revision can occur without making the programme unintelligible.

The chapter therefore treats closure as a problem of *programme identity under revisability*. A research programme can become too closed when its vocabulary, methods, or foundational distinctions are protected from counterevidence. It can also become too indeterminate when almost any later formulation can be redescribed as belonging to the same programme. GRE requires a middle discipline. It should remain sufficiently specified that researchers can identify what counts as a GRE claim, compare competing formulations, test consequences, preserve negative results, and recognize major revision. At the same time, its identity should not depend on freezing one ontology, one formalism, one value theory, one method, or one historically situated vocabulary.

The immediate task is consequently synthetic and reconstructive. Chapter 25 asks what the book has actually constructed, what epistemic status should be assigned to its different components, which commitments presently define GRE, and which apparent commitments are explicitly withheld. It then examines GRE as a language of economic inquiry and as an economic-domain instantiation of broader generative-relational foundations. The chapter subsequently considers historical revisability, plural internal formulations, collaboration and contestability, preservation and provenance, future re-epistemization, and openness to evidence from economics

and neighboring domains.

The final part of the chapter turns to theoretical evolution and economic futures. GRE does not presume that cumulative research will converge upon one immutable formulation or one predetermined economic order. Accumulation, critique, revision, branching, hybridization, abandonment, and later re-emergence can all belong to the history of a research programme. Correspondingly, economic futures remain objects of inquiry and praxis rather than endpoints already encoded in the theory. The chapter therefore closes by stating what GRE asks researchers and practitioners to notice, what problems remain explicitly unfinished, and what provisional closure means for a programme whose own future transformation is part of its stated architecture.

The method throughout is dependency-sensitive rather than celebratory. A concluding synthesis is useful only if it preserves the distinctions and limitations established earlier in the book. Chapter 25 therefore avoids converting recurring vocabulary into universal truth, formal representations into ontology, generativity into normative priority, or the completion of a first draft into completion of the research programme. The final question is narrower and more demanding: whether the framework constructed in this book is coherent enough to support cumulative inquiry and open enough to remain answerable to evidence, criticism, domain correction, historical change, and later theoretical reconstruction.

The chapter proceeds in nineteen sections. Section 569 reconstructs the book-level GRE architecture. Sections 570–572 clarify the epistemic status, commitments, and non-commitments of the present framework. Sections 573–581 examine GRE as a language and domain instantiation, its historical revisability, plural formulations, contestability, provenance, future re-epistemization, domain evidence, and cross-domain learning. Sections 582–583 address theoretical evolution and open economic futures. Sections 584–585 state the attentional disciplines proposed for research and practice. Section 586 records work deliberately left unfinished. Section 587 then provides a provisional closure whose purpose is to make continuation, criticism, and revision possible without dissolving the identity of the programme.

25.1 Book-Level Architecture of GRE

The opening section of Chapter 25 reconstructs the architecture assembled across the book and clarifies how its major components depend upon one another. Its role is synthetic rather than retrospective: the objective is not to provide a compressed chapter-by-chapter synopsis, but to identify the intellectual functions that the manuscript has constructed and the interfaces through which they form a recognizable Generative Relational Economics (GRE) research programme. The discussion proceeds through historical emergence, intellectual foundations, disciplinary constitution, ontology, epistemology, research praxis, applied praxis, substantive economic theory, theoretical dialogue, and programme formation. The method is dependency-sensitive reconstruction. Each component is treated according to what analytical work it performs, what other components it presupposes, and what would be lost if it were removed or collapsed into a neighboring component.

Definition 25.1 (Book-level GRE architecture). The *book-level GRE architecture* is the

dependency-organized configuration of historical motivations, disciplinary commitments, ontological and epistemic restraints, research and applied praxis, substantive economic concepts, dialogue mechanisms, domain interfaces, limitation disciplines, and revision procedures constructed across the manuscript.

This definition treats the book's contribution as more than an inventory of concepts. Relational allocation, generative value, conversion, circulation, economic spacetime, power, justice, epistemic economy, and AI-era capability asymmetry receive their meaning partly from the ontological, epistemological, historical, and methodological disciplines within which they are used. Likewise, the open research programme of the final Part depends on substantive objects capable of being tested, translated, narrowed, or abandoned. The architecture is therefore layered without being a simple hierarchy: later components can correct earlier ones, while earlier distinctions constrain the meanings available to later claims.

Table 25.1 summarizes the principal functions reconstructed in this section. The table is intentionally functional rather than chronological. Several functions were developed across multiple chapters, and the mature architecture sometimes revises the terms in which an earlier problem was first posed.

Proposition 25.2 (Architecture-over-inventory principle). *The book-level contribution of GRE is better evaluated through the relations among its historical, conceptual, methodological, substantive, and revision components than through the novelty or completeness of any isolated term.*

The proposition does not imply that every component is equally mature. Some distinctions have been developed extensively; others remain proposals, heuristics, or open research problems. The point is structural. A value-conversion concept without an epistemology of identification can become metaphorical. A power concept without typed asymmetry and mechanism evidence can become indiscriminate. A relational ontology without manifestation and representation limits can outrun evidence. An open programme without failure conditions can become self-insulating. The architecture attempts to place these problems in a mutually corrective configuration.

25.1.1 Historical Emergence

The book begins by treating GRE as historically situated rather than as a timeless theory waiting to be discovered. Contemporary economic life combines large-scale institutional interdependence, digital and computational mediation, changing forms of scarcity, globally extended production and exchange, intensified representational infrastructures, ecological constraint, and rapidly changing human–AI capability relations. These conditions do not logically entail GRE. They establish a problem environment in which entity-centred, static, or exclusively allocation-centred descriptions can leave consequential questions insufficiently articulated.

The historical construction is therefore motivational and restrictive at the same time. It motivates attention to relations, generation, conversion, circulation, capability formation, institutional mediation, delayed effects, and transformed option spaces. It also restricts GRE from presenting categories formed under contemporary conditions as universal economic primitives. A concept that is analytically useful for

Table 25.1: Principal components of the book-level GRE architecture and their analytical roles

Component	Principal analytical role	Dependency or corrective relation
Historical emergence	Locates the problems that make GRE intelligible as a contemporary economic inquiry	Constrains claims of universality and supplies historically changing problem conditions
Intellectual foundations	Provides relational, generative, institutional, historical, value-theoretical, and methodological resources	Supplies resources without making any inherited tradition canonical
Disciplinary constitution	Specifies GRE's economic problem-space, objects, questions, and contribution standards	Prevents domain expansion from being mistaken for general theory
Ontology and epistemology	Disciplines claims about relational reality, manifestation, representation, and warranted reconstruction	Constrains substantive and formal claims while preserving ontological suspension
Research praxis	Organizes inquiry under partial observation, plural methods, and generative-relational questions	Converts conceptual distinctions into answerable research designs
Applied praxis	Organizes decision and intervention under incomplete knowledge, value conflict, and practical consequence	Requires monitoring, participation, reversibility, learning, and responsibility
Substantive economic theory	Develops relational architecture, allocation, value, space-time, power, knowledge, AI, and economic-order problems	Gives GRE domain-specific explanatory content that can be empirically and normatively contested
Theoretical and domain dialogue	Enables translation, comparison, borrowing, correction, and non-translation	Prevents isolation while preserving theoretical and disciplinary non-equivalence
Limits and revision architecture	States uncertainty, failure conditions, defeat, and architectural revision thresholds	Makes substantive claims corrigible rather than semantically self-protective
Open research programme	Coordinates questions, dependencies, evidence, negative results, collaboration, and future theory	Preserves cumulative inquiry without treating the present framework as final

platform-mediated production, AI-assisted knowledge work, credentialized institutions, or contemporary monetary infrastructures may require substantial reconstruction in another historical configuration.

Definition 25.3 (Historical problem field of GRE). The *historical problem field of GRE* is the historically situated configuration of economic changes, institutional forms, technical capabilities, value conflicts, and representational conditions that makes particular generative-relational questions salient without establishing those questions as transhistorical necessities.

The mature GRE architecture consequently preserves historical emergence inside

later theory. Historical situatedness is not confined to an introductory genealogy. It returns in category revision, multiple timescales, institutional transformation, power continuity, domain transfer, AI-era validity horizons, and the requirement that theory itself remain historically revisable.

25.1.2 Intellectual Foundations

GRE was not constructed from a single intellectual lineage. The manuscript instead develops a plural inheritance from relational, processual, institutional, historical, evolutionary, value-theoretical, complexity-sensitive, capability-oriented, political-economic, and methodological traditions. These inheritances supply questions and analytical resources rather than a synthetic canon. Their disagreements remain important because GRE's own distinctions often arise precisely where existing approaches illuminate different aspects of the same economic process.

The foundational strategy is therefore one of critical inheritance. Concepts are retained when they clarify the economic problem under examination, retyped when their source-domain semantics do not transfer directly, and left unresolved when translation would erase a substantive disagreement. This strategy also applies to mathematical resources. Networks, dynamical systems, higher-order structures, fields, operator-like representations, category-theoretic language, 2-complexes, and related formalisms can provide useful structural representations, but their presence in GRE does not import the ontologies or empirical meanings of the domains from which the mathematics originated.

The most important intellectual construction is accordingly a discipline of combination. GRE permits multiple theoretical resources to participate in one research problem while resisting the inference that successful coexistence proves their theoretical identity. Chapter 21 later makes that discipline explicit through relational dialogue among economic theories, while Chapters 23–24 extend it to neighboring domains, failed translations, and the limits of generalization.

25.1.3 Disciplinary Constitution

The book constructs GRE as an economic research programme with a distinct but revisable problem-space. Its disciplinary constitution does not depend on a unique class of empirical objects. Families, firms, schools, courts, platforms, infrastructures, ecosystems, AI systems, and public institutions can all become economically relevant without becoming exclusively economic objects. GRE's domain is specified more usefully through the predicates and mechanisms for which economic explanation is being undertaken.

GRE asks, among other questions, how resources, relations, institutions, classifications, infrastructures, and interventions alter capacities, option spaces, patterns of participation, value realization, conversion possibilities, circulation paths, dependencies, and later conditions of generation. It also asks how apparently given economic subjects and categories become stabilized, how asymmetries become consequential power, how values remain heterogeneous or become institutionally commensurated, and how current economic activity changes the conditions of future economic activ-

ity.

Definition 25.4 (GRE disciplinary constitution). The *disciplinary constitution of GRE* is the provisional specification of an economic problem-space, explanatory responsibilities, research questions, contribution standards, and interfaces through which generative-relational analysis becomes recognizably economic while remaining open to correction by neighboring domains.

This constitution is intentionally non-imperial. Economic incidence does not confer authority over legal validity, political legitimacy, ecological value, educational quality, aesthetic judgment, technical capability, consciousness, or ultimate ontology. Chapter 23 develops this boundary through predicate-specific jurisdiction and domain deference. Chapter 24 makes the boundary revisable when repeated interface problems show that the current division of explanatory labour is inadequate.

25.1.4 Ontological View

The ontological construction of the book is deliberately restrained. The preliminary GR foundations required by GRE begin from sparse analytical primitives—change, structure, constraint, and difference—and develop richer relational objects without claiming that these primitives or their formal representations exhaust ultimate reality. The three-level distinction among ontological reality, relational reality, and manifestational reality provides the principal discipline.

Ontological reality remains suspended where the inquiry lacks warrant for stronger metaphysical claims. Relational reality concerns sufficiently stable, historically sustained, and causally consequential relational configurations that can participate in economic explanation. Manifestational reality concerns the context-dependent forms through which such configurations become accessible. The distinction permits GRE to treat institutions, currencies, identities, classifications, AI-mediated roles, legal-economic positions, and other relational beings as causally significant without converting their current manifestation into a claim about final ontology.

The mature ontology is therefore bounded relationally rather than relationally exhaustive. Relations receive methodological and often explanatory priority because many economic objects are constituted or transformed through relations. Chapter 24 nevertheless requires mixed explanatory architectures when material, technical, biological, ecological, legal, phenomenological, or other mechanisms add independent discrimination. Relational language is useful to the extent that it clarifies rather than absorbs those differences.

25.1.5 Epistemology

GRE's epistemology follows from the gap between relational reality and the manifestations through which inquiry proceeds. Economic research ordinarily encounters records, prices, classifications, measurements, documents, narratives, institutional categories, model outputs, observed interactions, and other representations. These are neither transparent copies of relational reality nor epistemically useless surfaces. They are historically generated access conditions whose production and limitations

require analysis.

The book therefore constructs inquiry as an inverse and often underdetermined problem. Several relational histories can produce similar manifestations; one classification can suppress materially important differences; observation can alter the system observed; missingness can be relationally patterned; and later categories can distort reconstruction of earlier economic worlds. The appropriate response is not generalized skepticism. It is bounded reconstruction through explicit assumptions, rival explanations, compatibility classes, sensitivity analysis, negative evidence, and preservation of epistemic remainders.

This epistemology also constrains formalization. A symbol can be mathematically exact while the bridge connecting it to an empirical target remains uncertain. Formal determinacy should therefore remain no stronger than the semantic and evidential warrant supporting the represented object. The book's formal resources are most defensible when their inferential role is stated locally and their projection losses remain visible.

25.1.6 Research Praxis

The research-praxis block converts ontological and epistemological discipline into procedures for inquiry. Research-dominant praxis is organized around a principal contradiction between the need to know enough to make a warranted scholarly claim and the incompleteness, historical situatedness, and intervention effects of actual inquiry. Relational and generative-relational methodologies address that contradiction through explicit problem formulation, boundary construction, relation identification, historical reconstruction, mixed evidence, model comparison, and iterative revision.

The distinctive research question is not simply whether variables covary or whether an entity possesses a property. GRE asks what is generated, through which relations and conditions, for which positions, over which horizon, with which conversions and circulation paths, and with which foreclosures or residual effects. Such questions can be pursued historically, interpretively, qualitatively, quantitatively, empirically, formally, or computationally. Methodological pluralism follows from the heterogeneity of access conditions rather than from a refusal to discriminate among methods. A method earns priority when it is better suited to the local question and evidential task.

The integrated research-design architecture constructed in Part III links problem formation, evidence, historical context, relation typing, generative attribution, formal representation, triangulation, uncertainty, and revision. Later chapters add explicit identification ladders, negative-result preservation, defeat tests, and validity horizons. Research praxis thus becomes one of the mechanisms through which GRE remains open without becoming epistemically permissive.

25.1.7 Applied Praxis

Application-dominant praxis addresses a different principal contradiction: decisions and interventions must often occur before the relevant economic system is completely known. The book therefore refuses to make complete prediction a

prerequisite for responsible action while also refusing to convert urgency into evidential certainty. Applied GRE emphasizes intervention adequacy under incomplete knowledge.

The constructed methodology includes relational consequence analysis, long-horizon attention, reversibility, option preservation, participation, value conflict, power asymmetry, monitoring, institutional capacity, repair, and learning through action. Interventions are treated as transformations that can alter the evidence environment, the subjects involved, the relations among them, and the possibility space in which later decisions occur. The distinction between observation and transformation is therefore preserved even when actual praxis couples them tightly.

Applied praxis also treats inaction symmetrically. Waiting, continuation of an inherited policy, refusal to intervene, or withdrawal can redistribute risk and close future options just as active intervention can. The relevant comparison concerns alternative courses of action under bounded knowledge, not an opposition between risky action and neutral non-action.

25.1.8 Substantive Economic Theory

The book's substantive economic construction begins with relational architecture and proceeds through allocation, heterogeneous generative value, generative spacetime, power and justice, epistemic economy, AI-era capability asymmetry, domain applications, and possible economic orders. These components supply GRE with economic content that exceeds a general preference for relational language.

Relational architecture treats economic systems as historically generated configurations of subjects, institutions, resources, rules, classifications, infrastructures, and relations whose boundaries and memberships can themselves change. Allocation is reconstructed as relational intervention because allocating resources can alter more than the nominal recipient: it can reorganize enabling conditions, dependencies, future capacities, and higher-order relations. Generative value then asks how heterogeneous value forms arise, convert, circulate, return, dissipate, become captured, or contribute to later generation without presuming a universal metric.

Generative spacetime provides a representation of history-bearing economic configurations in which past structure conditions present possibilities and present transformations alter future relational possibilities. It permits 2-complex, field-like, dynamical, and operator-like representations where useful, while Chapter 24 explicitly prevents any one such formalism from becoming mandatory or ontologically privileged.

The later substantive chapters add typed asymmetry and power, justice under heterogeneous value, knowledge and epistemic economy, and human–AI capability relations. Power is reconstructed through directional mechanisms that condition another position's possibilities; justice requires an independent normative bridge; epistemic resources and infrastructures become economically consequential without knowledge being reduced to a scalar asset; and AI is treated as a relational configuration whose economic effects depend on access, verification, organization, infrastructure, and institutional mediation.

The substantive synthesis is therefore plural. GRE does not culminate in one equilibrium state, welfare function, or ideal institutional form. It offers a family of typed questions and mechanisms for studying how economic configurations produce, distribute, preserve, convert, foreclose, and transform the conditions of later economic life.

25.1.9 Theoretical Dialogue

GRE is constructed in dialogue with existing economic theories rather than as their replacement. The book develops relational translation as a way to compare units of analysis, subjects, relations, value, scarcity, time, institutions, knowledge, power, and causal explanation across theoretical traditions. Translation can reveal correspondence, complementary explanatory reach, and hidden assumptions. It can also fail, and those failures are theoretically informative.

The mature dialogue architecture distinguishes translation from identity and comparison from commensuration. A neoclassical, institutional, evolutionary, capability-oriented, feminist, ecological, Marxian, Keynesian, behavioural, or other economic analysis can illuminate a problem without being reducible to GRE vocabulary. Equivalence is claim-relative and task-relative. Irreducible disagreement remains part of the comparative object.

The same discipline governs neighboring domains. History, governance, law, political theory, education, ecology, AI studies, social theory, and aesthetics can provide premises that correct GRE while retaining authority over their own predicates. GRE can also offer candidate structures outward, but successful borrowing remains weaker evidence than independently rediscovered recurrence. This architecture creates cross-domain learning while withholding premature general GRT.

25.1.10 Research Programme

The final construction is the research programme itself. Chapters 22–24 progressively make explicit what was implicit in earlier substantive work: GRE requires question portfolios, dependency maps, domain interfaces, research streams, scope conditions, validity horizons, negative-result preservation, failure conditions, revision pathways, and criteria for theory promotion or retirement. A research programme is therefore not simply a list of topics generated by a theory. It is an organized environment in which claims can accumulate, diverge, fail, and be reconstructed while their evidential and conceptual histories remain recoverable.

Definition 25.5 (Constructed GRE programme state). The *constructed GRE programme state* is the present, versioned configuration of GRE claims, proposals, hypotheses, heuristics, representations, empirical questions, domain interfaces, limitations, counterevidence pathways, and revision dependencies established by the book at a particular historical point.

The definition deliberately uses *state*. The completed manuscript does not convert GRE into a finished system. It records a sufficiently articulated configuration from which future work can proceed and against which future revisions can be understood. Some components may strengthen through empirical replication; some may

split into competing formulations; some may be localized to particular historical or institutional regimes; some may become unnecessary when better concepts are developed; and some may be abandoned.

Proposition 25.6 (Constructed-programme principle). *The principal scholarly object constructed by the book is a domain-specific, historically situated, empirically answerable, normatively non-self-authorizing, and revisable programme for generative-relational economic inquiry whose identity is carried by a structured set of questions, distinctions, dependencies, and correction procedures rather than by an immutable vocabulary or single formal system.*

This proposition supplies the starting point for the remainder of Chapter 25. Before the programme's identity can be stated more precisely, the different components of the present framework require explicit epistemic typing. A proposition argued substantively in one chapter, a methodological proposal, a testable hypothesis, a heuristic distinction, a formal representation, a domain-specific empirical result, and an unresolved open problem should not enter the final synthesis with the same status. Section 570 therefore turns from the architecture constructed by the book to the status of the claims that presently compose it.

25.2 Epistemic Status of the Present Framework

Section 25.1 reconstructed GRE as a dependency-organized research architecture whose components have been developed through different modes of argument, evidence, formalization, and disciplinary interaction. The role of the present section is to prevent the final synthesis from flattening those differences into a single level of theoretical authority. Its objective is to assign explicit epistemic status to the principal kinds of objects carried by the present framework, to state what each status licenses, and to identify how components may be promoted, narrowed, revised, or retired as later inquiry develops. The method is classificatory and dependency-sensitive. A component is typed according to the role it presently performs in the programme rather than according to its rhetorical importance or the amount of notation surrounding it.

The resulting classification is intentionally plural. GRE presently contains argued claims, conceptual and methodological proposals, testable hypotheses, heuristics, formal representations, domain-specific results, open problems, and unresolved disagreements. These statuses can interact, and the same substantive topic can contain objects of several types. A formal representation can support a hypothesis without becoming evidence for it; a proposal can organize research before empirical results exist; a domain-specific result can motivate a broader hypothesis without establishing cross-domain generality; and an unresolved disagreement can remain productive without being redescribed as theoretical incoherence.

Definition 25.7 (GRE epistemic-status profile). *A GRE epistemic-status profile records, for a specified programme component, its current status as claim, proposal, hypothesis, heuristic, formal representation, domain-specific result, open problem, unresolved disagreement, or a locally justified combination of these; the warrant supporting that status; the domain and historical scope of the warrant; dependencies on other*

Table 25.2: Epistemic statuses within the present GRE framework.

Status	Present function	Principal discipline
Claim	States an argued conclusion within a declared conceptual, historical, empirical, or normative scope	Preserve warrant, scope, dependencies, and defeat conditions
Proposal	Offers a concept, distinction, method, procedure, or research architecture for use and evaluation	Assess analytical usefulness, coherence, alternatives, and downstream consequences
Hypothesis	Makes a provisional, contrastable claim about a mechanism, relation, pattern, or condition	Specify discriminating evidence, serious rivals, and conditions of weakening or rejection
Heuristic	Directs attention or organizes inquiry without claiming complete description or mechanism identification	Evaluate discovery value, bias, omissions, and the point at which stronger claims require independent warrant
Formal representation	Encodes selected structure through mathematical, diagrammatic, computational, or logical form	Define semantics, assumptions, projection loss, empirical bridge, and non-ontological remainder
Domain-specific result	Establishes a finding within a specified economic, historical, institutional, or neighboring-domain context	Retain domain provenance, transport conditions, and correction authority
Open problem	Identifies an unresolved question whose answer can materially alter explanation, method, application, or programme architecture	Preserve tractability, dependencies, competing approaches, and research consequences
Unresolved disagreement	Records competing serious interpretations, models, normative premises, or programme formulations	Preserve the locus of disagreement, shared evidence, discriminating questions, and conditions for continued pluralism

claims or external premises; serious alternatives or counterevidence; and the conditions under which the status should be promoted, narrowed, revised, or retired.

The profile provides a book-level continuation of the limitation, defeat, and revision architecture developed in Chapter 24. Its function is constructive rather than merely cautionary. Explicit typing makes cumulative work easier because later researchers can determine whether new evidence is testing an empirical hypothesis, evaluating a conceptual proposal, comparing representations, refining a heuristic, or adjudicating a substantive disagreement. It also prevents an apparent contradiction created by assigning different epistemic burdens to objects that perform different scholarly functions.

Table 25.2 summarizes the principal statuses used in this chapter. The categories are neither a ranking of intellectual importance nor a linear maturation sequence. Some proposals may remain proposals because their value lies in organizing inquiry rather than becoming truth-apt empirical statements. Some heuristics may remain

useful even after specific hypotheses generated from them are rejected. Some formal representations may be replaced without altering the underlying substantive claim. Conversely, a hypothesis supported repeatedly within a stable domain may become a domain-specific result without thereby becoming a universal commitment of GRE.

Proposition 25.8 (Epistemic non-flattening principle). *A book-level synthesis of GRE should preserve the strongest epistemic distinctions that materially affect what a component licenses, how it can be tested, and what kind of revision follows from counterevidence; completion of the manuscript does not by itself raise proposals, hypotheses, heuristics, or representations to the status of established claims.*

The remainder of the section applies this principle to the eight status families that presently compose the programme.

25.2.1 Claims

A *claim* in the present framework is a proposition that the book argues should presently be accepted within a stated scope. Claim status remains compatible with revisability. The relevant question is whether the available conceptual argument, historical reconstruction, empirical evidence, domain warrant, or normative reasoning is strong enough for the particular conclusion being stated. Claim status therefore concerns warranted assertion within the present programme state rather than certainty beyond revision.

Several book-level claims have this character. The manuscript argues that economic phenomena can be constituted through historically generated relations; that observation and intervention should remain analytically distinguishable even when praxis couples them; that heterogeneous value cannot be assumed to share one common measure; that generativity and normative desirability require separate warrants; that economic power claims require typed asymmetry together with an identifiable conditioning mechanism; and that cross-domain translation does not establish theoretical identity. These conclusions are not all supported by the same kind of evidence. Some are conceptual distinctions required for inferential hygiene, some synthesize historical and theoretical argument, and some state programme-level methodological disciplines.

Definition 25.9 (Scoped GRE claim). *A scoped GRE claim is an argued conclusion whose object, domain, historical or institutional conditions, evidential or conceptual warrant, dependencies, and relevant defeat conditions are sufficiently specified to determine what accepting the claim presently licenses.*

This definition prevents the word *claim* from functioning as a synonym for settled fact. A conceptual claim can be well argued without being an empirical finding. An empirical claim can be strong within one institutional regime while remaining weakly transportable elsewhere. A normative claim can be defensible under explicit premises without becoming uniquely mandatory across all serious normative frameworks.

Proposition 25.10 (Claim-strength matching principle). *The strength of a GRE claim should remain matched to the strongest warrant that bears directly on its stated object and scope; additional conceptual richness, mathematical structure, or programme*

centrality does not independently increase that warrant.

The book therefore contains claims of different breadth. Their common status lies in argued assertibility, not in equal certainty, equal empirical maturity, or equal transportability.

25.2.2 Proposals

A substantial part of GRE presently consists of proposals. These include conceptual distinctions, methodological procedures, diagnostic profiles, research records, interface architectures, revision protocols, and candidate analytical vocabularies offered because they appear capable of organizing economic inquiry more precisely. Proposal status is especially appropriate where the book establishes coherence and analytical motivation but where comparative use across independent studies remains limited.

Examples include the proposed use of relational allocation as a way to study effects extending beyond nominal recipients; value-conversion and circulation ledgers for heterogeneous value processes; dependency-sensitive research portfolios; provenance-preserving domain interfaces; limitation and defeat registers; and versioned theory-promotion or retirement dossiers. The book argues for the usefulness of these devices, but usefulness ultimately requires practice beyond the manuscript. Researchers may discover that some records are too demanding for particular settings, that two distinctions can be merged, or that a simpler alternative performs the same analytical function more effectively.

Definition 25.11 (GRE analytical proposal). A *GRE analytical proposal* is a concept, distinction, procedure, representational practice, or research architecture advanced for disciplined use and comparative evaluation without presuming that its present formulation is uniquely necessary or empirically established across domains.

Proposal evaluation therefore differs from hypothesis testing. A proposal can fail because it produces little discrimination, obscures relevant objects, requires unavailable information, duplicates a simpler device, creates excessive conceptual overhead, or systematically biases inquiry. Conversely, repeated successful use can justify broader adoption without converting the proposal into a metaphysical or universal commitment.

Proposition 25.12 (Proposal promotion condition). *Repeated analytical usefulness can strengthen a GRE proposal's programme standing when independent applications demonstrate clearer discrimination, recoverable assumptions, productive comparison, and manageable revision costs; such success supports adoption of the proposal without establishing universal necessity.*

25.2.3 Hypotheses

GRE hypotheses make provisional claims about mechanisms, relations, dynamics, or empirical regularities for which discriminating evidence remains necessary. Hypothesis status is crucial because several intellectually attractive ideas in the book would become overclaims if presented as established results. The language of criticality, fast-slow dynamics, attractors, field-like organization, AI-mediated capability asym-

metry, conversion mechanisms, generative feedback, and historical persistence can generate testable research programmes, yet each requires evidence suited to its specific mechanism and scope.

Definition 25.13 (GRE research hypothesis). A *GRE research hypothesis* is a provisional proposition concerning an empirically or historically discriminable mechanism, relation, pattern, or condition for which the programme can state serious rival explanations and evidence that would raise, lower, or localize its warranted status.

The definition excludes formulations that can accommodate every possible observation by retrospective reinterpretation. A useful GRE hypothesis identifies a contrast. A criticality hypothesis should specify expectations that differ from ordinary instability, institutional breakdown, or exogenous shock. A conversion hypothesis should distinguish conversion from transfer, co-generation, reclassification, or common-cause change. A power hypothesis should identify a conditioning mechanism that separates power from persistent inequality or shared constraint. A generativity hypothesis should distinguish generation from revelation of already existing capacity.

Proposition 25.14 (Hypothesis answerability principle). *The programme standing of a GRE hypothesis increases through discriminating evidence and decreases when serious rivals explain the same target more adequately under preserved scope conditions; additional post hoc flexibility should not substitute for evidential answerability.*

Some hypotheses may later become domain-specific results. Others may remain productive despite partial defeat because their narrower components continue to generate informative contrasts. Hypothesis status therefore preserves both ambition and vulnerability.

25.2.4 Heuristics

Heuristics perform a different role. They direct attention, organize questions, and help reveal neglected relations without claiming to identify a complete mechanism or exhaustively represent the target. GRE relies on heuristics when it asks researchers to examine relational position, generative conditions, value conversion, circulation, foreclosed possibilities, historical path dependence, or long-horizon effects before assuming that conventional units and metrics capture the relevant problem.

Definition 25.15 (GRE heuristic). A *GRE heuristic* is a disciplined attentional or question-forming device that helps researchers generate observations, contrasts, hypotheses, or alternative representations while carrying weaker truth commitments than the substantive claims that may later be developed from it.

The weaker status of heuristics does not make them methodologically trivial. A heuristic can improve inquiry by revealing systematic blind spots. It can also distort inquiry if it causes researchers to privilege relations where intrinsic properties matter, to search for generativity when transfer explains the phenomenon, or to re-describe ordinary institutional constraint as power. Heuristics therefore need bias analysis and stopping rules.

Proposition 25.16 (Heuristic escalation condition). *When a GRE heuristic is used to support causal, ontological, empirical, or normative conclusions, the resulting stronger*

claim requires warrant independent of the heuristic's usefulness in directing attention.

This condition protects the programme from confusing a productive way of looking with evidence that the world necessarily has the structure highlighted by that way of looking.

25.2.5 Formal Representations

Formal representations encode selected structures so that assumptions, relations, transformations, and consequences can be examined with greater precision. The book uses or proposes graph-based, dynamical, field-like, operator-like, category-theoretic, 2-complex, spacetime, and other mathematical representations where they clarify a local problem. Chapter 24 established that formal precision does not itself increase empirical warrant and that transfer of mathematical structure does not transfer ontology automatically.

Definition 25.17 (GRE formal representation). *A GRE formal representation is a mathematically, logically, diagrammatically, or computationally specified encoding of selected features of a GRE object whose semantics, assumptions, projection losses, and relation to evidence are stated locally.*

Formal representations can occupy several epistemic roles. A schematic model may expose logical possibilities. A structural representation may preserve topology, ordering, dependency, or transformation without empirical parameterization. An analogy may suggest a research question while carrying little direct evidential weight. An empirically parameterized model may support stronger inference when its variables and mechanisms are adequately identified. These roles should remain distinguishable even when they use similar notation.

The book's 2-complex and spacetime representations provide a useful illustration. They can represent history-bearing configurations in which relations and transformations have temporal structure. Their usefulness does not establish that economic reality is fundamentally a 2-complex, spin foam, field, operator algebra, or any other imported mathematical object. Future GRE work may retain the analytical problem while replacing the representation entirely.

Proposition 25.18 (Representation independence principle). *A substantive GRE claim should survive replacement of a non-essential formal representation whenever the replacement preserves the empirically and conceptually relevant structure; dependence on one mathematical vocabulary requires an additional argument showing why that structure is indispensable to the claim.*

25.2.6 Domain-Specific Results

Some components of the present framework have stronger standing only within a particular domain, historical configuration, institutional setting, or evidence base. Their limitation is part of their warrant rather than a defect. GRE treats domain specificity as an epistemic property that should be preserved through later comparison and translation.

Definition 25.19 (Domain-specific GRE result). *A domain-specific GRE result is a finding or supported conclusion whose warrant depends materially on a declared eco-*

nomic domain, historical regime, institutional configuration, population, evidential environment, or neighboring-domain premise and whose transport beyond that setting requires separate justification.

Domain-specific results can include empirical findings, historically reconstructed mechanisms, institutional analyses, or conclusions imported conditionally from neighboring domains. Their status depends on provenance. A legal premise remains corrigible by legal analysis; an ecological constraint remains answerable to ecological evidence; an AI capability claim remains conditional on the technical and deployment configuration from which it was established. GRE can reason from such premises without absorbing their source-domain authority.

Proposition 25.20 (Domain-result transport condition). *Transport of a domain-specific GRE result requires evidence or argument that the conditions responsible for the result remain sufficiently preserved, or that the relevant changes have been explicitly modeled; recurrence of vocabulary or formal structure alone does not establish transportability.*

The distinction is especially important for the book's cross-domain and historical ambitions. A result can be important precisely because it is local and well established. Generality should be earned through comparison rather than inferred from programme membership.

25.2.7 Open Problems

Open problems identify questions whose resolution can materially alter GRE's explanatory reach, methods, applications, or architecture. Chapter 24 turned limitations into a scope-conditioned research programme; the present final chapter preserves that unfinished state rather than converting the open programme into a completed doctrine.

Definition 25.21 (GRE open problem). *A GRE open problem is a presently unresolved question for which alternative answers would materially affect at least one substantive claim, analytical proposal, empirical method, domain interface, normative conclusion, or architectural dependency of the programme.*

Open problems differ from vague invitations for more research. A well-formed open problem identifies what is unknown, why the unknown matters, which existing claims depend on it, what evidence or conceptual work could discriminate among alternatives, and how different answers would propagate through the framework. Examples include empirical identification of generative mechanisms, conditions of value conversion and circulation, historical transportability, specification of power mechanisms, practical reconstruction of option spaces, long-horizon AI capability dynamics, and the degree to which candidate cross-domain structures survive independent reconstruction.

Proposition 25.22 (Open-problem dependency principle). *An open problem becomes programme-significant when materially different resolutions would alter the warranted status or formulation of connected GRE components; recording those dependencies is part of preserving the programme's future revisability.*

Open problems are therefore part of the theory's present state. Their explicit

preservation prevents later researchers from mistaking unanswered questions for silently settled assumptions.

25.2.8 Unresolved Disagreements

The present GRE programme also contains disagreements that should remain unresolved at this stage. These can concern competing ontological readings, alternative formalizations, rival value theories, different accounts of power or justice, competing historical reconstructions, divergent normative premises, or different judgments about the appropriate boundaries of the economic domain. The existence of such disagreement is compatible with programme identity when the competing positions share enough questions, evidence, concepts, and correction procedures to remain mutually contestable.

Definition 25.23 (GRE unresolved disagreement). *A GRE unresolved disagreement is a documented divergence among serious programme-compatible interpretations, models, premises, or formulations for which the present evidence and argument do not warrant forced convergence and for which the locus of disagreement remains identifiable.*

Preserving disagreement requires more structure than listing alternative opinions. The programme should record what the positions share, where their premises or interpretations diverge, which observations or arguments discriminate among them, whether the disagreement is empirical, conceptual, formal, normative, or domain-jurisdictional, and which downstream claims are affected. Some disagreements may later dissolve because one side is empirically defeated. Others may remain plural because several formulations organize distinct but compatible aspects of the same problem.

Proposition 25.24 (Productive-disagreement principle). *An unresolved disagreement can remain part of GRE when competing formulations preserve explicit points of comparison, accept relevant counterevidence and domain correction, and generate discriminating research within a shared programme structure.*

The eight statuses form the epistemic ledger for the remainder of Chapter 25. Programme unity can coexist with unequal levels of warrant because continuity lies in explicit dependencies and revision pathways rather than equal status across components.

Definition 25.25 (GRE status ledger). *A GRE status ledger is a versioned record linking programme components to their status, warrant, dependencies, provenance, counterevidence, unresolved alternatives, and revision history.*

Proposition 25.26 (Status-preserving programme principle). *GRE remains epistemically coherent when cumulative development can change component status without silent retyping; programme continuity therefore requires preservation of the histories through which warrants strengthen, weaken, or change.*

This discipline prepares Section 571 to state GRE's core commitments without treating every recurring concept as equally foundational or equally established. Core commitments can organize the programme while remaining compatible with revision.

25.3 Core Commitments of GRE

Section 25.2 distinguished the unequal epistemic status of GRE's present components. The present section asks a different question: which commitments organize the programme strongly enough that removing or reversing them would materially alter the kind of economic inquiry GRE has become? Its objective is to identify programme identity without converting present formulations into protected doctrine. The discussion proceeds through relational attention, generative attention, historical situatedness, value plurality, revisability, methodological pluralism, praxis orientation, domain specificity, and openness to counterevidence. The method is dependency-sensitive rather than axiomatic. A commitment counts as core when it shapes questions, evidential burdens, domain boundaries, or revision pathways across multiple parts of the programme, even though the particular concepts through which that commitment is presently expressed may later be revised.

Definition 25.27 (GRE core commitment). A *GRE core commitment* is a programme-level orientation whose removal or reversal would materially alter GRE's characteristic problem selection, inferential discipline, economic domain identity, or revision architecture across a substantial range of its present inquiries.

This definition separates centrality from certainty. A core commitment can organize the programme while remaining philosophically contestable, empirically answerable, and historically revisable. Core status therefore does not promote a heuristic into a fact, a formal representation into an ontology, or a normative proposal into an established moral conclusion.

Proposition 25.28 (Defeasible identity principle). *A commitment can be constitutive of GRE's present programme identity without being immune to counterevidence or architectural revision; programme identity is therefore versioned rather than doctrinally fixed.*

Table 25.3 summarizes the nine commitments developed below. The final column states the principal collapse that each commitment is intended to prevent. These are disciplines of inquiry rather than claims that one theoretical vocabulary exhausts the relevant phenomenon.

25.3.1 Relational Attention

Relational attention is one of GRE's most visible commitments, but its meaning is narrower than an assertion that reality is fundamentally composed of relations. The programme asks how economically relevant positions, capacities, constraints, values, institutions, and possibilities are constituted, conditioned, or transformed through relations with other positions and structures. This attention can reveal dependencies and mediated effects that disappear when an analytical object is treated as self-contained.

Definition 25.29 (Relational-attention commitment). The *relational-attention commitment* is the programme-level requirement that GRE test whether the economic properties attributed to an object depend materially on its relations, relational position, interaction history, institutional embedding, or participation in larger relational configurations.

The commitment is diagnostic rather than totalizing. Some properties can be use-

Table 25.3: Core commitments of the present GRE programme

Commitment	Positive orientation	Principal collapse resisted
Relational attention	Examine positions, dependencies, mediations, and relation-conditioned possibilities	Treating economically relevant objects as context-free isolated units
Generative attention	Ask how capacities, relations, values, institutions, and possibilities come to be formed or transformed	Reducing economic analysis to allocation among already-given objects
Historical situatedness	Index concepts, mechanisms, evidence, and theory to historical conditions	Treating historically formed categories as timeless primitives
Value plurality	Preserve typed value forms, conversion conditions, and evaluative remainders	Assuming one common metric or silent equivalence by default
Revisability	Keep claims, concepts, boundaries, and architectures open to warranted change	Treating programme continuity as preservation of present formulations
Methodological pluralism	Match methods to questions, objects, evidence, and uncertainty	Treating one method as universally epistemically prior
Praxis orientation	Examine consequences of inquiry and intervention under incomplete knowledge	Separating economic understanding categorically from practical consequence
Domain specificity	Maintain GRE as an economic research programme with explicit neighboring-domain interfaces	Conflating economic inquiry with a completed general relational theory
Openness to counterevidence	Require adverse evidence to be able to lower warranted claim status	Protecting GRE through semantic expansion or ad hoc exception

fully analyzed at the level of an individual object, material constraint, technical characteristic, or domain-specific mechanism. Chapter 24 already established that relational explanation should not become relational reduction. The core commitment is therefore to ask the relational question where it is consequential, not to force every explanandum into one relational ontology.

Relational attention also carries a burden of typing. Communication is not automatically trust; exchange is not automatically dependence; co-membership is not automatically authority; correlation is not automatically relation; and relation is not automatically power. The programme's relational identity depends partly on preserving these distinctions rather than using "relation" as a universal residual category.

Proposition 25.30 (Relational attention without relational exhaustiveness). *GRE's relational commitment requires systematic testing of relation-conditioned economic properties, but it does not require every economically consequential property or mechanism to be exhaustively relational in constitution or explanation.*

25.3.2 Generative Attention

Generative attention gives GRE its second major orientation. The programme does not examine only how scarce resources are allocated among already specified agents, goods, institutions, and preferences. It asks how economic processes help form, trans-

form, sustain, close, or regenerate the capacities, relations, institutions, value forms, categories, and option spaces through which later economic action becomes possible.

Definition 25.31 (Generative-attention commitment). The *generative-attention commitment* is the requirement that GRE investigate whether an economic process changes the conditions under which later economically relevant subjects, relations, capacities, values, institutions, or feasible possibilities can arise and persist.

This commitment is not a license to call every change generative. Chapters 12–15 and the value-theoretical and empirical-identification discussions of Chapter 24 distinguish generation from transfer, conversion, circulation, selection, revelation, persistence, redistribution, and reclassification. Chapter 24 further makes generativity answerable to discriminating evidence. Generative attention is core because GRE repeatedly asks how possibility conditions themselves change; the present taxonomy of generative mechanisms is not core in the same sense and can be revised.

The commitment also remains normatively neutral until an independent evaluative bridge is supplied. Generative processes can expand capabilities, reproduce domination, create ecological harm, generate exclusion, or multiply possibilities that are costly or destructive. The programme therefore treats generativity as an analytical object rather than a synonym for improvement.

Proposition 25.32 (Generative attention without generative valorization). *GRE treats changes in later conditions of possibility as analytically important while requiring separate evidence and normative warrant for claims that those changes are beneficial, just, desirable, or worthy of preservation.*

25.3.3 Historical Situatedness

GRE treats economic objects and the theory used to study them as historically situated. Markets, currencies, firms, property regimes, technologies, categories of work, forms of knowledge, legal institutions, social identities, and AI-mediated capabilities have histories that condition their present economic roles. Analytical vocabulary also has a history. A concept can therefore become misleading when transported across periods without reconstructing the institutions, categories, and manifestation regimes through which it acquired meaning.

Definition 25.33 (Historical-situatedness commitment). The *historical-situatedness commitment* is the requirement that GRE state or reconstruct the historical conditions under which its economically relevant objects, categories, mechanisms, evidence, and theoretical formulations acquire their present meanings and ranges of validity.

Historical situatedness does not imply that every proposition is unique to one moment or that comparison across periods is impossible. It changes the burden of generalization. Recurrence across historical regimes becomes evidence to be established rather than presumed. Fast–slow relations, criticality hypotheses, institutional persistence, power continuity, and cross-period category bridges are consequently regime-bounded claims unless stronger evidence supports wider transport.

The same requirement applies reflexively to GRE. The present programme is a product of a particular historical problem field and should remain reconstructable as its objects and conditions change. Historical revision is therefore not merely an

external possibility discussed later in this chapter; it is already part of GRE's core identity.

Proposition 25.34 (Historical transport burden). *A GRE concept or mechanism does not acquire transhistorical status merely because it is analytically productive in the present; transport across periods requires evidence that its constitutive conditions or a defensible bridge among those conditions are preserved.*

25.3.4 Value Plurality

GRE's value architecture begins from the possibility that economically relevant value is heterogeneous. Monetary value, capability, knowledge, ecological conditions, recognition, institutional standing, relational goods, future options, and other value-bearing forms need not share one natural metric. The programme therefore treats conversion, circulation, commensuration, aggregation, and compensation as questions requiring explicit mechanisms and warrants.

Definition 25.35 (Value-plurality commitment). *The value-plurality commitment is the presumption that economically relevant value forms should remain typed and potentially non-equivalent unless a common representation, conversion rule, comparison operation, or normative ordering is independently warranted for the task at hand.*

The word *presumption* is important. Chapter 24 makes value plurality itself revisable. A sufficiently powerful common representation could outperform a heterogeneous architecture in a specified domain, while poorly distinguished value categories could create unnecessary conceptual inflation. GRE's core commitment is therefore not to maximize the number of value forms. It is to avoid silent scalarization and to preserve value remainders until equivalence has been earned.

This commitment also distinguishes practical settlement from value identity. Institutions frequently make decisions by imposing prices, scores, rankings, thresholds, rights, budgets, or optimization criteria. Such commensuration can be practically necessary without proving that the underlying values are substantively equivalent or fully represented by the settlement rule.

Proposition 25.36 (Plurality-before-equivalence principle). *When several value-bearing dimensions are materially relevant, GRE should preserve their distinct typing until the comparison or conversion relation required for a particular inference has been justified; practical commensuration alone does not establish general value equivalence.*

25.3.5 Revisability

Revisability is more than an acknowledgement that future research may change conclusions. Chapters 24–25 treat revision as an internal property of the programme. Claims have defeat conditions; concepts can be narrowed, retyped, decomposed, merged, regionalized, or retired; formal representations can be replaced; domain boundaries can move; and sufficiently recurrent failure can trigger architectural revision.

Definition 25.37 (GRE revisability commitment). *The GRE revisability commitment is the requirement that substantive claims, conceptual distinctions, formal representa-*

tions, domain boundaries, and programme architecture remain linked to identifiable conditions under which their warranted status or formulation should change.

Revisability differs from vagueness. A framework is not more open merely because its concepts can be stretched to accommodate any observation. Genuine revisability requires sufficiently stable semantics for evidence to count against a claim. It also differs from indiscriminate novelty. Revision should be proportionate to the locus and severity of defeat, preserving well-supported local results when a broader component changes.

Proposition 25.38 (Revision-with-continuity principle). *GRE programme continuity depends on recoverable histories of why components changed rather than on preservation of their current wording; justified revision can therefore strengthen programme identity when provenance and dependency relations remain explicit.*

25.3.6 Methodological Pluralism

GRE does not assign one universal hierarchy to historical interpretation, qualitative inquiry, quantitative analysis, formal modelling, comparative research, institutional reconstruction, participatory methods, or computational methods. Different questions expose different aspects of relational and generative economic processes, and several methods can be necessary to identify one mechanism adequately.

Definition 25.39 (Methodological-pluralism commitment). The *methodological-pluralism commitment* is the requirement that GRE select and combine methods according to the structure of the research question, object, evidence, uncertainty, and inferential burden rather than according to a fixed programme-wide methodological hierarchy.

Pluralism is not methodological permissiveness. A method still has to answer the relevant question. Historical narrative cannot substitute for identification where a causal contrast is required; formal elegance cannot substitute for measurement; quantitative precision cannot repair a mis-specified concept; qualitative interpretation cannot by itself establish prevalence; and participatory input does not automatically establish representativeness or normative authority. The commitment is to question-sensitive adequacy rather than equal authority for every method in every task.

Proposition 25.40 (Method-to-question adequacy principle). *Methodological pluralism strengthens GRE only when the contribution and limitation of each method to the target inference are stated; plurality of methods does not by itself increase warrant when their errors, assumptions, or evidential sources are shared.*

25.3.7 Praxis Orientation

GRE was developed not only to describe economic structures but also to support inquiry into allocation, institutional design, intervention, governance, participation, and future possibility under incomplete knowledge. Praxis orientation links explanation to the consequences of acting, delaying, maintaining, redesigning, or withdrawing interventions. It does not require every GRE study to recommend action, nor does it collapse research into advocacy.

Definition 25.41 (Praxis-orientation commitment). The *praxis-orientation commitment* is the requirement that GRE remain capable of connecting warranted economic understanding to the conditions, consequences, uncertainties, affected positions, revision possibilities, and responsibilities of practical intervention where action is part of the research problem.

Praxis orientation is constrained by the epistemic discipline developed earlier in the book. Intervention does not strengthen weak evidence merely because a decision is urgent. Applied reasoning should preserve uncertainty, value conflict, participation limits, institutional capacity, irreversibility, and consequences of non-action. Conversely, indefinite deferral is not neutral when delay itself redistributes burden or forecloses options.

Proposition 25.42 (Praxis without compulsory intervention). *GRE's praxis commitment requires practical consequences to remain analytically visible where relevant, but it does not require every research result to terminate in intervention; non-intervention, observation, reversible experimentation, or further inquiry can be warranted outcomes of praxis-sensitive analysis.*

25.3.8 Domain Specificity

GRE is an economic research programme. Its relational and generative vocabulary can enter history, law, governance, education, ecology, AI studies, political theory, social theory, aesthetics, and other neighboring domains, but such movement does not erase domain-specific objects or correction authority. Chapter 23 made disciplinary containment and reciprocal correction central to cross-domain inquiry, while Chapter 24 made failed transfer part of the programme's limitation record.

Definition 25.43 (Domain-specificity commitment). The *domain-specificity commitment* is the requirement that GRE identify its principal economic problem-space and distinguish economic claims from historical, legal, political, ecological, educational, technical, aesthetic, social, or other claims whose warrants must be supplied or corrected by their relevant domains.

Domain specificity prevents two opposite failures. GRE should not isolate economic inquiry from the non-economic relations that constitute or condition economic processes. It should also not absorb every consequential relation into economics. The appropriate unit of jurisdiction is often the predicate or claim rather than the whole empirical object.

This commitment also limits the relation between GRE and a possible future Generative Relational Theory (GRT). GRE can supply comparative evidence and candidate structures, but successful economic formalization does not establish universal GR primitives. A future GRT would need stronger cross-domain and cross-historical evidence than the present book provides.

Proposition 25.44 (Economic-domain identity principle). *GRE remains recognizably economic when its principal explanatory and practical questions concern economically relevant allocation, generation, value, capability, institution, exchange, conversion, circulation, power, and possibility structures while neighboring-domain predicates retain their independent warrants and correction pathways.*

25.3.9 Openness to Counterevidence

Openness to counterevidence is the strongest discipline among the present commitments because it determines whether the others remain research commitments rather than identity-protecting doctrines. Chapter 24 specifies both evidential defeat conditions and the circumstances under which repeated defeat should escalate to architectural revision. The final programme therefore requires more than willingness to discuss criticism. Relevant adverse evidence must be capable of changing warranted status.

Definition 25.45 (Counterevidence-openness commitment). The *counterevidence-openness commitment* is the requirement that GRE formulate consequential claims and programme components so that sufficiently relevant adverse evidence, rival explanations, replication failures, domain counterexamples, or internal inconsistencies can lower, narrow, retype, replace, or retire them.

This commitment prevents the programme from becoming self-sealing. Relational explanation cannot be protected by redefining every causal factor as relational. Generativity cannot be protected by labeling every change generation. Value plurality cannot be protected by multiplying categories whenever comparison succeeds. Domain specificity cannot be protected by treating every failed transfer as irrelevant. Revisability therefore becomes genuine only when evidential loss has consequences.

Proposition 25.46 (Identity-through-answerability principle). *GRE's programme identity is strengthened, rather than weakened, when adverse evidence can change its components through declared defeat and revision pathways; answerability is therefore part of what makes the programme recognizable across revisions.*

The nine commitments should not be read as an axiom list whose elements must remain textually unchanged. They form a present identity profile. Relational and generative attention specify characteristic questions; historical situatedness and value plurality constrain how objects and evaluative forms are typed; methodological pluralism and praxis orientation shape inquiry and intervention; domain specificity regulates external interfaces; revisability and counterevidence preserve the possibility that all of these commitments can themselves be reconsidered.

Definition 25.47 (GRE programme identity kernel). The *GRE programme identity kernel* is the mutually constraining configuration of core commitments through which the present programme selects problems, organizes evidence, limits its domain, and remains answerable to revision, without requiring one immutable vocabulary, method, formalism, or metaphysical doctrine.

Proposition 25.48 (Core-commitment interaction principle). *No single present core commitment is sufficient to identify GRE in isolation; the programme is characterized by their joint operation, including the tensions through which one commitment limits the overextension of another.*

This interaction prepares Section 572 to state the corresponding non-commitments. A programme becomes clearer not only by identifying what it requires, but also by stating which stronger metaphysical, formal, methodological, normative, disciplinary, and general-theoretical conclusions do not follow from those requirements.

25.4 Boundaries of GRE Programme Commitment

Section 25.3 identified the orientations that presently make GRE recognizable as a research programme. The present section states the complementary boundary conditions on those commitments. Its objective is to prevent the programme identity described in the preceding section from being silently strengthened into metaphysical doctrine, formal exclusivity, value monism, historical teleology, methodological hierarchy, normative automaticity, disciplinary replacement, or premature general theory. The discussion proceeds through eight commitment boundaries. The method is inferential: for each boundary, the section asks which stronger conclusion does not follow merely from accepting GRE's core commitments and what additional warrant would be required before that stronger conclusion could responsibly be adopted.

Definition 25.49 (GRE programme non-commitment). A *GRE programme non-commitment* is a stronger metaphysical, formal, evaluative, historical, methodological, normative, disciplinary, or general-theoretical conclusion that is not entailed by GRE's present core commitments and therefore requires independent warrant before it can be attributed to the programme.

A non-commitment is not a declaration that the stronger position is false. Some stronger positions may later prove useful, empirically supported, philosophically defensible, or locally necessary. The point is narrower: GRE does not acquire them merely by virtue of being relational, generative, historically situated, pluralist, praxis-oriented, domain-specific, revisable, and open to counterevidence.

Proposition 25.50 (Commitment asymmetry principle). *GRE's core commitments constrain how inquiry should proceed, but they do not automatically authorize stronger conclusions about ultimate ontology, universal formal language, complete value commensuration, historical direction, methodological supremacy, normative priority, disciplinary replacement, or general relational theory.*

Table 25.4 summarizes the eight boundaries developed below. The final column states the additional kind of warrant that would be needed before the stronger conclusion could move from external possibility to warranted GRE commitment.

25.4.1 Metaphysical Suspension

GRE's relational attention is analytically strong but metaphysically restrained. The programme often studies entities, institutions, capacities, values, and economic positions as historically sustained relational configurations, and it distinguishes relational reality from the manifestations through which that reality becomes accessible. Neither move establishes that ultimate reality is fundamentally relational, processual, field-like, or otherwise exhausted by the conceptual language used for inquiry.

Definition 25.51 (Metaphysical suspension boundary). The *metaphysical suspension boundary* is the programme condition under which GRE may use relational, processual, field-theoretic, geometric, spacetime, or related ontological vocabularies analytically while withholding the stronger claim that any such vocabulary has established the final constitution of reality.

This boundary matters because successful explanation within a relational representation is weaker than metaphysical proof. A relation-sensitive account of owner-

Table 25.4: Boundaries of present GRE programme commitment

Boundary	Conclusion not supplied by GRE alone	Additional warrant required
Metaphysical scope	Relations constitute ultimate reality	Independent metaphysical argument and domain-appropriate evidence
Formal scope	One mathematical language is universally privileged	Demonstrated indispensability across problem classes and domains
Value metrics	Heterogeneous values reduce to one complete metric	Justified commensuration preserving materially relevant distinctions
Historical direction	Generative history converges toward a predetermined end	Independent historical and normative warrant for directional necessity
Method choice	One method is epistemically supreme for GRE	Scope-specific evidence that rivals systematically fail for the task
Normative priority	More generativity is automatically better	Explicit normative bridge concerning what, for whom, and at what cost
Disciplinary role	GRE supersedes existing economics	Comparative explanatory and empirical superiority over defined scopes
General theory	GRE establishes a completed GRT	Independent cross-domain and cross-historical reconstruction and testing

ship, trust, currency, institutional standing, or economic power can outperform an atomistic account without showing that all properties of the relevant objects are relational in ultimate ontology. Likewise, the practical persistence and causal efficacy of relationally constituted objects do not settle whether deeper material, biological, phenomenological, physical, or otherwise differently characterized structures also matter.

The metaphysical boundary therefore protects GRE from converting explanatory usefulness into ontological necessity. It also protects future inquiry. If a later domain develops stronger reasons for a different ontological reading, GRE can revise its representation without requiring the entire economic programme to collapse.

Proposition 25.52 (Analytical success without metaphysical closure). *Successful relational explanation can support the adequacy of a relational representation for a declared economic problem without establishing that the represented relation or structure is the unique or ultimate ontology of its target.*

25.4.2 Formal Plurality

The same restraint applies to formal language. This book has used or discussed networks, dynamical systems, field-like descriptions, operator-like transformations, category-theoretic relations, history-bearing complexes, and other formal resources. These formalisms are not interchangeable, and their coexistence should not be interpreted as a search for one notation into which every GRE problem must eventually

be translated.

Definition 25.53 (Formal plurality boundary). The *formal plurality boundary* is the requirement that GRE select formal structures according to the local analytical object, inferential burden, empirical correspondence, and representational gain rather than presuming one mathematical language to be universally privileged.

A universal formalism would require much stronger evidence than repeated usefulness. It would have to preserve the distinctions required across substantially different problems, permit warranted empirical interpretation, and outperform serious alternatives without acquiring its universality by semantic dilution. A formalism that can represent everything only because its primitives have become indefinitely permissive offers little discriminating advantage.

The book's preferred advanced formalisms should therefore remain defeasible. A 2-complex can be useful for representing history-bearing relational structures; an operator-like language can be useful for typed transformations; field language can be useful where distributed structure adds explanatory discrimination. None thereby becomes GRE's obligatory syntax.

Proposition 25.54 (Formal non-exclusivity principle). *No formal representation used in the present GRE programme acquires universal authority from elegance, recurrence, or successful local application alone; continued use remains conditional on locally demonstrated analytical and evidential adequacy.*

25.4.3 Value-Metric Plurality

Value plurality is a core commitment because the book repeatedly encounters value forms whose realization conditions, temporal structures, affected positions, and normative warrants differ. The corresponding non-commitment is not a doctrine of absolute incommensurability. GRE does not require that heterogeneous values can never be compared, aggregated, exchanged, translated, or represented under a common decision rule. It requires the bridge enabling such operations to be justified rather than silently assumed.

Definition 25.55 (Value-metric plurality boundary). The *value-metric plurality boundary* is the programme condition under which heterogeneous value forms remain separately typed until a comparison or aggregation rule has demonstrated sufficient validity for the declared purpose without erasing distinctions material to the inference or decision.

This boundary permits partial and local commensuration. Monetary valuation can answer some allocation questions; multicriteria systems can structure some policy comparisons; thresholds can protect non-substitutable claims; deliberation can settle action without producing a cardinal common measure. The existence of these procedures does not establish that the underlying values are one substance, and their absence in another case does not prove that all comparison is impossible.

The programme therefore rejects both premature monism and automatic incommensurability. The appropriate question is operation-specific: which values are being compared, through what rule, for which decision, with which remainder, and under whose authority?

Proposition 25.56 (Commensuration without metric monism). *GRE can accept locally warranted comparison, translation, or aggregation among heterogeneous values without committing to one complete metric that preserves every economically or normatively material value distinction.*

25.4.4 Historical Contingency and Directional Restraint

Generative analysis is inherently historical because it asks how later capacities, structures, institutions, relations, and possibilities arise from earlier configurations. That temporal orientation does not entail teleology. A generative process need not move toward progress, efficiency, justice, complexity, equilibrium, freedom, or any other predetermined endpoint.

Definition 25.57 (Historical non-teleology boundary). The *historical non-teleology boundary* is the requirement that GRE explain historical generation through contingent mechanisms, constraints, branching possibilities, closures, feedback, and path dependence without inferring predetermined direction or normative progress from generation itself.

The boundary is especially important because retrospective narratives easily convert realized outcomes into apparent destinations. Once a monetary institution, technological standard, firm form, welfare regime, or political economy becomes durable, its persistence can make earlier alternatives appear less possible than they were. GRE should instead preserve failed, unrealized, or foreclosed alternatives when they are necessary for understanding the historical possibility structure.

This does not rule out directional tendencies. Some regimes can produce cumulative concentration, capability expansion, increasing dependence, ecological depletion, or other recurrent trajectories. Such tendencies remain historically conditioned mechanisms rather than evidence that history as a whole possesses an intrinsic destination.

Proposition 25.58 (Generation without historical destination). *The identification of generative mechanisms, cumulative dynamics, or path dependence does not by itself establish a necessary historical endpoint or a normative ranking of the direction in which the system changes.*

25.4.5 Methodological Plurality and Local Adequacy

Methodological pluralism implies more than tolerance among methods. It denies that GRE's identity is tied to one universally superior route to knowledge. Historical reconstruction, ethnography, interpretation, comparative institutional analysis, qualitative inquiry, statistics, causal inference, formal modeling, simulation, archival research, and computational methods can answer different parts of a relational-generative problem.

Definition 25.59 (Methodological non-exclusivity boundary). The *methodological non-exclusivity boundary* is the requirement that no method receive programme-wide epistemic priority independent of the question, target, evidence structure, uncertainty, and inferential task for which it is being used.

The boundary does not imply that every method is equally adequate for every problem. Methodological pluralism permits strong local judgments. A carefully identified natural experiment may answer one causal question better than interpretive evidence; archival reconstruction may answer another question that contemporary measurement cannot reach; formal modeling may reveal consequences of assumptions that descriptive prose leaves obscure. The pluralist commitment concerns the absence of a universal hierarchy, not the absence of methodological criticism.

It also resists a subtler hierarchy in which formalization is treated as the final stage of theoretical maturity. Some GRE questions can be formalized productively; others may lose essential historical, semantic, normative, or institutional structure when forced into a prematurely closed formal space.

Proposition 25.60 (Method-to-question priority). *Within GRE, methodological adequacy is assessed relative to the research question and inferential burden; the programme does not rank historical, interpretive, empirical, qualitative, quantitative, formal, or computational methods by one context-independent order of epistemic prestige.*

25.4.6 Generativity and Normative Independence

Generativity is analytically central to GRE, but the programme does not treat generativity itself as a complete normative standard. The capacity to generate more options, capabilities, institutions, relations, values, or future pathways can be economically important while remaining ethically or politically ambiguous. Systems can generate capacities for domination, extraction, surveillance, ecological degradation, manipulation, or exclusion as well as capacities that many normative frameworks would value positively.

Definition 25.61 (Normative independence of generativity). The *generativity–normativity separation* is the programme condition under which a claim that a process generates or preserves economically relevant capacities, relations, values, or possibilities remains analytically distinct from the normative judgment that such generation or preservation is good, just, legitimate, or worthy of priority.

This separation also prevents a reverse error. A process can be normatively important even when it is not highly generative. Protection of a vulnerable relation, ecological threshold, legal right, historical memory, or non-substitutable value may require limiting some forms of generation or option expansion. The normative question therefore concerns what is generated, for whom, through which burdens and relations, relative to which alternatives, and under which warranted evaluative principles.

Proposition 25.62 (Normative bridge requirement for generativity). *A GRE claim about generative capacity acquires normative priority only through an additional evaluative bridge that specifies the value, standing, distribution, burden, temporal horizon, and relevant alternatives associated with what is generated or preserved.*

25.4.7 Complementarity with Existing Economics

GRE has been developed partly because important economic questions are obscured when actors, values, institutions, histories, and possibilities are treated as already given. This motivation does not imply that existing economics should be displaced wholesale. Price theory, game theory, econometrics, industrial organization, public economics, macroeconomics, behavioral economics, institutional economics, political economy, and other traditions contain methods and explanations that can remain highly effective within their appropriate scopes.

Definition 25.63 (Disciplinary complementarity boundary). The *disciplinary complementarity boundary* is the programme condition under which GRE presents its concepts and methods as additions, reconstructions, critiques, or alternatives for specified economic problems rather than as a presumptive replacement for the heterogeneous bodies of existing economics.

Replacement is a comparative claim. It requires demonstrating that GRE explains or supports inquiry better for a defined problem while preserving relevant empirical adequacy and avoiding excessive auxiliary assumptions. In many cases, GRE may instead supply a prior question about how preferences, capabilities, institutions, market categories, or feasible sets were generated before a conventional model analyzes behavior within the resulting structure.

This complementarity also keeps dialogue reciprocal. Existing economic theories can expose where GRE is unnecessarily elaborate, insufficiently identified, formally weak, empirically redundant, or unable to reproduce well-established results. GRE's openness to such criticism is part of its programme identity rather than a concession outside it.

Proposition 25.64 (Problem-relative disciplinary contribution). *GRE's contribution to economics should be judged problem by problem through explanatory, empirical, conceptual, and practical comparison; the existence of GRE does not entail the obsolescence of theories whose assumptions remain adequate for their declared tasks.*

25.4.8 Deferred General Relational Unification

GRE is a domain instantiation developed with preliminary GR foundations, not a completed general Generative Relational Theory. The recurrence of relation, generation, history, constraint, manifestation, power, field, or related vocabulary across neighboring domains can motivate comparison, but recurrence is not sufficient evidence of a domain-general invariant. Shared intellectual ancestry can itself produce apparent cross-domain regularity.

Definition 25.65 (Deferred general-unification boundary). The *deferred general-unification boundary* is the requirement that claims about a general Generative Relational Theory remain provisional until independently developed domains provide sufficiently discriminating cross-domain and cross-historical evidence for shared structures that survive domain-specific reconstruction, counterexamples, translation failure, and alternative formulations.

This boundary leaves open several possible futures. Comparative work may reveal robust invariants worthy of GRT-level formulation. It may instead reveal families of

related but irreducible domain theories, or a thinner common grammar whose explanatory content remains primarily local. The present book does not decide among these futures.

The strongest evidence for generality would not be that multiple domains repeat vocabulary introduced from the same source. It would be that independently constituted inquiries encounter structurally comparable problems, reconstruct analogous mechanisms using their own evidence and methods, survive serious domain-specific counterexamples, and still retain a non-trivial shared structure after the domain-specific remainder is restored.

Proposition 25.66 (Generality after independent reconstruction). *A future GRT claim would be strengthened when independently developed domains rediscover a structurally comparable relation after domain-specific reconstruction and adversarial testing; designed recurrence within a shared vocabulary is insufficient by itself.*

The eight boundaries developed in this section complete the identity profile begun in Section 25.3. GRE is presently recognizable through what it asks researchers to attend to and through the stronger conclusions it refuses to acquire automatically. The resulting programme is relational without requiring final relational metaphysics; formally ambitious without formal monism; value-plural without declaring universal incommensurability; historical without teleology; methodologically plural without suspending methodological judgment; generative without automatic normative valorization; economically distinctive without claiming disciplinary replacement; and connected to GR without prematurely claiming a completed GRT.

Definition 25.67 (GRE commitment boundary profile). *The GRE commitment boundary profile is the paired specification of present core commitments and present non-commitments that jointly identifies what the programme requires for recognizable inquiry and which stronger conclusions remain outside that requirement absent independent warrant.*

Proposition 25.68 (Programme identity through bounded commitment). *GRE's identity is more precisely preserved when core commitments are paired with explicit non-commitments, because the pair constrains both conceptual dilution and theoretical overreach while leaving future revision possible.*

This bounded identity prepares Section 573 to examine GRE as a language of economic inquiry. A research language is useful not because every concept it contains is mandatory or universally true, but because it makes certain questions, distinctions, translations, comparisons, reconstructions, and limits easier to state and contest.

25.5 GRE as a Language of Economic Inquiry

Sections 25.3–25.4 specified what presently identifies GRE and which stronger conclusions do not follow from that identity. The present section develops a different aspect of programme identity: GRE can function as a language of economic inquiry. The objective is not to redescribe the economy in one mandatory vocabulary, but to identify a disciplined set of questions, distinctions, translation practices, comparison procedures, reconstruction tasks, formalization choices, and dialogical interfaces that make particular economic problems easier to state and contest. The section

Table 25.5: Functions and limits of GRE as a language of economic inquiry

Function	Principal contribution	Discipline required
Questions	Makes generation, relation, history, value, and possibility explicit objects of inquiry	Do not presume the answer in the wording of the question
Distinctions	Separates mechanisms that ordinary vocabulary can conflate	Preserve type differences and allow later retyping
Translation	Relates vocabularies across theories, domains, and historical settings	Record semantic loss, remainder, and correction authority
Comparison	Makes similarities and differences inspectable without presuming equivalence	State the comparison task and dimensions explicitly
Reconstruction	Organizes inference from traces toward histories and relational structures	Preserve uncertainty, alternatives, and inverse-problem limits
Formalization	Provides precise representations where additional structure earns analytical value	Define semantics locally and avoid ontology by notation
Dialogue	Supports contestable exchange among theories, disciplines, and practical positions	Permit external concepts and counterevidence to revise GRE
Language limits	Reveals blind spots, semantic inflation, and compulsory-vocabulary risks	Treat the language itself as revisable research infrastructure

proceeds through eight functions of this language and closes by specifying its limits. The method is functional rather than metaphysical: the adequacy of the language is judged by what it helps inquiry discriminate, reconstruct, compare, and revise, not by whether its vocabulary is presumed to mirror the ultimate structure of reality.

Definition 25.69 (GRE inquiry language). A *GRE inquiry language* is a revisable set of problem-framing concepts, distinctions, question forms, representational resources, and inferential disciplines used to investigate economically relevant relational generation, transformation, value, history, power, and possibility without requiring those resources to constitute a universal description of economic reality.

The word *language* is deliberately broad but bounded: it includes prose, technical distinctions, diagrams, formal representations, comparative schemas, and question structures. It neither implies one complete formal language nor requires GRE terminology. Different vocabulary can address a GRE-relevant problem when the relevant analytical distinctions are preserved.

Proposition 25.70 (Interrogative priority of GRE language). *The primary value of GRE as an inquiry language lies in improving the questions and distinctions through which economic phenomena are investigated; adoption of GRE vocabulary is secondary to preservation of the analytical work performed by those questions and distinctions.*

Table 25.5 summarizes the eight functions developed below. The final row is intentionally limiting: every inquiry language makes some phenomena easier to notice and others easier to obscure, so reflexive criticism of the language belongs inside the programme.

25.5.1 Question Architecture

An inquiry language first changes what can be asked economically. Standard economic questions often begin with already specified actors, preferences, resources, institutions, constraints, technologies, and feasible sets. Those questions remain important. GRE adds a prior and complementary family of questions concerning how these objects became available, stable, recognized, convertible, valuable, or actionable in the first place.

Definition 25.71 (GRE question architecture). The *GRE question architecture* is the recurrent family of questions that asks how economically relevant subjects, relations, capacities, institutions, values, constraints, classifications, and possibilities are generated, sustained, transformed, converted, circulated, foreclosed, or rendered manifest within historical and relational conditions.

The architecture does not require every study to investigate every process. A labor-market study may examine credential recognition; an institutional study, legal categories and conversion; an historical study, relations making later market forms feasible; an AI-era study, organizational conditions converting technical into economic capability. The shared feature is attention to how the conditions of familiar economic objects are generated or transformed.

Questions themselves can nevertheless overreach. A question such as “which relation generated the outcome?” already assumes that the outcome was generated through a relation rather than selected, transferred, revealed, or produced through a mixed mechanism. GRE therefore requires questions to remain rival-sensitive.

Proposition 25.72 (Question non-presupposition principle). *A GRE-framed question should make relational or generative possibilities investigable without building the truth of a specifically relational or generative explanation into the question itself.*

25.5.2 Analytical Distinctions

A second function of the GRE language is distinction. Much of the book’s architecture depends on refusing to use one term for several analytically different operations: generation differs from transfer; conversion differs from circulation; circulation differs from return; stability differs from goodness; generativity differs from normative desirability; formal equivalence differs from ontological identity; economic agency differs from legal personality or moral standing.

Definition 25.73 (GRE distinction set). A *GRE distinction set* is a locally justified separation among concepts or mechanisms whose conflation would materially change the interpretation, evidence, or consequence of an economic claim.

The requirement of local justification matters. A language can become unusable if it multiplies distinctions indefinitely. GRE should preserve a distinction when the separated categories differ in evidence, mechanism, normative implication, domain authority, temporal structure, or revision condition. When a distinction does no analytical work, maintaining it merely because it appears elsewhere in the programme produces terminological burden rather than precision.

The same principle permits later retyping. A distinction that initially appears important may prove empirically redundant; conversely, a category treated as unitary

may later require decomposition. The inquiry language should therefore support sharper typing without turning early classifications into permanent ontological commitments.

Proposition 25.74 (Distinction adequacy principle). *A GRE distinction earns continued use when preserving it improves empirical discrimination, inferential clarity, normative transparency, domain containment, or revision capacity relative to plausible simpler classifications.*

25.5.3 Translation across Vocabularies

Economic inquiry rarely occurs within one vocabulary. Terms travel among theories, disciplines, institutions, historical periods, policy systems, and everyday practices. GRE therefore requires translation, but Chapter 23 established that translation does not establish identity. The present section recasts that lesson as a property of the inquiry language itself.

Definition 25.75 (Inquiry-language translation). *Inquiry-language translation* is the explicit mapping of a concept, distinction, question, or formal object from one vocabulary into another while preserving the dimensions required for the intended inquiry and recording dimensions that are transformed, lost, or left without an equivalent.

A legal status can be economically consequential without being reducible to an economic position; an ecological threshold can constrain economic possibility without becoming an economic value; an educational capability can affect economic conversion without being exhausted by its economic effect. Translation should therefore identify the purpose for which correspondence is being claimed. A translation adequate for tracing economic consequences may be inadequate for evaluating legal validity or educational quality.

Semantic remainder therefore has a constructive role: incomplete translation can reveal receiving-domain distinctions, GRE-specific assumptions, or the need for a new interface concept.

Proposition 25.76 (Purpose-bounded translation principle). *The adequacy of a GRE translation is relative to the declared inferential purpose; successful translation for one economic question does not authorize unrestricted substitution of the translated concepts across other questions or domains.*

25.5.4 Comparison without Premature Equivalence

Comparison is closely related to translation but performs different work. Translation asks how one vocabulary can be related to another. Comparison asks along which dimensions two objects, mechanisms, histories, institutions, or theories should be treated as similar or different. GRE's relational orientation makes comparison especially important because apparent similarity at the level of outcomes can coexist with substantial differences in relational constitution or historical production.

Definition 25.77 (GRE comparison frame). *A GRE comparison frame* is an explicit specification of the comparison object, dimensions, historical and institutional scope, evidential basis, and inferential purpose through which similarities and differences are assessed.

A comparison frame prevents lexical identity from carrying excessive inferential weight. Institutions called “markets” can differ in membership, law, authority, value forms, power, and historical formation; apparent capability gains can arise through different mechanisms; mathematically similar models can represent different empirical objects.

Comparison can also reveal invariance. When a structure survives substantial variation in vocabulary, history, domain, and representation, it becomes a stronger candidate for broader generalization. Yet the comparison itself should remain prior to the inference of invariance.

Proposition 25.78 (Comparison-before-equivalence principle). *GRE should establish the dimensions and limits of comparison before inferring equivalence, invariance, portability, or common mechanism from observed similarity.*

25.5.5 Historical and Relational Reconstruction

GRE also functions as a language of reconstruction. Many economically consequential relations cannot be observed directly, and many historical processes are accessible only through incomplete traces, manifestations, institutional records, classifications, testimony, or later outcomes. Inquiry therefore often proceeds backward from partial evidence toward plausible relational histories.

Definition 25.79 (GRE reconstruction language). The *GRE reconstruction language* is the set of concepts used to state how present or recorded manifestations support bounded inferences about past or latent relational structures, mechanisms, and possibility conditions while preserving alternative reconstructions and evidential limits.

Reconstruction should make uncertainty representable rather than append a generic caveat. Reconstruction envelopes, compatibility classes, hidden relations, historical horizons, missingness, and rival mechanisms help specify where several histories remain compatible with the evidence.

Reconstruction is also necessary for apparently stable economic objects. Money, property, firms, credentials, technological capability, or institutional authority can appear as present entities while depending on long historical processes of stabilization and recognition. Reconstruction asks which parts of those histories remain causally or constitutively relevant to the present claim.

Proposition 25.80 (Bounded reconstruction principle). *GRE reconstruction should support conclusions only at the level of detail stable across serious evidential alternatives; greater narrative completeness should not be inferred merely because the inquiry language can describe a more complete history.*

25.5.6 Selective Formalization

Formalization is another component of the inquiry language, but Section 25.4 already established formal plurality as a programme boundary. GRE therefore treats mathematics as one family of languages for precision rather than as the final language into which all economic inquiry should be translated.

Definition 25.81 (Selective GRE formalization). *Selective GRE formalization* is the use

of a mathematically specified representation when its additional structure improves a declared analytical task sufficiently to justify the assumptions, semantic commitments, and representational losses introduced by the formalism.

Formalization follows conceptual typing. Graphs require defensible node and edge semantics; operator-like representations require meaningful transformations and types; field descriptions require discriminating distributed structure; history-bearing complexes require that the preserved historical relations matter to the question.

Formalization can nevertheless feed back into ordinary language. A failed attempt to formalize a concept may reveal ambiguity in its definition, hidden dependence on scale, inconsistent typing, or an unarticulated assumption. The failure can therefore improve GRE even when the proposed formalism is abandoned.

Proposition 25.82 (Formalization feedback principle). *The value of GRE formalization includes both successful representation and diagnostic failure: inability to formalize a concept coherently can reveal conceptual ambiguity or hidden assumptions that should be repaired independently of whether a formal model is ultimately retained.*

25.5.7 Dialogical Use

An inquiry language should also permit dialogue with scholars who do not share it. GRE would become intellectually closed if criticism first had to be translated into GRE terminology before it could count as relevant. The programme instead requires bidirectional dialogue: GRE concepts can illuminate problems in other theories, and external theories can expose redundancy, empirical weakness, conceptual inflation, missing mechanisms, or better distinctions within GRE.

Definition 25.83 (Dialogical interoperability). *Dialogical interoperability* is the capacity of the GRE inquiry language to enter structured comparison with alternative theoretical, disciplinary, empirical, and practical vocabularies without requiring those vocabularies to adopt GRE's categories as a condition of criticism or contribution.

Interoperability requires common objects of disagreement. Critics can challenge a generative attribution, relational explanation, value distinction, or domain translation without adopting GRE terminology. GRE should respond through evidence, scope revision, conceptual repair, or rejection on stated grounds rather than terminological insulation.

Dialogue also supports cumulative comparison. When two theories use different terms but make comparable predictions or mechanism claims, their disagreement can be reconstructed without forcing lexical harmonization. When they answer different questions, the dialogue can reveal complementarity rather than artificial competition.

Proposition 25.84 (Vocabulary-independent contestability). *A criticism or alternative explanation can count against a GRE claim even when it is formulated outside GRE vocabulary, provided that it addresses the same empirical, inferential, formal, or normative burden with sufficient specificity.*

25.5.8 Limits of the Inquiry Language

Treating GRE as a language of inquiry creates its own risk. A vocabulary that becomes familiar can make the distinctions it contains appear natural, while phenomena that do not fit those distinctions become harder to notice. Repeated use of words such as relation, generation, value, conversion, circulation, power, field, spacetime, or manifestation can also create an illusion of explanatory continuity even where their local meanings differ substantially.

Definition 25.85 (Inquiry-language blind spot). An *inquiry-language blind spot* is a recurrent failure to notice, describe, or test an economically relevant phenomenon because the available GRE vocabulary, question structure, or distinction set makes alternative framings difficult to express or treats them as derivative by default.

Blind spots can arise through lexical saturation, semantic expansion, inherited binaries, favored formalisms, poorly corrected imports, or the assumption that every relevant process must fit the current GRE taxonomy. They are difficult to detect when the programme is assessed only from within its own language.

Shared vocabulary remains necessary for cumulative work, but it should stay permeable to paraphrase, external description, counterexample, reclassification, and concept retirement.

Definition 25.86 (GRE language-revision trigger). A *GRE language-revision trigger* arises when recurrent empirical, comparative, cross-domain, historical, or dialogical work shows that a GRE term, distinction, or question form systematically obscures relevant alternatives, collapses materially different mechanisms, or requires semantic stretching to accommodate counterevidence.

Proposition 25.87 (Language non-mandatoriness principle). *No GRE term is mandatory for valid economic inquiry merely because it belongs to the programme; the programme should preserve conceptual identity through inferential work and explicit distinctions rather than through compulsory terminology.*

Definition 25.88 (GRE inquiry-language profile). The *GRE inquiry-language profile* is the versioned record of the programme's principal question forms, analytical distinctions, translation rules, comparison frames, reconstruction concepts, formal resources, dialogical interfaces, known blind spots, and language-revision triggers.

Proposition 25.89 (Inquiry language as revisable infrastructure). *GRE is best treated as a language of economic inquiry when its vocabulary functions as revisable research infrastructure: stable enough to support cumulative comparison, yet permeable enough to permit paraphrase, counterexample, alternative formalization, domain correction, and concept retirement.*

The language perspective adds a distinct dimension to GRE's programme identity: a structured way of making economic questions, distinctions, translations, comparisons, reconstructions, formalizations, and disagreements explicit. Its usefulness depends on improving inquiry relative to alternatives; its legitimacy depends on remaining contestable and replaceable. The following section examines how this economic inquiry language stands as a domain instantiation of preliminary Generative Relational foundations.

25.6 Economic Instantiation of Preliminary GR

Section 25.5 described GRE as a revisable language of economic inquiry. The present section locates that language within the wider Generative Relational project without reversing the book's order of warrant. GRE is the principal domain developed here; GR supplies only the preliminary foundations needed to formulate and discipline that economic programme. The objective is therefore to specify what is shared, what is economically reconstructed, what can fail locally, what may travel across domains, and what evidential burden would have to be met before any broader Generative Relational Theory (GRT) could be claimed. The section proceeds through eight issues: domain specificity, shared foundations, economic concept formation, economic failure, cross-domain learning, candidate invariants, non-transferable assumptions, and conditions for future GRT. The method is comparative and dependency-sensitive. Recurrence of vocabulary is treated as a starting point for testing, not as evidence of completed generality.

Definition 25.90 (GRE domain instantiation). A *GRE domain instantiation* is the economically specific reconstruction of preliminary Generative Relational questions, distinctions, and analytical disciplines within an economic problem-space, such that the resulting concepts remain answerable both to economic evidence and to the limits of the preliminary foundations from which they were developed.

The word *instantiation* therefore does not mean mechanical application. A domain instantiation may alter the meaning, typing, evidential burden, or usefulness of a preliminary concept. It may also reveal that a supposedly general distinction does not survive domain-specific investigation.

Proposition 25.91 (Domain-first warrant principle). A *GRE result acquires broader GR significance only after its economic warrant has been established at the level appropriate to the claim; recurrence of GR vocabulary within GRE cannot substitute for domain-specific evidence.*

Table 25.6 summarizes the eight dimensions developed below. The table is intentionally asymmetric: the first four concern what GRE receives and reconstructs, while the last four concern what GRE can return to broader comparative inquiry.

25.6.1 Economic Domain Specificity

GRE is not defined merely by attaching economic examples to relational vocabulary. Its domain specificity comes from the kinds of problems for which it seeks economic explanation: allocation, capability, value formation and conversion, circulation, property and access, institutional coordination, economic power, distribution, economic participation, intertemporal consequence, and the generation or foreclosure of economically consequential possibilities.

Definition 25.92 (GRE principal problem-space). The *GRE principal problem-space* is the set of questions concerning how economically relevant subjects, relations, capacities, institutions, value forms, constraints, conversion conditions, circulation paths, power structures, and possibility spaces are generated, sustained, transformed, allocated, or foreclosed within historically situated economic life.

The adjective *economic* remains indispensable. A relation can be politically legit-

Table 25.6: Architecture of GRE as an economic instantiation of preliminary GR foundations

Dimension		GRE task	Principal discipline
Domain	speci- ficity	Define the economic problem-space and its objects without assuming universal scope	Economic warrant precedes cross-domain generalization
Shared	founda- tions	Reuse minimal GR questions and distinctions where they remain useful	Foundations are preliminary and revisable
Economic	con- cepts	Develop domain-specific concepts such as allocation, value conversion, circulation, power, and economic spacetime	Domain semantics are not generic GR primitives by default
Economic	fail- ures	Record where GRE concepts fail, overreach, or require retyping	Failure can revise GRE and test supposed generality
Cross-domain	learning	Compare independently developed neighboring domains	Correction is bidirectional rather than export-only
Candidate invari- ants		Test recurrent structures across domains and historical settings	Shared origin is a confound, not corroboration
Non-transferable assumptions		Identify assumptions that depend on economic institutions or semantics	Failed transfer is positive evidence about scope
Future GRT		Promote only structures surviving independent, adversarial comparison	General theory remains a future empirical and conceptual achievement

imate or illegitimate, legally valid or invalid, aesthetically valuable or poor, educationally enabling or damaging, and ecologically regenerative or destructive in ways that GRE cannot settle by economic analysis alone. GRE enters those questions when the relevant relation also changes economic access, capability, allocation, value realization, dependence, or future possibility. It does not acquire authority over the non-economic predicate merely because economic consequences are present.

Domain specificity also prevents an opposite error: reducing economics to pre-existing markets, prices, exchange, or monetary allocation. The economic problem-space itself is historically generated. Care, knowledge, digital infrastructure, platforms, AI systems, environmental constraints, public goods, credentials, legal recognition, and symbolic forms may become economically consequential through different historical architectures. GRE therefore treats the boundary of the economic domain as revisable without treating it as unlimited.

Proposition 25.93 (Problem-space identity principle). *GRE remains an economic programme when its principal explanatory target is an economically consequential problem-space, even where the empirical object is simultaneously legal, political, social, educational, ecological, technical, or aesthetic.*

This principle is claim-specific rather than object-specific. A university, court, household, watershed, AI system, museum, firm, or state may support several domain analyses at once. GRE's task is to specify which economically relevant predicates it explains and which predicates remain under another domain's authority.

25.6.2 Shared Preliminary GR Foundations

The book has used a deliberately sparse set of preliminary GR resources. They are shared because they organize inquiry across several parts of the book, not because they have been established as universal ontology. Four minimal analytical primitives—change, structure, constraint, and difference—allow richer objects to be introduced without presupposing that subjects, relations, institutions, fields, or value forms are metaphysically primitive. The three-level reality architecture distinguishes ontological reality, whose ultimate character is suspended; relational reality, comprising sufficiently stable and causally consequential relational configurations; and manifestational reality, through which such configurations become accessible under particular conditions.

Definition 25.94 (Preliminary GR foundation set). The *preliminary GR foundation set* is the revisable collection of minimal questions and distinctions used in this book before domain-specific GRE concepts are introduced, including change, structure, constraint, difference, ontological suspension, relational reality, manifestation, historical situatedness, relational-generative analysis, and explicit revisability.

These resources are intentionally thinner than GRE itself. They do not contain an economic value theory, a theory of conversion, an account of economic circulation, a power genealogy, a justice architecture, or an economic spacetime model. Nor do they determine which methods should be used in a particular study. Their function is to make several families of questions available while keeping stronger commitments open to correction.

The term *foundation* should therefore not be read foundationalistically. Some foundations may later prove domain-bound, redundant, or badly typed. The economic domain can test them. If manifestation adds no discrimination in a class of cases, if relational priority repeatedly underperforms mixed explanations, or if the three-level architecture becomes unstable under empirical use, GRE supplies reasons to revise the preliminary GR foundation rather than merely adjust the economic application.

Proposition 25.95 (Foundation revisability principle). *A preliminary GR distinction used by GRE remains a working foundation only while it continues to improve economic inquiry relative to serious alternatives; economic failure can therefore propagate upward to revision of the preliminary foundation itself.*

This upward direction of correction is essential. Without it, calling GRE an instantiation would make GR insulated from the very domain evidence that is supposed to give its concepts content.

25.6.3 Economic Concept Formation

GRE adds substantive economic concepts that cannot be read directly from the preliminary foundation set. Relational allocation, generative value, conversion, circulation, return, capture, regeneration, economic participation, economic power, economic justice, epistemic economy, capability asymmetry, and economic spacetime each require domain-specific typing and evidential bridges.

Definition 25.96 (Domain-generated GRE concept). A *domain-generated GRE concept* is an analytical object whose meaning and evidential role arise through economic

reconstruction of preliminary GR questions rather than by direct inheritance from a presumed general GR vocabulary.

This distinction matters because the word *relation*, for example, is too thin to tell us whether a particular economic mechanism is trust, dependence, ownership, authority, conversion access, bargaining asymmetry, circulation control, or institutional recognition. Likewise, a general notion of change does not distinguish generation from transfer or conversion. Economic theory has to supply those distinctions and test whether they matter empirically.

The resulting concepts may later prove portable. Value conversion might have analogues in education or law; circulation might illuminate other domains; a history-bearing relational representation may prove useful outside economics. Yet portability is a result to be tested after domain construction, not a property granted at birth.

Proposition 25.97 (Domain enrichment principle). *A domain instantiation can add conceptual structure that is absent from its preliminary foundations; successful domain construction therefore contributes potential new material to future cross-domain theory rather than merely instantiating a fixed prior scheme.*

GRE is consequently both downstream and productive. It is downstream because it inherits preliminary questions and disciplines. It is productive because economic research can generate distinctions that later become candidates for broader comparison.

25.6.4 Economic Failure as Foundation-Relevant Evidence

Chapter 24 developed an extensive account of limitation, defeat, and architectural revision. Those failure conditions acquire an additional role here. A failure can be local to GRE, but it can also reveal that a supposedly shared GR structure was badly specified.

Definition 25.98 (Domain failure signal). *A domain failure signal is a recurrent empirical, formal, conceptual, historical, or normative failure within GRE that bears on the adequacy of a preliminary GR distinction or bridge used across multiple GRE claims.*

Suppose that relational explanations repeatedly add no discrimination after strong mixed-mechanism comparisons. The immediate result is a limitation on GRE's relational claim. If the failure recurs across independent economic problem classes, however, it also counts against any broader assertion that relational priority should organize GR generally. The same logic applies to manifestation, generativity, field language, spacetime representations, or other recurring structures.

Failure signals should be typed before they are generalized. A failed value-conversion model can arise from economic institutions that do not exist elsewhere. A failed power model may reveal a problem with the economic genealogy of power rather than with a general theory of relational asymmetry. A failed formal representation may concern its parameterization rather than the underlying conceptual distinction.

Proposition 25.99 (Failure localization before generalization). *A GRE failure should first be localized to the narrowest economic claim, bridge, or concept that it defeats; only recurrent failures sharing a preliminary GR dependency justify upward revision*

pressure on that dependency.

This mirrors the counterevidence discipline established earlier in the book. It also prevents one disappointing application from being treated as decisive evidence for or against a future general theory.

25.6.5 Cross-Domain Learning

A future GR programme cannot be built by exporting GRE vocabulary into neighboring fields and then counting the resulting recurrence as confirmation. Cross-domain learning requires independently constituted domains capable of correcting the proposed shared structure. History, governance, law, political theory, education, ecology, social theory, aesthetics, and AI studies each contain objects, evidence, methods, and normative authorities that are not reducible to economics.

Definition 25.100 (Cross-domain learning event). *A cross-domain learning event occurs when comparison with an independently warranted neighboring-domain result changes the scope, semantics, evidential burden, formal representation, or revision status of a GRE concept or of a candidate shared GR structure.*

Learning can be confirmatory, differentiating, or corrective. A neighboring domain may independently reconstruct a similar generative distinction, strengthening its candidacy for broader comparison. It may preserve only part of the structure, showing that the GRE concept contains domain-specific components. Or it may reject the translation altogether, revealing that the apparent commonality depended on economic assumptions.

The relevant comparison is therefore not lexical. Two domains can use the word *value* while referring to objects with different constitutive rules and normative authorities. Conversely, they can use different vocabularies while instantiating a comparable transformation structure. Cross-domain learning must compare roles, mechanisms, evidence, and correction pathways rather than words alone.

Proposition 25.101 (Independent-domain correction principle). *A neighboring domain contributes stronger evidence to broader GR development when its relevant structure is reconstructed under its own evidential and conceptual disciplines and remains capable of correcting, narrowing, or rejecting the GRE analogue.*

This is why cross-domain answerability is more valuable than superficial unification. A domain that cannot say no to a proposed generalization cannot provide independent support for it.

25.6.6 Candidate Cross-Domain Invariants

Some structures developed in GRE may eventually recur elsewhere. Relation-sensitive constitution, generative transformation, typed conversion, non-invertible manifestation, historically conditioned constraint, possibility-space change, and revision-sensitive formalization are plausible examples of structures worth comparing. At present, however, they should remain *candidate* invariants.

Definition 25.102 (Candidate GR invariant). *A candidate GR invariant is a structural distinction, dependency, or transformation pattern that appears to survive transla-*

tion across more than one independently developed domain while retaining enough semantic and inferential content to support non-trivial comparison.

Candidate invariance requires more than recurrence. The shared-origin problem is especially important. GR-influenced domains may resemble one another because researchers intentionally began from the same vocabulary, diagrams, or formal intuitions. Such *designed recurrence* is useful for programme construction but weak evidence of generality.

A stronger case arises when a domain begins from its own problem-space and, through its own evidence and methods, arrives at a structurally similar distinction. The comparison should also survive historical variation. A structure found only in contemporary platform economies and contemporary AI governance may reflect common institutional history rather than a more general relational regularity.

Definition 25.103 (Candidate-invariant dossier). A *candidate-invariant dossier* records the domains compared, their degree of developmental independence, the translated structure, preserved and altered semantics, historical variation, failed cases, domain-specific remainders, rival explanations, and the analytical content that survives the comparison.

Proposition 25.104 (Generality-content balance). *A candidate invariant becomes theoretically useful only if increasing cross-domain scope does not strip away so much structure that the surviving claim loses discriminating analytical content.*

A statement such as “things change under constraints” may be broadly true but too thin to support a distinctive GRT. Generality and explanatory content have to be evaluated together.

25.6.7 Non-Transferable Economic Assumptions

Economic inquiry relies on assumptions and institutional facts that cannot be presumed outside economics. Property, prices, contracts, legal personhood, firms, monetary accounting, labor markets, bargaining, taxation, credit, exchange, scarcity conventions, recognized ownership, and administratively legible economic categories can be constitutive of an economic mechanism. Even where neighboring domains contain analogues, their semantics may differ materially.

Definition 25.105 (Non-transferable economic assumption). A *non-transferable economic assumption* is an assumption, institutional condition, semantic typing, measurement convention, or normative premise that materially supports a GRE result but lacks independent warrant in the receiving domain.

Non-transferability is not a defect. It identifies where GRE is genuinely economic. For example, a conversion interface defined through legally enforceable ownership and monetary pricing cannot be exported unchanged into an ecological relation whose relevant values are not constituted by those institutions. Similarly, a bargaining model presupposing substitutable agents and credible exit may fail in kinship, ecological stewardship, or legal status relations where exit and substitution have different meanings.

Definition 25.106 (Domain-specific remainder of GRE transfer). The *domain-specific remainder of GRE transfer* is the set of economic assumptions, institutional dependen-

cies, semantic distinctions, and evidential bridges that must be dropped, retyped, or replaced when a GRE concept is reconstructed elsewhere.

Failed transfer can therefore improve theory. It identifies which components belonged to economic history or institutions rather than to a more general relational structure.

Proposition 25.107 (Non-transfer as positive evidence). *A well-diagnosed failure of GRE transfer provides positive evidence about programme scope by revealing which assumptions are economically constitutive and which candidate structures survive their removal.*

25.6.8 Conditions for Future General Relational Theory

The possibility of a future GRT remains open, but this book does not claim to have completed it. A general theory worthy of the name would require more than the recurrence of GR vocabulary in domains that share a common intellectual ancestry. It would need independently developed domain inquiries, historically varied cases, explicit translation and non-translation, adversarial testing, preservation of domain-specific remainders, and a clear account of what analytical content remains after generalization.

Definition 25.108 (Future-GRT evidential threshold). *The future-GRT evidential threshold is the minimum comparative burden required before a structure developed within one or more GR domains is promoted into a provisional general-theory claim: independent domain reconstruction, semantic typing, historical variation, serious counterexamples, failed-transfer records, rival explanations, correction authority, and sufficient surviving analytical content.*

The threshold is modular. Different candidate structures may mature at different rates. A general manifestation distinction might receive stronger comparative support than a general theory of value; a cross-domain account of historical constraint might mature independently of any general formalism. GRT need not emerge as one simultaneous deductive system.

Future generalization should also preserve downward correction. If a GRT candidate later conflicts with well-supported economic, legal, ecological, educational, or other domain evidence, the general statement must be revisable. The purpose of a general theory is not to outrank its domains but to organize structures that survive their mutual correction.

Definition 25.109 (Domain-return condition). *The domain-return condition requires any provisional GRT claim to remain interpretable within, testable against, and revisable by the independently warranted domain inquiries from which its comparative support was derived.*

Proposition 25.110 (Emergent general-theory principle). *A future GRT should be treated as an emergent comparative achievement of sufficiently independent domain research rather than as a template whose prior authority is established by repeated application of the same vocabulary.*

Definition 25.111 (GRE-to-GRT contribution profile). *The GRE-to-GRT contribution profile is the versioned record of preliminary GR foundations used by GRE, eco-*

conomic concepts developed beyond those foundations, domain failures bearing on shared structures, candidate invariants, non-transferable economic assumptions, cross-domain corrections, and general-theory claims that GRE can presently support, challenge, or leave open.

Proposition 25.112 (Economic instantiation without premature unification). *GRE can be a substantive economic instantiation of preliminary Generative Relational foundations while remaining logically compatible with multiple future outcomes: confirmation of some cross-domain structures, decomposition of others, regionalized theories, competing GR families, or no single sufficiently contentful GRT.*

The domain-instantiation perspective therefore gives GRE a two-way relation to the wider Generative Relational project. Preliminary GR resources help organize economic inquiry, but economics returns domain-specific concepts, failures, counterexamples, and candidate structures that can revise those resources. The result is not a hierarchy in which a finished GR governs its applications. It is a recursive research architecture in which domains develop enough independence to make comparison informative. The next section applies the same discipline temporally by examining the historical revisability of GRE itself.

25.7 Historical Revisability of GRE

Section 25.6 located GRE within a recursive relation between economic inquiry and preliminary Generative Relational foundations. The present section applies the same discipline to GRE across time. A historically situated research programme cannot treat its current vocabulary, methods, evidence base, normative premises, or domain boundary as if they were produced outside history. The objective is therefore to specify how GRE can change historically without reducing revision to either ordinary error correction or unrestricted reinterpretation. The section proceeds through eight issues: the historical position of theory, concept revision, method revision, evidential reassessment, normative revision, domain revision, versioned theory, and reconstructable theoretical history. The method is genealogical and dependency-sensitive. A later formulation is treated as a successor to an earlier one only when the relevant continuities, revisions, reasons, and consequences can be reconstructed.

Definition 25.113 (Historical revisability of GRE). *Historical revisability of GRE is the programme-level condition under which GRE's claims, concepts, methods, evidential warrants, normative commitments, domain boundaries, and internal dependencies may be revised as historical circumstances and available knowledge change, while the reasons, scope, and consequences of those revisions remain reconstructable.*

Historical revisability is stronger than admitting that later researchers may know more. A theory can remain empirically accurate in one period while its categories become less discriminating in another; a method can remain technically valid while new infrastructures alter what it measures; a normative premise can remain internally coherent while new affected positions make its scope incomplete. Revision can therefore concern meaning, relevance, evidence, or domain constitution as well as truth or falsity.

Proposition 25.114 (Historically indexed programme identity). *GRE should be iden-*

Table 25.7: Principal dimensions of historical revisability in GRE

Revision dimension	Possible historical change	Required record
Theory position	Problems, institutions, technologies, and available comparisons change	Historical position and validity horizon
Concepts	Meanings, boundaries, and type distinctions shift	Concept genealogy and semantic bridge
Methods	New methods or changed objects alter inferential adequacy	Method substitution and comparability record
Evidence	New archives, measurements, or reinterpretations alter warrant	Evidential supersession record
Normative premises	Standing, values, priorities, or affected positions change	Normative provenance and revision reason
Domain boundary	Economic relevance or neighboring-domain jurisdiction changes	Boundary genealogy and correction authority
Programme version	Several revisions accumulate into a new configuration	Version dependency map
Research memory	Earlier claims, failures, and alternatives risk being lost	Reconstructable revision history

tified through a reconstructable sequence of historically indexed programme states rather than through the fiction of one timeless formulation whose current vocabulary retrospectively governs every earlier or later version.

Table 25.7 summarizes the principal revision dimensions developed below.

25.7.1 Historical Position of Theory

A theory is produced from a historical position. The problems regarded as economically important, the data available for observing them, the institutions through which economic life is organized, and the neighboring disciplines with which economics interacts are historically variable. GRE cannot escape that condition by describing itself as relational or generative. Its own attentional priorities were formed in response to a particular intellectual and socio-technical environment.

Historical situatedness does not make a theory merely relative to its moment. It instead requires the programme to distinguish what is expected to travel from what depends on historically specific conditions. A relational account of platform dependence, for example, may preserve an analytical structure across technological regimes while the relevant actors, infrastructures, contractual arrangements, and verification capacities change substantially.

Definition 25.115 (GRE historical position profile). *A GRE historical position profile records the principal economic problems, institutional forms, technologies, data infrastructures, disciplinary interfaces, normative disputes, and known blind spots that materially shape a GRE formulation at a given historical stage.*

The profile is not biographical context. Its function is analytical: it identifies background conditions that may have entered the programme's categories or evidential expectations. A later researcher can then ask whether a claim remains warranted

because its mechanism survives changed conditions or merely because inherited vocabulary continued to be used.

Definition 25.116 (Theoretical validity horizon). A *theoretical validity horizon* is the set of historically specified conditions within which a claim, concept, method, or formal representation is presently expected to retain its intended semantics and evidential warrant without material revalidation.

The horizon can be broad or narrow. It should not be confused with an expiration date. A concept may remain useful well beyond its original setting, but historical change creates a reason to test rather than presume continuity.

Proposition 25.117 (Historical revalidation principle). *When institutions, technologies, subject positions, categories, or evidence-generating processes change materially relative to a GRE claim's stated validity horizon, continued use of that claim should require historical revalidation rather than semantic continuity by default.*

25.7.2 Concept Revision

GRE's central concepts are working analytical constructions. Relation, subject, value, generation, conversion, circulation, power, manifestation, participation, field, and spacetime can all acquire different empirical content as economic forms change. Historical revision therefore cannot be documented adequately by keeping the same label while silently changing its meaning.

Concept revision can take several forms. A category can be narrowed when recurrent cases previously grouped together prove mechanistically distinct. It can be subdivided when one category contains several independently consequential types. It can be merged when distinctions add no analytical discrimination. It can be regionalized when a concept is useful only in a specified historical or institutional regime. It can be retyped when its inferential role changes. It can also be retired.

Definition 25.118 (GRE concept genealogy). A *GRE concept genealogy* is the versioned record of a concept's meanings, scope conditions, type distinctions, empirical motivations, formal representations, revisions, competing formulations, and reasons for retention, subdivision, merger, regionalization, retyping, or retirement.

A genealogy should preserve both continuity and discontinuity. If a later version of *power* adds conversion-rule control or infrastructural dependence, it should be possible to determine whether the concept has been enriched, partially replaced, or used for a materially different analytical object.

Definition 25.119 (Semantic succession bridge). A *semantic succession bridge* specifies which meanings and inferential roles of a concept are preserved between two programme versions, which are changed, and which earlier claims require reinterpretation because of the change.

Proposition 25.120 (Concept-continuity burden). *Reuse of the same GRE term across programme versions does not establish conceptual continuity; continuity should be claimed only where a semantic succession bridge preserves the dimensions required for the relevant comparison or inference.*

This discipline also protects earlier work from retrospective assimilation. A later, more elaborate concept should not be projected backward into an earlier paper or

chapter unless the earlier object and warrant actually support that reconstruction.

25.7.3 Method Revision

Methods change historically because both research technologies and research objects change. Archival digitization can alter historical coverage; computational methods can make previously inaccessible relational structures observable; new experimental or quasi-experimental opportunities can strengthen causal discrimination; qualitative access can reveal mechanisms hidden by aggregate measurement. At the same time, new methods create new representation errors, dependencies, and blind spots.

GRE's methodological pluralism therefore has a temporal dimension. A method justified in one programme version need not remain privileged when a later method answers the same inferential question with greater discrimination or fewer unsupported assumptions. Conversely, novelty does not automatically establish superiority.

Definition 25.121 (Method succession record). A *method succession record* documents why a GRE study or programme component changes its principal method, which inferential burden the new method addresses, which earlier results remain comparable, which become non-comparable, and which new assumptions or representation limits the replacement introduces.

Method revision can create a comparability problem. If a new relational measurement changes node definitions, time resolution, or observation rules, a difference between old and new results may reflect the method rather than the economic process. Historical continuity of evidence therefore requires explicit bridges between measurement regimes.

Definition 25.122 (Method-comparability bridge). A *method-comparability bridge* states the transformations, preserved observables, changed assumptions, and residual differences required to compare results produced by different methodological regimes.

Proposition 25.123 (Method revision without retrospective invalidation). *Adoption of a method with stronger present inferential adequacy does not by itself invalidate earlier GRE work; earlier claims should be reassessed according to the evidence and methods available to them, then re-evaluated separately under the later method where comparison is possible.*

The proposition preserves historical fairness without granting immunity to inherited claims. Later methods can substantially weaken earlier conclusions while still distinguishing reasonable earlier inference from present warrant.

25.7.4 Evidential Reassessment

Evidence changes even when the past does not. New archives can be opened, records can be digitized, datasets can be linked, measurement errors can be discovered, synthetic artifacts can contaminate evidence environments, and new theories can change what counts as a discriminating observation. Evidence is therefore historically revisable in both availability and interpretation.

GRE should distinguish additional evidence from evidential supersession. More observations may simply increase coverage. Supersession occurs when later evidence materially changes the warrant of an earlier claim by exposing a measurement defect, revealing a previously hidden mechanism, enabling stronger rival discrimination, or changing the interpretation of the earlier evidence.

Definition 25.124 (Evidential supersession event). *An evidential supersession event occurs when newly available, newly interpretable, or newly validated evidence materially changes the warranted status of an existing GRE claim rather than merely adding another observation to the same evidential base.*

Supersession need not produce simple reversal. An earlier broad claim may survive only in a narrower subgroup; a causal claim may become descriptive; a historical reconstruction may become one member of a larger compatibility class; a qualitative mechanism may receive stronger support even while its prevalence estimate changes.

Definition 25.125 (Evidential revision ledger). *An evidential revision ledger records the prior claim, prior evidence, new evidence or interpretation, changed inferential bridge, revised claim status, residual uncertainty, and downstream GRE components affected by the reassessment.*

Proposition 25.126 (Non-retroactive evidence discipline). *Later evidence should revise the present warrant of earlier GRE claims without being treated as evidence that earlier researchers possessed, ignored, or should necessarily have anticipated information that was not reasonably available within their historical epistemic horizon.*

This is the programme-level counterpart of the historical epistemic discipline developed earlier in the book. A reconstructable theory history should preserve both present judgment and historical epistemic position.

25.7.5 Normative Revision

GRE's normative restraint does not remove normative history. Standing rules, conceptions of harm, acceptable risk, intergenerational concern, ecological obligations, participation standards, and judgments about coercion or recognition can change. Some changes reflect moral learning; others reflect shifts in power, institutional settlement, or social convention. GRE should therefore neither freeze current normative premises nor presume that later normative frameworks are automatically superior.

Normative revision requires provenance. A later evaluation may change because new affected positions become visible, because an empirical premise was corrected, because a normative framework was revised, or because institutional authority changed. These are analytically different.

Definition 25.127 (Normative revision profile). *A normative revision profile records the evaluative claim being revised, the standing rules, values, thresholds, priorities, rights, procedural commitments, or intergenerational premises involved, the reason for revision, the relevant authority or argument, and the GRE conclusions whose normative status changes as a result.*

A historical revision can also expose earlier normative omission. An economic analysis may have treated unpaid care, ecological damage, disabled access, future

generations, or non-human affectedness as outside its evaluative frame. Later inclusion should be recorded as expansion of standing or scope, not presented as if the earlier framework had already contained the same subjects implicitly.

Definition 25.128 (Normative standing revision). *A normative standing revision occurs when the set of subjects, positions, interests, relations, or future claims treated as normatively relevant is materially expanded, narrowed, or retyped within a GRE evaluation.*

Proposition 25.129 (Normative revision transparency). *When a GRE recommendation changes because its normative premises or standing rules have changed, the revision should be identified as normative rather than represented as though new empirical evidence alone compelled the later evaluation.*

This transparency is especially important in a framework committed to normative underdetermination. Historical change can alter the normative bridge without altering the underlying empirical mechanism.

25.7.6 Domain Revision

The economic domain itself is historically revisable. Activities once organized primarily through households, communities, public institutions, professional norms, or informal relations can become monetized, platform-mediated, regulated, financialized, automated, or newly measured. Conversely, formerly market-mediated activities can move into public provision, commons arrangements, or non-market coordination. Such changes alter which predicates become economically consequential and which neighboring-domain interfaces matter.

Domain revision should not be confused with unlimited expansion. GRE does not become competent to settle legal validity, political legitimacy, ecological value, educational quality, or technical truth merely because those matters become economically consequential. Historical change can enlarge or reorganize the economic problem-space while correction authority remains distributed across domains.

Definition 25.130 (Economic-domain boundary genealogy). *An economic-domain boundary genealogy records how a class of objects, relations, activities, or claims entered, exited, or changed position within GRE's principal economic problem-space, together with the institutional changes, evidential reasons, and neighboring-domain dependencies supporting that reclassification.*

The boundary can also contract. A concept introduced as broadly economic may later prove mainly legal, political, ecological, educational, or technical once its constitutive mechanism is better understood. Domain revision must therefore support both inclusion and deference.

Definition 25.131 (Domain reclassification event). *A domain reclassification event occurs when a claim or object previously treated as directly within GRE is reassigned to partial GRE explanation, domain deference, or another principal disciplinary jurisdiction, or when a previously external phenomenon becomes economically constitutive enough to require direct GRE analysis.*

Proposition 25.132 (Historically revisable domain identity). *GRE can retain a recognizable economic identity while the historically constituted boundary of its principal*

problem-space changes, provided claim-specific jurisdiction, external correction authority, and reasons for reclassification remain explicit.

25.7.7 Versioned Theory

Once concept, method, evidence, normative, and domain revision are admitted, a theory should not be represented as one continuously overwritten text. Later changes can alter the meaning of earlier claims, remove assumptions on which other components depended, or create branches that should remain simultaneously available for comparison. GRE therefore requires explicit versioning at the level of programme architecture as well as manuscripts and datasets.

Definition 25.133 (GRE programme version). *A GRE programme version is a historically indexed configuration of claims, concepts, methods, formal representations, evidential warrants, normative premises, domain boundaries, open problems, and dependency relations that is sufficiently specified to be compared with earlier and later configurations.*

Versioning should not imply that every minor editorial change creates a new theory. The relevant threshold is conceptual or inferential: a new version is warranted when a change materially alters the semantics, scope, warrant, dependency, or revision consequence of a substantive component.

Definition 25.134 (Programme-version transition). *A programme-version transition is the documented transformation connecting two GRE programme versions through retained components, revised components, retired components, newly introduced components, changed dependencies, and explicit reasons for the transition.*

Versions can also branch. Competing formalisms or value theories need not be forced into one successor if the evidence does not yet discriminate among them. Section 576 will treat such plural formulations directly. Historical versioning provides the infrastructure required to preserve them without losing programme identity.

Proposition 25.135 (Non-erasure versioning principle). *Revision of GRE should preserve the recoverability of superseded programme states, including claims and formulations no longer endorsed, whenever their history is materially relevant to understanding present concepts, evidence, dependencies, or unresolved alternatives.*

25.7.8 Reconstructable Theoretical History

Historical revisability becomes intellectually useful only if later researchers can reconstruct why the theory changed. A final document that retains only current conclusions erases failed hypotheses, abandoned categories, negative results, disputes, evidential reversals, and alternative branches that may explain how the programme reached its present form. Such erasure weakens both accountability and future reanalysis.

Definition 25.136 (Reconstructable theoretical history). *A reconstructable theoretical history is a provenance-preserving record from which a later researcher can recover the principal programme versions, their substantive differences, the evidence and arguments motivating transitions, competing alternatives, negative results, domain corrections, normative changes, and consequences for downstream claims.*

Reconstructability does not require preserving every draft. It requires preserving enough information to understand substantive change. A useful record should identify the pre-revision state, trigger, considered alternatives, decision or branching point, affected dependencies, validation performed, and unresolved remainder.

Definition 25.137 (Theory-revision provenance record). A *theory-revision provenance record* links a substantive GRE revision to its triggering evidence or argument, responsible programme components, considered alternatives, resulting version transition, affected claims, and residual uncertainties or disagreements.

The record also protects later interpretation from inevitability narratives. Once a revision appears successful, earlier alternatives can look obviously mistaken. Preserving the decision context reveals which alternatives were reasonable, which evidence was decisive, and which outcomes remained uncertain at the time.

Proposition 25.138 (Reconstructability as revision discipline). A *GRE revision is epistemically stronger when a later researcher can reconstruct not only the resulting formulation but also the evidential, conceptual, methodological, normative, or domain reasons by which the programme moved from the earlier state to the later one.*

Definition 25.139 (GRE historical revision dossier). The *GRE historical revision dossier* is the integrated, versioned record of historical position profiles, concept genealogies, method succession records, evidential revision ledgers, normative revision profiles, domain boundary genealogies, programme-version transitions, and theory-revision provenance records needed to reconstruct the evolution of the programme.

Proposition 25.140 (Historically revisable continuity principle). *GRE can remain recognizably continuous across substantial historical revision when the dependencies connecting programme versions are reconstructable; continuity therefore depends less on retaining identical vocabulary than on preserving an intelligible lineage of questions, warrants, revisions, and correction pathways.*

Historical revisability gives the programme a temporal form of openness. GRE need not choose between doctrinal continuity and theoretical amnesia. It can preserve earlier programme states, identify why concepts or methods changed, distinguish present warrant from historical warrant, and permit revisions of normative and domain assumptions without rewriting their histories as inevitable. This versioned continuity also creates the conditions for principled internal plurality: once alternative formulations can be located historically and their dependencies made explicit, disagreement need not be resolved by forcing all variants into one supposedly final expression. The next section therefore examines how competing formulations can coexist within a recognizable GRE programme.

25.8 Plural Formulations of GRE

Section 25.7 established that GRE should possess a reconstructable theoretical history rather than one continuously overwritten formulation. The present section adds a second dimension of openness: plurality within the same historical programme state. A research programme can remain recognizable even when its investigators disagree about formalization, ontology, value, power, justice, or historical reconstruction, pro-

vided those disagreements are explicit enough to be compared and tested. The objective is therefore not to celebrate plurality in the abstract, but to distinguish legitimate internal alternatives from semantic drift, false equivalence, and formulations that revise a present core commitment so substantially that they should be treated as successor candidates rather than ordinary variants. The section proceeds through six families of competing formulation, productive internal disagreement, and conditions of programme identity. Its method is comparative and dependency-sensitive: formulations are compared by the questions they preserve, commitments they accept or revise, inferential burdens they carry, evidence that could discriminate among them, and consequences for downstream claims.

Definition 25.141 (GRE formulation). A *GRE formulation* is a sufficiently specified configuration of concepts, assumptions, methods, formal representations, evidential bridges, normative premises, and domain commitments used to investigate a GRE problem while remaining comparable with alternative configurations addressing materially related questions.

A formulation can differ locally or extensively. Two studies may share the same value theory but use different formal representations; alternatively, they may disagree about ontology, power, or justice while retaining enough common problem structure for comparison. Programme plurality therefore requires typed disagreement rather than a declaration that every version is simply “another GRE.”

Definition 25.142 (Formulation-comparison profile). A *formulation-comparison profile* records, for two or more GRE formulations, their shared research object, differing assumptions, preserved core commitments, revised commitments, empirical or interpretive consequences, discriminating evidence, unresolved remainder, and implications for programme identity.

Table 25.8 summarizes the principal forms of plurality developed below. The table does not rank the formulations. Its purpose is to identify what would make disagreement analytically productive rather than merely terminological.

25.8.1 Competing Formalizations

GRE has already used graphs, temporal networks, field language, spacetime representations, 2-complexes, operator-like constructions, category-theoretic diagrams, dynamical systems language, and other formal devices. None of these should become the mandatory mathematical form of the programme merely because it proved useful in one part of the book. Different formalisms can preserve different aspects of the same economic object and therefore support different legitimate inquiries.

Definition 25.143 (Formalization plurality). *Formalization plurality* is the coexistence of two or more mathematically distinct representations of materially related GRE objects or mechanisms where each representation has explicit local semantics, preserves a defensible subset of relevant structure, and exposes its own assumptions and losses.

The criterion is not mathematical elegance alone. A network representation may preserve adjacency and path structure while obscuring higher-order relations; a 2-complex may preserve histories and compositional structure while requiring

Table 25.8: Principal forms of plurality within the GRE research programme

Formulation family	Legitimate source of plurality	Primary discipline
Formal	Different representations preserve different structures or support different inferences	Compare semantics, assumptions, empirical bridges, and lost information
Ontological	Several readings remain compatible with ontological suspension and available evidence	Do not convert representational usefulness into metaphysical settlement
Value	Alternative taxonomies or theories preserve different evaluative distinctions	Keep standing, comparison, conversion, and normative warrants explicit
Power	Different typed mechanisms explain different forms of consequential conditioning	Preserve direction, capacity, mechanism, scope, and counterevidence
Justice	Competing normative frameworks evaluate the same GRE structure differently	Separate empirical description from independent normative premises
Historical	Several reconstructions remain compatible with incomplete or contested evidence	Preserve alternative histories, category change, and discriminating evidence
Programme-level	Formulations disagree while retaining enough shared identity for common testing	State which core commitments are retained, revised, or challenged

stronger representational assumptions; a dynamical model may clarify temporal dependence while imposing closure or state-space assumptions that a historical reconstruction should not accept. These models can be mutually informative without being reducible to one another.

Definition 25.144 (Formal non-equivalence remainder). *A formal non-equivalence remainder is the economically or inferentially relevant structure preserved by one GRE formalization but not recoverable from another under the proposed translation between them.*

A stronger formalism does not automatically supersede a weaker one. Added mathematical structure is useful only when its extra assumptions and semantics earn additional analytical or empirical discrimination. Conversely, a simpler model should not be preferred merely because it is simpler if it deletes the historical or relational structure necessary for the target question.

Proposition 25.145 (Plural-formalism discipline). *Competing GRE formalizations can coexist when their semantics, preserved structures, assumptions, and non-equivalence remainders are explicit; disagreement among formalisms should be resolved only to the extent that the target inference or evidence discriminates among them.*

25.8.2 Competing Ontological Readings

Ontological plurality is more constrained. The book's default is ontological suspension, not a menu of equally established metaphysical doctrines. Researchers may interpret relational reality through stronger realist, pragmatist, processual, structural,

dispositional, or other metaphysical readings, but those readings should remain distinguished from what GRE itself requires for economic inquiry.

Definition 25.146 (Ontological reading profile). An *ontological reading profile* states the metaphysical commitments a GRE formulation adds beyond ontological suspension, the economic inferences claimed to depend on those commitments, the evidence or argument offered for them, and the conclusions that remain valid if the stronger reading is withdrawn.

This profile prevents two opposite errors. Ontological suspension should not be used to prohibit legitimate metaphysical argument, but a metaphysical interpretation should not acquire programme-wide authority simply because it can redescribe GRE terminology. A relational realist and a pragmatically oriented researcher may agree on the same empirical relational mechanism while disagreeing about its ultimate ontological status.

Definition 25.147 (Ontological surplus). *Ontological surplus* is the portion of a formulation's metaphysical interpretation that exceeds what is required to support the GRE claim presently under investigation.

Ontological surplus is not automatically a defect. It can generate new hypotheses or philosophical inquiry. It becomes problematic only when conclusions requiring that surplus are presented as though they followed from the shared GRE framework itself.

Proposition 25.148 (Ontological plurality under suspension). *GRE can host competing ontological readings when the programme-level claims remain distinguishable from reading-specific metaphysical conclusions and when withdrawal of a stronger ontology does not silently remove evidential support from claims presented as generally GRE.*

25.8.3 Competing Value Theories

Value plurality within GRE has two levels. At the descriptive level, researchers can disagree about how many value forms should be distinguished, which boundaries are useful, and whether some forms should be merged or subdivided. At the normative level, researchers can disagree about what has intrinsic, relational, instrumental, generative, ecological, educational, political, or other value and about how conflicts among these values should be evaluated.

Definition 25.149 (GRE value formulation). A *GRE value formulation* is a specified account of value-bearing objects or relations, value forms, standing rules, comparison conditions, conversion assumptions, temporal horizons, normative warrants, and residual value that guides a particular GRE inquiry.

Several value formulations can therefore share the commitment to value plurality while disagreeing substantially about the taxonomy. One formulation may treat capability and relational continuity as distinct value forms; another may reconstruct them as dimensions of a broader value family. The disagreement is productive only if each formulation states what empirical or normative distinctions its taxonomy preserves and what would be lost under the alternative.

Definition 25.150 (Value-theory discrimination burden). The *value-theory discrimination burden* is the requirement that competing GRE value formulations identify

the empirical, interpretive, comparative, conversion, or normative consequences by which their different classifications or warrants could matter to inquiry.

A taxonomy that produces no difference in observation, explanation, comparison, practical judgment, or revision may be terminologically distinct without being theoretically distinct. Conversely, practical disagreement over compensation, restoration, participation, or future burden can reveal that apparently similar taxonomies hide materially different value theories.

Proposition 25.151 (Plural value-theory principle). *GRE's commitment to heterogeneous value permits competing value formulations, but it does not imply that all taxonomies are equally adequate; formulations remain answerable to the distinctions they preserve, the warrants they require, and the remainders they leave unrepresented.*

25.8.4 Competing Power Theories

Power provides another legitimate site of internal plurality. The book has developed power through typed asymmetry, credible capacity, consequential relational conditioning, control over conversion and circulation, recognition, infrastructure, information, timing, exit, and other mechanisms. Researchers may disagree about which mechanisms are primary, how much counterfactual capacity is required, or whether particular forms belong within one power family.

Definition 25.152 (GRE power formulation). *A GRE power formulation specifies the relevant asymmetry or dependency, direction of conditioning, credible capacity, operative mechanism, affected possibilities, temporal horizon, scope, rival explanations, and conditions under which the proposed relation should cease to count as power.*

Plurality is preferable to premature scalarization. Resource power, recognition power, temporal power, conversion-rule power, infrastructural power, or epistemic power may interact without becoming quantities of one common substance. A formulation that emphasizes control can therefore coexist with another emphasizing dependence or modal capacity if their differing predictions and classification rules remain visible.

Definition 25.153 (Power-formulation divergence). *Power-formulation divergence occurs when two GRE power theories assign different power status, mechanism type, direction, persistence, or practical consequence to the same relational configuration under otherwise materially comparable evidence.*

Such divergence is useful because it creates a target for discrimination. The appropriate response is not necessarily to collapse the theories into a broader definition. Evidence may show that one captures the mechanism better, that each applies to a different scope, or that both should be retained as typed power families.

Proposition 25.154 (Typed power plurality). *Competing GRE power formulations can coexist when they preserve a shared minimal burden of directional, consequential, relational conditioning while keeping their mechanism-specific criteria and defeat conditions explicit.*

25.8.5 Competing Justice Theories

Justice plurality is necessarily normative. GRE can describe distributions, relations, recognition, participation, generative effects, conversion interfaces, intergenerational burdens, and residual value in considerable detail, but these descriptions do not uniquely determine the normative principles by which justice should be assessed. Different serious frameworks can therefore evaluate the same GRE reconstruction differently.

Definition 25.155 (GRE justice formulation). A *GRE justice formulation* combines a specified empirical GRE description with explicit normative premises concerning standing, baseline, rights, duties, thresholds, priorities, aggregation, procedure, responsibility, temporal scope, and acceptable residual burdens.

The empirical side of the formulation remains jointly contestable. If two justice theories disagree because they use different factual descriptions, stronger economic or historical evidence may narrow the disagreement. If they agree on the facts but differ in normative premises, GRE should identify the divergence rather than conceal it in a supposedly neutral metric.

Definition 25.156 (Justice-formulation convergence). *Justice-formulation convergence* is agreement among materially different normative formulations on a practical or evaluative conclusion despite their distinct normative premises and reasoning paths.

Convergence can strengthen the robustness of a recommendation within the compared set of frameworks without establishing universal moral truth. Divergence can likewise be informative by showing where empirical clarification ends and normative judgment begins.

Proposition 25.157 (Justice plurality with normative provenance). *GRE can support competing justice formulations when their empirical premises and normative warrants remain separately traceable; programme openness does not authorize hiding normative disagreement inside economic description or formal optimization.*

25.8.6 Competing Historical Models

Historical plurality differs from a simple plurality of stories. In many cases the available archives, manifestations, categories, and causal traces support more than one serious reconstruction. Different historical models may emphasize institutions, relations, technologies, legal classifications, political events, ecological constraints, or economic mechanisms while remaining compatible with substantial portions of the same evidence.

Definition 25.158 (Historical-model portfolio). A *historical-model portfolio* is a documented set of serious alternative reconstructions of a GRE-relevant historical process, together with their shared evidence, differing assumptions, category bridges, causal mechanisms, missing evidence, discriminating observations, and downstream theoretical consequences.

The portfolio prevents premature closure. A later successful institution should not make its antecedent pathway appear inevitable; a surviving archive should not erase historically consequential positions that left weaker records; and one periodization

should not automatically define the temporal scale of every mechanism.

Definition 25.159 (Historically discriminating evidence). *Historically discriminating evidence* is evidence whose expected interpretation differs materially across serious historical models and can therefore alter their relative warrant rather than merely adding detail shared by all of them.

Historical plurality can persist even after extensive research. That persistence is not necessarily theoretical weakness if the remaining alternatives are explicit and if conclusions are restricted to properties stable across them. It becomes problematic when the programme selects one reconstruction because it fits a preferred theory rather than because the evidence discriminates in its favor.

Proposition 25.160 (Reconstruction-plurality principle). *GRE should retain multiple historical models when available evidence does not justify unique reconstruction, while distinguishing conclusions robust across the portfolio from conclusions dependent on a particular historical interpretation.*

25.8.7 Productive Internal Disagreement

Plurality contributes to a research programme only when disagreement can do analytical work. Disagreement can reveal hidden assumptions, produce discriminating tests, identify semantic ambiguities, expose domain dependence, generate new evidence, or show that one programme component should branch. A proliferation of formulations that cannot be compared or corrected is not productive pluralism.

Definition 25.161 (Productive internal disagreement). *Productive internal disagreement* is a programme-internal divergence whose competing formulations share enough problem structure for meaningful comparison and whose differences generate identifiable empirical, interpretive, formal, normative, or scope consequences capable of guiding further inquiry.

Productive disagreement requires more than politeness toward alternatives. Competing formulations should state where they disagree, why the disagreement matters, what evidence or argument could change their relative warrant, and which downstream claims would be affected. The status ledger developed in Section 25.2 remains essential: a hypothesis and a formal representation should not be treated as rival claims merely because they use different language.

Definition 25.162 (False pluralism). *False pluralism* is the appearance of programme openness created by retaining multiple formulations whose differences are not semantically specified, not inferentially consequential, not open to discrimination, or protected from criticism by shifting their meanings when challenged.

False pluralism can also arise when mutually inconsistent claims are declared complementary without specifying the scopes in which each is warranted. Genuine plurality permits contradiction to remain visible where it exists.

Definition 25.163 (Formulation branch point). A *formulation branch point* is a documented programme state at which materially different formulations remain sufficiently warranted to continue as separate lines of inquiry because available evidence or argument does not yet justify convergence, replacement, or retirement.

Proposition 25.164 (Disagreement-to-inquiry principle). *Internal disagreement*

strengthens GRE when it is converted into explicit contrasts, evidence requirements, revision conditions, or branch points; disagreement that cannot affect inquiry should not be presented as substantive programme plurality.

25.8.8 Conditions of Programme Identity

The final issue is how much plurality GRE can sustain before programme identity becomes indeterminate. Section 25.3 identified a present identity kernel composed of relational and generative attention, historical situatedness, value plurality, revisability, methodological pluralism, praxis orientation, domain specificity, and openness to counterevidence. Plural formulations need not instantiate these commitments identically, but an ordinary programme-internal formulation should preserve enough of their joint function to remain part of current GRE.

Definition 25.165 (Programme-internal formulation). A *programme-internal formulation* is a GRE formulation that preserves the characteristic problem-space, answerability, domain discipline, and sufficient portion of the current programme identity kernel for its disagreements with other GRE formulations to remain intelligible as internal disagreements rather than as disputes between different research programmes.

This definition is intentionally functional rather than textual. A formulation can reject a particular formalism, revise a value taxonomy, or reinterpret power without leaving GRE. Even a present core commitment can be challenged. The difference is that a formulation rejecting a core commitment may no longer be an ordinary internal variant if the rejection restructures the programme's identity architecture.

Definition 25.166 (Revisionary successor candidate). A *revisionary successor candidate* is a formulation that arises from GRE's questions and evidence but proposes a sufficiently consequential revision of one or more present core commitments that its relation to current GRE should be treated as a possible programme transition rather than assumed programme-internal equivalence.

The category prevents two errors. A programme should not expel every deep criticism merely because it challenges present identity. It also should not preserve identity by definition when the revision would transform the programme's central questions, evidential discipline, domain boundary, or account of counterevidence. Section 25.7's versioned theory architecture provides the appropriate temporal relation: a revisionary successor can become a later GRE programme version if its transition is justified and reconstructable.

Definition 25.167 (Programme-identity comparison). A *programme-identity comparison* evaluates a formulation against the current GRE problem-space, core commitments, commitment boundaries, epistemic-status discipline, domain identity, and defeat/revision pathways, recording which elements are retained, revised, rejected, or replaced.

Proposition 25.168 (Plurality-with-identity principle). *GRE can sustain substantial internal plurality when formulations remain mutually contestable and preserve enough shared programme structure for comparison; fundamental revision should instead be recorded as a possible programme transition.*

Plurality therefore locates coherence in reconstructable relations among alternatives rather than in one compulsory formalism, ontology, value theory, power model, justice theory, or historical reconstruction. The next section turns this internal contestability outward by examining the collaborative conditions through which criticism, counterexamples, replication, reinterpretation, and cross-disciplinary participation can become effective parts of the programme.

25.9 Collaboration and Contestability

Section 25.8 established that GRE can sustain plural formulations when disagreements remain explicit enough for comparison and when consequential departures from the present identity kernel are recorded as possible programme transitions. The present section specifies the social and epistemic conditions under which such plurality becomes answerable. A research programme remains revisable only when criticism can reach identifiable claims, counterexamples can alter scope or warrant, replication can test dependence on particular evidence or procedures, reinterpretation can reopen inferential bridges, and collaborators beyond the originating research setting can exercise meaningful correction. The objective is therefore to construct contestability as a programme mechanism rather than as a general declaration of openness. The section proceeds through criticism, counterexamples, replication, reinterpretation, cross-disciplinary and cross-cultural collaboration, public contestability, and institutional contestability. Its method is dependency-sensitive and role-sensitive: each challenge is evaluated by its target, epistemic standing, correction authority, evidential basis, downstream consequences, and preservation requirements.

Definition 25.169 (GRE programme contestability). *GRE programme contestability* is the condition under which materially consequential claims, concepts, methods, formal representations, evidential bridges, normative premises, domain classifications, and applications can be challenged through identifiable procedures whose possible consequences for warrant, scope, revision, branching, or retirement are explicitly recorded.

Contestability therefore requires more than the abstract possibility of disagreement. A criticism that cannot identify what it challenges, a counterexample that cannot enter the claim record, or a practitioner objection for which no response pathway exists has little capacity to revise the programme. Conversely, contestability does not imply that every challenge receives equal evidential weight or compels revision. Different challenges carry different standing, competence, evidence, and inferential force.

Definition 25.170 (Contestability pathway). A *contestability pathway* connects a challenge to its target, grounds, relevant correction authority, response, adjudication status, dependency consequences, and resulting action, including retention, clarification, scope revision, reanalysis, branching, suspension, or retirement.

Table 25.9 summarizes the principal contestability channels developed below. The table treats collaboration as a set of correction relations rather than as co-authorship alone.

Table 25.9: Principal channels of collaboration and contestability in GRE

Channel	Primary object of challenge	Possible programme consequence
Criticism	Semantics, inference, evidence, formalization, norms, scope, or application	Clarification, revised warrant, dependency reanalysis, or targeted revision
Counterexample	Generality, mechanism, typology, boundary, or applicability	Scope contraction, subtype formation, mechanism revision, or claim defeat
Replication	Dependence on data, procedures, interpretation, formal derivation, or implementation	Corroboration, sensitivity discovery, non-replication, or revised validity horizon
Reinterpretation	Evidential or conceptual bridge connecting observations to claims	Alternative reading, underdetermination, changed claim status, or formulation branching
Cross-disciplinary collaboration	Domain predicates and external correction dependencies	Domain correction, translation revision, deference, or joint reconstruction
Cross-cultural collaboration	Concept portability, standing, categories, institutions, and historical assumptions	Semantic revision, regionalization, expanded standing, or new comparison classes
Public contestability	Representations, lived consequences, feasibility, harms, standing, and priorities	Corrected description, new evidence, normative reconsideration, or implementation revision
Institutional contestability	Procedures governing entry, review, preservation, funding, publication, and correction	Changed access to challenge, appeal, provenance, oversight, or programme governance

Proposition 25.171 (Challenge-to-revision traceability). *A consequential challenge strengthens GRE's revisability when the programme can reconstruct what was challenged, why the challenge had standing, how it was assessed, which dependencies were affected, and why the resulting claim or programme state was retained or changed.*

25.9.1 Criticism

Criticism is the broadest contestability channel. It can concern the meaning of a concept, the validity of an inference, the adequacy of evidence, the assumptions of a formal representation, the provenance of a normative judgment, the placement of a domain boundary, or the consequences of an applied recommendation. GRE should therefore treat criticism as typed intervention into programme architecture rather than as an undifferentiated expression of disagreement.

Definition 25.172 (GRE criticism record). *A GRE criticism record identifies the challenged programme component, its epistemic status and version, the critic's stated grounds, the relevant evidence or argument, the claimed scope of the problem, affected dependencies, the programme response, unresolved remainder, and any re-*

sulting revision action.

Typing matters because criticisms that appear similar can require different responses. A semantic criticism may show that two studies use *value conversion* differently. An evidential criticism may show that a proposed mechanism rests on measurements that do not identify the intended relation. A formal criticism may expose an unstated assumption required for a derivation. A normative criticism may dispute the standing rule by which affected subjects were included. A domain criticism may show that a predicate treated as economically decidable actually requires legal, ecological, historical, or technical correction authority.

A criticism can be consequential without defeating its target. It may reveal a missing scope condition, require a stronger evidential bridge, narrow an interpretation, or expose an unresolved ambiguity. The response should therefore preserve a distinction among clarification, qualification, revision, suspension, and defeat.

Definition 25.173 (Criticism-response burden). The *criticism-response burden* is the programme obligation to provide a reasoned and reconstructable response when a criticism identifies a plausible defect that would materially alter the warrant, interpretation, scope, dependency, or application of a GRE component if sustained.

The burden does not require agreement with the critic. It requires the programme to state why the criticism changes the target, leaves it unchanged, remains unresolved, or redirects the dispute to another evidential or disciplinary venue. Silence can itself become informative when a programme systematically lacks procedures for answering particular classes of criticism.

Proposition 25.174 (Typed criticism principle). *GRE should assess criticism by the kind of programme component challenged and the inferential consequence of the alleged defect, so that semantic, empirical, formal, normative, domain, and applied criticisms produce appropriately differentiated revision pathways.*

25.9.2 Counterexamples

Counterexamples are especially important for a programme whose claims vary in epistemic status and scope. A case that contradicts a universal proposition has a different force from a case that falls outside a heuristic's expected range, a historical reconstruction's evidence base, or a domain-specific mechanism's stated conditions. The analytical task is to determine whether the candidate case actually satisfies the target claim's antecedent and scope conditions and, if so, what aspect of the claim it challenges.

Definition 25.175 (GRE counterexample profile). A *GRE counterexample profile* records the target claim, its stated scope and conditions, the candidate case, evidence that the case satisfies the relevant inclusion conditions, the observed divergence, alternative explanations, possible measurement or interpretation errors, and the revision consequences that would follow if the counterexample is sustained.

A counterexample can operate at several levels. It can challenge generality by showing that a claim fails in a case within its stated domain. It can challenge a proposed mechanism by showing that the predicted generative sequence is absent or reversed. It can challenge a typology by presenting a case that cannot be classified

without distorting its properties. It can challenge a domain boundary by demonstrating that a supposedly external factor is constitutive of the phenomenon. It can also challenge an application by showing that an intervention expected to preserve options or expand relational capacity recurrently produces foreclosure under specified conditions.

Scope revision is a legitimate response when it is independently defensible. A programme can learn that a mechanism operates only under narrower institutional, historical, technological, or cultural conditions than originally proposed. Such narrowing should revise the recorded generality of the earlier claim. Redefining the scope only after each adverse case in a way that insulates the claim from possible failure would weaken contestability.

Definition 25.176 (Counterexample propagation map). *A counterexample propagation map records which downstream propositions, applications, classifications, or research questions depend materially on a claim challenged by a sustained counterexample and therefore require reassessment rather than automatic retention.*

Proposition 25.177 (Counterexample incorporation principle). *When a candidate counterexample satisfies the documented scope conditions of a GRE claim and survives reasonable evidential and interpretive scrutiny, the programme should revise the target's warrant or scope and propagate that revision through materially dependent components.*

Negative cases therefore belong to the constructive development of GRE. Their importance lies in the information they provide about boundaries, mechanisms, omitted variables, unsuitable categories, and the circumstances under which one formulation should branch or be retired.

25.9.3 Replication

Replication within GRE requires a plural conception because the programme includes empirical, historical, interpretive, formal, and applied work. Experimental repetition can be appropriate for some research designs, while historical reconstruction, qualitative inquiry, formal derivation, and institutional case analysis require different forms of independent re-examination. The common objective is to test whether a reported result depends excessively on one dataset, procedure, coding scheme, interpretation, formal implementation, or research setting.

Definition 25.178 (GRE replication attempt). *A GRE replication attempt is an independent or meaningfully separated re-examination of a prior GRE result using a procedure appropriate to that result's epistemic status, with the purpose of testing the stability, recoverability, scope, or implementation dependence of the reported finding or inference.*

For a quantitative empirical result, replication may involve re-estimation from the same or newly collected data, alternative operationalization, or application in another population. For a historical claim, it may involve independent archival reconstruction, source criticism, or reassessment using newly available records. For qualitative work, it may involve independent coding, comparison across sites, or renewed field inquiry. For a formal result, it may involve independent derivation, proof

checking, simulation reproduction, or testing alternative parameterizations. For an applied intervention, replication may concern whether the generative mechanism and consequences recur under materially comparable implementation conditions.

These procedures answer different questions. Agreement across them can increase confidence, while disagreement can locate a boundary or hidden dependence. A failed replication also has several possible interpretations: the original result may be incorrect, the later design may not instantiate the same object, the mechanism may be historically or institutionally contingent, the operationalization may differ, or the phenomenon may be unstable. The replication record should keep these possibilities distinguishable.

Definition 25.179 (Replication comparison profile). *A replication comparison profile records the original and replication objects, data or source bases, procedures, operationalizations, historical and institutional conditions, implementation differences, result correspondence, residual discrepancies, and the revised validity horizon justified by the comparison.*

Proposition 25.180 (Status-sensitive replication principle). *GRE should evaluate replication through procedures appropriate to the epistemic status and evidence relation of the original result; stability across relevant replications can strengthen warrant, while non-replication should trigger diagnosis of error, scope, interpretation, or contextual dependence before broader conclusions are drawn.*

Replication thus functions as a generator of scope knowledge as well as a check on correctness. A result that reproduces only under a narrow institutional configuration may remain useful if that configuration is made explicit.

25.9.4 Reinterpretation

Reinterpretation concerns the bridge between available material and the claim inferred from it. The same archive, interview corpus, institutional record, statistical pattern, or formal representation can sometimes support more than one serious interpretation. GRE's inverse-problem epistemology makes such underdetermination expected in many domains. Programme contestability therefore requires alternative interpretations to remain visible when the evidence does not uniquely select among them.

Definition 25.181 (GRE reinterpretation dossier). *A GRE reinterpretation dossier records the shared evidential material, the prior interpretation, the alternative interpretation, the concepts and inferential bridges on which they diverge, evidence capable of discriminating between them, consequences for downstream claims, and any remainder that remains underdetermined.*

Reinterpretation can expose hidden assumptions. A pattern previously interpreted as voluntary coordination may be redescribed as dependence once exit conditions are examined. A historical episode described as value generation may look different when unrecorded costs or excluded subjects enter the evidential field. A network representation interpreted as influence may support only association if the causal bridge is weaker than originally assumed. These revisions concern the relation between representation and inference rather than merely vocabulary.

Alternative interpretation should also remain constrained. A reinterpretation gains programme relevance when it has explicit semantics, preserves the evidential record, identifies the inferential change, and exposes consequences that can in principle be compared. An interpretation that shifts meaning whenever adverse evidence appears creates semantic immunity rather than contestability.

Definition 25.182 (Reinterpretation discrimination burden). The *reinterpretation discrimination burden* is the requirement that materially competing interpretations identify the observations, arguments, source relations, or future evidence that could alter their relative warrant, or explicitly state when current evidence leaves them underdetermined.

Proposition 25.183 (Interpretive plurality principle). *GRE should preserve materially serious alternative interpretations when available evidence does not warrant unique selection, while restricting downstream conclusions to those supported by the interpretation actually adopted or robust across the surviving alternatives.*

Reinterpretation thereby connects contestability with the plural-formulation architecture of Section 25.8. A sufficiently consequential interpretive divergence may become a formulation branch point rather than an ambiguity to be removed editorially.

25.9.5 Cross-Disciplinary Collaboration

Cross-disciplinary collaboration becomes necessary when an economic question contains predicates whose warrant depends partly on neighboring domains. GRE may investigate the economic consequences of legal validity, ecological thresholds, historical sequence, educational quality, technological capability, or political authority, while the programme does not thereby acquire principal correction authority over those predicates. Collaboration should therefore be organized around distributed competence and reciprocal correction.

Definition 25.184 (Cross-disciplinary contestability interface). A *cross-disciplinary contestability interface* specifies a shared research object, the claims contributed by each participating domain, predicate-specific correction authority, translation rules, evidential responsibilities, unresolved jurisdictional overlap, and the GRE components that should change when an external-domain correction is sustained.

The interface differs from disciplinary borrowing. Borrowing can import a concept as a fixed input. Collaboration creates a pathway through which historians, legal scholars, ecologists, engineers, educators, political theorists, or other specialists can challenge how GRE has represented the object and can require revision when the challenge falls within their relevant competence. GRE can likewise return economic findings that alter neighboring-domain interpretations without presuming that economic relevance establishes disciplinary priority.

This relation is especially important where concepts share vocabulary across disciplines while carrying different meanings. *Institution*, *capacity*, *value*, *power*, *right*, *risk*, or *sustainability* can enter several literatures with distinct inferential roles. A collaborative interface should preserve those differences before seeking common structure.

Definition 25.185 (Distributed correction authority). *Distributed correction authority* is the allocation of primary and contributory correction roles according to the predicate, evidence, method, and institutional competence relevant to a disputed claim, rather than according to ownership of the larger research project.

Proposition 25.186 (Cross-disciplinary correction principle). *When a GRE conclusion materially depends on a claim whose principal warrant lies in another domain, sustained correction from that domain should propagate into the GRE conclusion through an explicit interface even when the economic analysis itself remains internally coherent.*

Cross-disciplinary collaboration therefore increases programme answerability by creating external correction routes. Its success is measured partly by whether participants can revise one another's relevant claims, not merely by whether several disciplinary vocabularies appear in the same study.

25.9.6 Cross-Cultural Collaboration

Cross-cultural collaboration tests whether GRE categories, comparisons, value concepts, subject assumptions, institutional classifications, and evidential practices travel across historically and culturally differentiated settings. The relevant analytical units should remain specific. Broad civilizational or national labels can conceal internal plurality, migration, class, language, region, generation, institutional variation, and contested traditions. GRE therefore treats cross-cultural inquiry as comparison among situated interpretive and institutional configurations rather than as comparison among internally homogeneous cultures.

Definition 25.187 (Cross-cultural contestability profile). *A cross-cultural contestability profile* records the GRE concept or claim under examination, the historically situated settings compared, relevant language and translation issues, institutional differences, subject positions, local categories, normative standing assumptions, observed mismatches, and the programme revisions proposed in response.

Several forms of correction can result. A concept may prove semantically narrower than assumed because another setting lacks an equivalent category. A typology may require additional cases. A value account may reveal standing rules that were treated as universal despite being historically local. A measurement may fail because its indicators encode one institutional practice. A proposed causal mechanism may depend on background relations absent elsewhere. In each case, cross-cultural collaboration can alter the framework itself rather than merely append another regional example.

Translation is central to this process. Lexical equivalence is insufficient where concepts occupy different relational positions, carry different histories, or presuppose different institutional distinctions. Participants with situated linguistic, historical, and practical competence should therefore be able to contest the translation architecture through which a GRE claim is transported.

Definition 25.188 (Cultural portability assessment). *A cultural portability assessment* evaluates which semantics, mechanisms, categories, standing rules, indicators, and inferential relations of a GRE component remain warranted across specified settings, which require translation or regionalization, and which fail to travel without mate-

rial reconstruction.

Proposition 25.189 (Cross-cultural revision principle). *When cross-cultural inquiry reveals that a GRE concept or claim depends materially on historically local semantics, institutions, standing rules, or evidence practices, the programme should regionalize, translate, or revise the affected component rather than preserve broader scope by terminological equivalence alone.*

Cross-cultural contestability therefore contributes directly to theory construction. It can identify candidate invariants, but it can equally reveal non-transferable structures whose preservation is necessary for domain accuracy and intellectual humility.

25.9.7 Public Contestability

GRE frequently studies relations in which people, communities, organizations, workers, consumers, recipients of public services, and other affected parties possess knowledge unavailable from formal datasets alone. They can contest descriptions of their practices, classifications imposed upon them, assumptions about feasible action, accounts of harm, distributions of standing, or institutional representations of consent and participation. Public contestability provides a pathway by which such challenges can enter research and application without assuming that experiential standing settles every empirical or normative question.

Definition 25.190 (Public contestability interface). *A public contestability interface is a documented procedure through which persons or collectivities materially represented, affected, or governed by a GRE analysis can challenge relevant descriptions, categories, evidence, assumptions, value premises, or applications and receive a traceable response connected to possible revision.*

Different forms of public contribution carry different epistemic roles. Participants may possess first-person knowledge of constraints, tacit knowledge of institutional practice, records unavailable to researchers, collective memory, knowledge of implementation failure, or normative claims about standing and acceptable risk. These contributions can correct research even when they do not confer principal authority over statistical validity, legal interpretation, ecological thresholds, or other predicates requiring additional expertise.

Meaningful contestability also depends on accessibility. A technically public model can remain practically insulated if its objects, assumptions, data transformations, uncertainty, or avenues of challenge are unintelligible to the people expected to contest it. Accessibility requirements should be proportional to the consequences of the analysis and the roles expected of affected participants.

Definition 25.191 (Representational challenge). *A representational challenge is a contestation by an affected or knowledgeable party claiming that a GRE description, category, proxy, subject model, or inferred relation materially misrepresents the object or consequences relevant to the analysis.*

A representational challenge should be evaluated rather than treated as automatically dispositive. Researchers may retain a contested category if they can justify its analytical purpose and evidential basis. The challenge nevertheless creates a response burden where the representation materially affects conclusions, standing, or inter-

vention.

Proposition 25.192 (Affected-party answerability). *When GRE represents or informs consequential action toward identifiable affected parties, the programme should provide proportionate avenues through which materially relevant representational, experiential, and normative challenges can enter the analysis and receive documented responses.*

Public contestability also has a power dimension. The practical ability to challenge research depends on language, time, resources, institutional recognition, access to records, and protection from retaliation. A nominal invitation to comment therefore does not by itself establish meaningful contestability.

25.9.8 Institutional Contestability

Contestability ultimately depends on institutions that determine who can raise a challenge, where it is recorded, who is expected to answer, what evidence can be accessed, whether negative findings are publishable, and how revisions persist over time. Journals, repositories, universities, research groups, public agencies, funding arrangements, ethics procedures, data infrastructures, professional associations, and community organizations can support these functions. They can also create gatekeeping, path dependence, conflicts of interest, or asymmetric costs that suppress correction.

Definition 25.193 (Institutional contestability condition). *An institutional contestability condition is a configuration in which relevant challenges have accessible entry points, identifiable response responsibility, sufficient evidential access, proportionate independence from the challenged interest, traceable adjudication or unresolved status, and durable preservation of the resulting record.*

No single institutional form is sufficient across the programme. Formal peer review may detect some errors while missing practitioner knowledge. Public consultation may surface implementation harms while lacking access to confidential data or technical derivations. Replication repositories can preserve computational materials while leaving interpretive disputes unresolved. Cross-disciplinary panels can broaden correction authority while reproducing their own exclusions. GRE therefore benefits from multiple, partially independent contestability routes.

Definition 25.194 (Contestability failure). *A contestability failure occurs when a materially relevant challenge is systematically prevented from reaching, testing, or revising its programme target because entry, evidence, response, independence, escalation, or preservation mechanisms are inadequate.*

Contestability failure can occur even where criticism is formally permitted. A challenge may be too costly to submit, inaccessible in the required language or format, dependent on data controlled by the challenged institution, or incapable of producing a durable correction. Institutional analysis should therefore examine the generative conditions of criticism itself: which relations make correction possible, which positions can impose a response burden, and which challenges disappear without leaving a research trace.

Definition 25.195 (GRE contestability portfolio). *A GRE contestability portfolio is the programme-level record of available criticism, counterexample, replication, reinter-*

pretation, cross-disciplinary, cross-cultural, public, and institutional challenge pathways, including their entry conditions, correction authorities, unresolved cases, and known access asymmetries.

Proposition 25.196 (Plural contestability principle). *GRE's openness is more credible when consequential claims can be challenged through several appropriately differentiated pathways and when the programme records both successful corrections and known barriers to correction.*

Collaboration and contestability therefore give operational content to GRE's commitment to revisability. Criticism becomes useful when it can reach specified targets; counterexamples when they can revise scope or mechanism; replication when it can expose stability and dependence; reinterpretation when alternative inferential bridges remain comparable; and collaboration when correction authority can cross disciplinary, cultural, public, and institutional boundaries. These mechanisms also create a further requirement. A programme cannot learn from contestation if the challenged claims, evidence, alternative interpretations, negative results, and revision decisions disappear as soon as a new version is produced. Section 578 therefore turns to preservation and provenance as the research memory required for contestability to accumulate rather than repeatedly restart.

25.10 Preservation and Provenance

Section 25.9 established contestability as a programme mechanism through which criticism, counterexamples, replication, reinterpretation, and external correction can reach identifiable GRE components and produce traceable consequences. Such contestability accumulates only when the objects of challenge and the reasons for their retention, revision, branching, or retirement remain reconstructable over time. The present section therefore specifies the preservation and provenance architecture required by an open research programme. Its objective is to identify what should be retained, which relations among records matter, how provenance differs across concepts, claims, data, and models, and why negative results and alternative interpretations belong within programme memory. The discussion proceeds through concept lineage, claim warrant, data transformations, model assumptions, negative results, interpretive alternatives, revision histories, and research memory. Its method is dependency-sensitive and historically reconstructive: preservation is evaluated by the future analytical work a record can support, while provenance records the relations through which a present programme state became warranted, contested, transformed, or superseded.

Definition 25.197 (GRE preservation-provenance architecture). *A GRE preservation-provenance architecture is a programme-level arrangement that retains materially consequential research objects together with the semantic, evidential, methodological, formal, normative, historical, and revision relations required to reconstruct how those objects entered, changed within, or left the programme.*

Preservation and provenance perform different functions. Preservation maintains access to an object or record. Provenance makes its lineage intelligible. A stored dataset without collection and transformation history may remain available while

losing much of its evidential meaning. A superseded concept definition can remain textually preserved while becoming difficult to compare if the reason for revision is absent. A model file can survive while the assumptions, parameter choices, training conditions, or intended interpretation that gave it analytical meaning disappear. GRE therefore treats durable storage as one component of research memory rather than as its complete form.

Definition 25.198 (Programme provenance relation). A *programme provenance relation* is a documented relation connecting a preserved object to a materially relevant source, predecessor, transformation, assumption, evidential basis, interpretive decision, criticism, revision event, branch, or successor.

The relevant unit of preservation is consequently relational. Later researchers should be able to recover both an object and enough of its dependency structure to understand what it meant and what supported it at a specified programme state. The required depth varies with consequence, uncertainty, dependency, and practical feasibility. Minor editorial changes ordinarily require less provenance than a revised definition that alters several downstream propositions or an applied model that affects consequential institutional decisions.

Table 25.10 summarizes the principal preservation objects developed in this section and the provenance relations that make them analytically reusable.

Proposition 25.199 (Reconstructable preservation principle). *Preservation strengthens an open GRE programme when later inquiry can reconstruct the material relations through which a preserved object acquired its meaning, warrant, limitations, and programme consequences, rather than merely recover the object's latest textual or computational form.*

25.10.1 Concept Provenance and Semantic Lineage

Concepts are among the most frequently reused programme objects and among the easiest to preserve incompletely. The same label can acquire a revised definition, narrower domain, additional distinction, new measurement bridge, altered normative implication, or different relation to neighboring theories. A later reader who encounters only the current definition may be unable to determine whether an earlier claim used the same concept in the same sense. Concept provenance therefore records semantic lineage rather than treating vocabulary as historically stable by default.

Definition 25.200 (GRE concept lineage record). A *GRE concept lineage record* identifies a concept's versioned definition, analytical role, domain and scale, predecessor formulations, successor formulations, materially relevant distinctions, translation relations, documented disputes, and the reasons for consequential semantic revision.

A lineage record is especially important for concepts that recur across chapters or domains. Terms such as *generativity*, *value*, *power*, *relational capacity*, *participation*, and *economic order* can carry family resemblance across contexts while requiring different predicates, evidence, or operationalization in specific inquiries. Preservation should make these relations explicit enough that recurrence does not create an unsupported presumption of identity.

Definition 25.201 (Semantic continuity assessment). A *semantic continuity assess-*

Table 25.10: Principal preservation objects and provenance requirements in GRE

Preserved object	Material provenance	Future analytical function
Concept	Definition, semantic lineage, domain, translations, disputes, predecessor and successor meanings	Recover semantic change and prevent accidental equivalence across versions
Claim	Exact formulation, status, scope, assumptions, warrant, dependencies, criticism, outcome	Reconstruct why a claim was accepted, qualified, suspended, defeated, or retained
Data	Source, collection context, measurement, inclusion rules, transformations, access conditions	Reassess evidential fit and reproduce or reinterpret analytical transformations
Model	Purpose, assumptions, inputs, implementation, parameterization, diagnostics, version, interpretation	Compare model branches and identify dependence on formal or computational choices
Negative result	Target, conditions, procedure, failure mode, uncertainty, interpretation	Prevent selective programme memory and reopen previously unsuccessful paths under changed conditions
Alternative interpretation	Shared evidence, divergent inferential bridge, assumptions, discriminating evidence, status	Preserve underdetermination and enable later reinterpretation without reconstructing lost alternatives
Revision history	Previous state, trigger, rationale, dependency effects, successor state, unresolved remainder	Explain programme change and distinguish correction, branching, retirement, and succession
Research memory	Preserved objects, provenance relations, access conditions, unresolved records, retention priorities	Support cumulative contestability, reanalysis, comparison, and future re-epistemization

ment compares two versions or uses of a concept by recording which defining properties, inferential roles, domain conditions, measurement bridges, and normative implications remain stable and which have changed.

Semantic continuity can be partial. A later formulation may preserve the relational core of a concept while changing its formal representation. A cross-domain translation may preserve a structural question while changing the domain predicate that determines whether an instance qualifies. A historical reinterpretation may show that a category previously treated as stable depended on an institution or vocabulary that did not exist in the earlier period. These cases require a lineage that records continuity and discontinuity separately.

Concept preservation should also retain abandoned distinctions when their removal affected later reasoning. Deleting an unsuccessful conceptual branch can make subsequent theory appear more linear and inevitable than the research process actually was. Retaining the branch, its motivation, and its reason for aban-

document can reveal which ambiguities have already been examined and which assumptions were required to resolve them.

Definition 25.202 (Semantic provenance loss). *Semantic provenance loss* occurs when a concept remains in use while the record no longer supports reconstruction of materially relevant changes in its definition, inferential role, domain, or relation to earlier formulations.

Semantic provenance loss can generate false agreement. Two authors may appear to endorse the same GRE proposition while using different versions of a central term. It can also generate false disagreement when labels differ despite substantially shared analytical content. A preserved semantic lineage gives later comparison a more reliable object than terminology alone.

Proposition 25.203 (Concept-lineage principle). *Consequential GRE concepts should be preserved as versioned semantic lineages when changes in their meaning, domain, or inferential role would alter the interpretation of earlier or later programme claims.*

25.10.2 Claim Provenance and Warrant Lineage

Claims require a different provenance architecture because their central problem is warrant. Section 25.2 distinguished claims from proposals, hypotheses, heuristics, formal representations, domain-specific results, open problems, and unresolved disagreements. Preservation should maintain that status discipline over time. A sentence that was originally proposed as a heuristic should not later appear as a settled result merely because its qualification disappeared during repeated summarization.

Definition 25.204 (GRE claim provenance record). *A GRE claim provenance record* preserves the claim's exact versioned formulation, epistemic status, stated scope, assumptions, supporting evidence or argument, dependency relations, known counterevidence, material criticisms, revision conditions, and current programme disposition.

The exact formulation matters because small changes can alter evidential burden. A claim that a mechanism *can* occur under specified conditions differs from a claim that it *typically* occurs, and both differ from a claim of general necessity. Preservation should therefore keep the formulation against which evidence and criticism were originally evaluated.

Definition 25.205 (Warrant lineage). *A warrant lineage* is the reconstructable sequence through which the support for a claim is introduced, supplemented, challenged, reinterpreted, narrowed, replaced, or withdrawn across programme versions.

Warrant lineage differs from citation history. Citations can identify intellectual or evidential sources while leaving the inferential role of each source unspecified. A warrant lineage records which evidence supports which component of a claim, which assumptions connect evidence to conclusion, which criticisms reach those connections, and how the programme responds. It can therefore show that a claim survived because new evidence corroborated it, because its scope was narrowed, because an alternative explanation was rejected, or because the issue remains unresolved.

Definition 25.206 (Claim-state transition). *A claim-state transition* is a documented

change in a claim's epistemic status, scope, warrant, dependency position, or programme disposition produced by new evidence, argument, criticism, reinterpretation, or revision.

Claim-state transitions should preserve defeated and superseded states when they remain relevant to understanding later theory. A claim can be retired while its failure contributes to a new distinction or research question. A hypothesis can lose empirical support while a formal representation derived from it remains useful under a different interpretation. Provenance should permit these differentiated outcomes to remain visible.

The level of record should be proportional to programme consequence. A local wording change can be documented lightly. A claim that anchors several downstream sections, guides data collection, or enters policy application warrants deeper preservation because later revision may require tracing its effects across a larger dependency structure.

Proposition 25.207 (Warrant-reconstruction principle). *For claims with material downstream dependencies, GRE should preserve enough warrant lineage to reconstruct why each consequential claim state was accepted, qualified, contested, suspended, defeated, or retained at the time it was used.*

25.10.3 Data Provenance and Evidential Lineage

Data preservation concerns more than retaining files. GRE frequently works with historically generated classifications, institutional records, surveys, measurements, administrative data, archives, computational traces, interviews, and mixed evidential forms. Their evidential meaning depends on how observations were produced, selected, transformed, and linked to the relational objects or processes under study. Data provenance therefore belongs to epistemic interpretation as well as reproducibility.

Definition 25.208 (GRE data provenance record). *A GRE data provenance record identifies the source and collection context of data, relevant measurement or classification procedures, sampling and inclusion rules, exclusions and missingness, transformations, linkage operations, derived variables, access conditions, version changes, and known limitations that bear on evidential interpretation.*

The record should distinguish source data from derived data. A derived variable may depend on recoding, aggregation, imputation, normalization, textual interpretation, model-based inference, or linkage across sources. Each transformation can alter what later analysis can reasonably infer. Preserving only the final analytic table obscures these steps and can make a relational interpretation appear to arise directly from observations that were themselves heavily processed.

Definition 25.209 (Evidential transformation chain). *An evidential transformation chain is the documented sequence connecting source observations to the derived representations used in an analysis, including the transformations, assumptions, classification decisions, and uncertainty introduced at each materially consequential step.*

GRE's historical orientation adds another requirement. Categories embedded in records may reflect institutions, legal classifications, administrative purposes, techno-

logical capacities, or social conventions specific to their time and place. Provenance should preserve enough contextual information to prevent later researchers from treating a historically generated category as a transparent measure of a timeless object. This concern applies equally to contemporary digital traces whose availability is shaped by platform architecture, access rules, and recording practices.

Preservation can conflict with privacy, confidentiality, legal obligations, community governance, security, or contractual restrictions. Research memory therefore does not imply unrestricted retention or public disclosure. Where direct preservation of sensitive data is inappropriate, the programme can preserve metadata, transformation logic, access conditions, synthetic or redacted derivatives, secure references, and explicit statements of what later researchers cannot independently inspect.

Definition 25.210 (Provenance sufficiency under access constraint). *Provenance sufficiency under access constraint* is the condition in which a research record preserves the maximum ethically, legally, and practically appropriate information needed to assess evidential origin and transformation while explicitly documenting residual limits on independent inspection or replication.

A provenance record should also preserve data corrections. Silent replacement of an erroneous file can improve the current analysis while erasing the reason earlier results differed. Versioned corrections permit later researchers to distinguish changes caused by theory from changes caused by data repair.

Proposition 25.211 (Evidential-lineage principle). *GRE analyses should preserve the materially consequential lineage connecting observations to analytical representations, including transformation and access constraints, whenever those relations affect interpretation, replication, or the scope of warranted inference.*

25.10.4 Model Provenance and Assumption Lineage

Models concentrate many layers of choice. A conceptual model can encode a particular boundary around the object of inquiry. A formal model can depend on definitions, structural assumptions, mathematical simplifications, and parameter restrictions. A computational model adds implementation, software, initialization, numerical procedure, and hardware or environment dependencies. A statistical or machine-learning model can further depend on training data, feature construction, optimization choices, evaluation metrics, and decision thresholds. Model preservation should therefore retain the assumptions and implementation conditions that make an output interpretable.

Definition 25.212 (GRE model provenance record). *A GRE model provenance record* identifies a model's analytical purpose, version, represented objects, assumptions, inputs, parameterization, implementation or derivation, evaluation procedures, diagnostics, known failure conditions, intended interpretation, dependencies, and relation to predecessor, competing, or successor models.

The record should keep analytical purpose explicit. The same mathematical or computational structure can serve descriptive, explanatory, exploratory, predictive, counterfactual, or heuristic roles. Reusing a model in a new role without preserving that change can create an unsupported expansion of claim strength.

Definition 25.213 (Assumption lineage). An *assumption lineage* records the introduction, justification, relaxation, replacement, and downstream consequences of assumptions that materially shape a model's behavior or interpretation.

Assumption lineage is especially important when later formulations appear to improve a model by adding complexity. A new version may fit observations better while changing the object represented, the parameter interpretation, or the conditions under which earlier propositions held. Provenance allows comparison of models as structured alternatives rather than as a simple sequence from inferior to superior.

Definition 25.214 (Model branch record). A *model branch record* documents a point at which materially different model variants continue in parallel because they encode different assumptions, purposes, evidence relations, or interpretive commitments whose relative adequacy remains unresolved or context-dependent.

Model branches can preserve productive disagreement identified in Section 25.8. They also prevent later computational convenience from silently selecting one theoretical interpretation. A model that becomes easier to estimate or implement does not thereby acquire stronger ontological standing. The ontological restraint developed earlier in the book continues to apply to preserved formal and computational artifacts.

Executable preservation, where feasible, strengthens provenance by retaining code, environment specifications, parameter files, and tests. Executability remains only one component. A perfectly reproducible computation can still rest on a poor conceptual translation or an inappropriate evidential bridge. Model memory should therefore connect implementation reproducibility to semantic and epistemic provenance rather than substitute one for the other.

Proposition 25.215 (Model-lineage principle). *GRE should preserve consequential models together with the assumptions, purposes, evidence relations, and implementation conditions needed to distinguish computational reproducibility from substantive validity and to compare model branches across programme versions.*

25.10.5 Negative Results as Programme Evidence

An open research programme requires memory of paths that did not produce the expected result. Negative findings can reveal scope boundaries, failed mechanisms, unstable measurements, non-identification, unsuccessful translations, model sensitivity, implementation barriers, or unresolved contradictions. Their preservation reduces the risk that programme history becomes a retrospective sequence of successful formulations while repeated failures disappear from view.

Definition 25.216 (GRE negative-result record). A *GRE negative-result record* preserves a research question or target, the relevant hypothesis or expectation, methods and conditions, evidence obtained, the sense in which the expected result was absent or failed, plausible alternative explanations, uncertainty, and the programme implications supported by the result.

The category should remain typed. A statistically imprecise estimate is different from evidence favoring a null relation. A failed replication differs from a study whose design cannot identify the target mechanism. A formal derivation that cannot be com-

pleted under given assumptions differs from a proof that a proposed structure is inconsistent. A translation failure between disciplines can be theoretically important without implying that either source theory is wrong. Preservation should record the kind of negative result so later researchers do not strengthen its meaning retrospectively.

Definition 25.217 (Failure-context profile). A *failure-context profile* records the domain, scale, data conditions, method, assumptions, implementation conditions, and interpretive criteria under which a negative result occurred, together with changes that might make later reconsideration informative.

Failure context matters because later evidence, methods, or technologies can alter the significance of an earlier negative result. A computationally infeasible analysis may become tractable. A measurement problem may receive a new instrument. A historical archive may become available. A category once treated as homogeneous may later be disaggregated. Preserving failure conditions therefore creates resources for the future re-epistemization developed in the next section.

Negative-result preservation also provides a check against internal selection pressures. Researchers may preferentially circulate successful models, striking mechanisms, or theoretically congenial findings. Programme memory should preserve serious unsuccessful attempts when their absence would distort assessment of robustness, novelty, or evidential balance.

Definition 25.218 (Negative-result reuse condition). A *negative-result reuse condition* identifies the material changes in evidence, method, theory, domain, technology, or interpretation that could justify reopening an earlier negative result rather than merely repeating the same unsuccessful inquiry.

Preservation does not require equal attention to every failed attempt. Trivial errors, exploratory dead ends without downstream significance, and redundant failures can be summarized or discarded according to proportionate retention rules. The relevant question is whether loss of the record would remove information needed to assess programme robustness, avoid uninformative repetition, reconstruct revision, or recognize changed conditions.

Proposition 25.219 (Negative-result preservation principle). *GRE should preserve consequential negative results with their failure contexts when those records can constrain later claims, reveal programme boundaries, prevent selective memory, or provide a basis for informative reanalysis under changed conditions.*

25.10.6 Alternative Interpretations and Evidential Underdetermination

Evidence often supports more than one serious interpretation. Section 25.8 treated competing historical, ontological, value, power, justice, and formal formulations as potentially productive programme plurality. Preservation should retain the interpretive alternatives that made such plurality analytically meaningful, including alternatives that were temporarily disfavored but not decisively defeated.

Definition 25.220 (Interpretive branch record). An *interpretive branch record* preserves a set of serious alternative interpretations of shared or overlapping evidence

together with their conceptual assumptions, inferential bridges, supporting and conflicting evidence, discriminating observations, programme consequences, and current comparative status.

The purpose is not to archive every conceivable reading. An alternative belongs in the record when it has sufficient argumentative or evidential standing that choosing among interpretations materially affects conclusions. This threshold preserves contestability while avoiding an unbounded catalogue of possibilities.

Definition 25.221 (Interpretive closure event). An *interpretive closure event* is a documented programme decision to privilege, merge, regionalize, suspend, or retire interpretive alternatives on the basis of stated evidence, argument, scope, or practical decision requirements.

Closure can remain provisional. A programme may adopt one interpretation for current analysis because it has stronger warrant while retaining the alternatives and the evidence that could reopen them. Application may also require a working interpretation before theoretical underdetermination is fully resolved. In that case the record should distinguish decision necessity from epistemic settlement.

Alternative interpretations are especially important for historical and cross-cultural inquiry, where later archival access, language competence, conceptual reconstruction, or changed historical position can alter what counts as a plausible reading. They also matter for contested contemporary institutions, where different participants may possess evidence or semantic knowledge unavailable from one analytical position.

Definition 25.222 (Dormant interpretation). A *dormant interpretation* is a preserved interpretation that lacks sufficient current warrant for active use but remains neither defeated nor analytically irrelevant because identifiable future evidence or argument could restore its comparative standing.

The category permits GRE to preserve underdetermination without forcing equal present weight. It also reduces hindsight bias: a later dominant account need not erase the fact that earlier evidence left several serious possibilities open.

Proposition 25.223 (Interpretive-preservation principle). *When materially different interpretations remain serious under the available evidence, GRE should preserve their inferential structures and comparative status so later reanalysis can revisit the disagreement without reconstructing lost alternatives from fragments.*

25.10.7 Revision Histories and Decision Provenance

Section 25.7 developed historically revisable and versioned theory. Preservation gives that architecture operational memory. A revision history should record more than successive files. It should make visible which programme object changed, what triggered the change, why a particular response was chosen, which dependencies were affected, and what unresolved remainder continued into the successor version.

Definition 25.224 (GRE revision event). A *GRE revision event* is a documented transition in which a programme component changes materially in semantics, epistemic status, scope, evidence, method, formal representation, normative warrant, domain placement, dependency structure, or programme disposition.

This definition distinguishes substantive revision from ordinary textual editing. Copyediting can alter expression without changing programme content. A semantic revision may change the meaning of a term while leaving the surrounding prose similar. A scope revision can preserve a sentence while narrowing the population or historical range to which it applies. Decision provenance therefore requires comparison at the level of analytical function rather than file difference alone.

Definition 25.225 (Revision decision record). A *revision decision record* identifies the pre-revision state, trigger, relevant criticism or evidence, considered alternatives, selected action, rationale, dependency consequences, unresolved remainder, responsible decision context, and successor state.

The record of considered alternatives is important when several responses were reasonable. A programme may answer a counterexample by narrowing scope, introducing a subtype, revising a mechanism, or abandoning a claim. Preserving the rejected options helps later researchers understand why the chosen revision appeared preferable under the evidence and assumptions then available.

Definition 25.226 (Dependency-aware revision history). A *dependency-aware revision history* connects revision events to the downstream and upstream programme components whose interpretation, warrant, or applicability may change as a consequence.

Such histories reduce local correction that leaves incompatible downstream claims untouched. They also make it possible to revisit earlier decisions when a foundational assumption changes. A revised value concept, for example, may affect measurement choices, justice arguments, and application criteria developed in different chapters. Provenance should expose these relations sufficiently for later integration work.

Revision histories should preserve superseded states without treating them as equally current. Clear status marking can separate active, legacy, archived, defeated, and successor components. This combination of preservation and disposition enables historical reconstruction without creating ambiguity about the programme's present state.

Definition 25.227 (Revision provenance gap). A *revision provenance gap* occurs when a programme state changes materially but the surviving record does not adequately identify the trigger, rationale, dependency consequences, or relation between predecessor and successor states.

Revision provenance gaps weaken later contestability because critics may be unable to determine whether an objection has already been considered, why an assumption disappeared, or which evidence produced a conceptual change. They also make programme succession appear smoother than it was.

Proposition 25.228 (Revision-legibility principle). *Consequential GRE revisions should remain legible as decisions in a dependency-bearing theoretical history, with enough provenance to distinguish semantic change, evidential correction, scope revision, branching, retirement, and programme succession.*

25.10.8 Research Memory and Re-Epistemization Capacity

The preceding preservation objects form a research memory when their relations can support later inquiry. Research memory is therefore neither a complete archive of everything produced nor a repository containing only final outputs. It is a structured capacity to recover consequential intellectual states, evidential pathways, disagreements, failures, and revisions with enough context for new researchers, methods, and historical positions to evaluate them again.

Definition 25.229 (GRE research memory). *GRE research memory* is the distributed and versioned preservation of programme objects and provenance relations required to reconstruct consequential meanings, warrants, alternatives, failures, and revisions for later comparison, contestation, replication, reinterpretation, and reanalysis.

The memory is distributed because no single repository or format can adequately preserve every object. Text, data, code, model specifications, diagrams, decision records, criticism, correspondence where ethically appropriate, version metadata, and access-controlled materials may require different infrastructures and governance. The programme-level requirement is relational interoperability: records should contain enough stable identifiers and provenance information that materially linked objects can be found and interpreted together.

Definition 25.230 (Research-memory continuity). *Research-memory continuity* is the condition in which changes of personnel, institution, technology, repository, format, or programme version do not sever the material provenance relations needed to reconstruct consequential research states.

Continuity is vulnerable to mundane failures. File formats become obsolete, links decay, repositories close, access permissions change, undocumented code stops running, tacit knowledge leaves with researchers, and terminology shifts. Institutional contestability from Section 25.9 therefore extends into preservation governance: the programme should know which memory functions depend on particular institutions and which records would become inaccessible if those arrangements fail.

Preservation also has costs. Unlimited retention can impose storage, curation, privacy, security, and interpretive burdens while making consequential records harder to locate. GRE therefore requires selection criteria rather than total accumulation.

Definition 25.231 (Proportionate preservation priority). A *proportionate preservation priority* assigns greater retention and provenance depth to programme objects with higher downstream dependence, uncertainty, contestation, practical consequence, irreversibility, uniqueness, or value for future discrimination, while allowing lighter treatment of redundant or low-consequence materials.

The criterion is revisable and context-sensitive. A seemingly minor record can later become important if new evidence reveals that it contains a unique observation or preserves an abandoned conceptual path. Selection decisions should therefore preserve their own rationale when exclusion could materially shape future research memory.

Definition 25.232 (Re-epistemization readiness). *Re-epistemization readiness* is the degree to which preserved programme materials retain sufficient provenance, acces-

sibility, status information, and dependency structure to be re-evaluated when new evidence, methods, technologies, historical positions, domains, or normative frameworks become available.

Re-epistemization readiness converts preservation from retrospective record keeping into prospective epistemic capacity. A dataset whose classifications are documented can be reanalyzed with new models. A negative result whose conditions are preserved can be reconsidered after a methodological advance. A dormant interpretation can regain relevance when new archives appear. A superseded concept can be compared with a later domain translation. A revision record can reveal that an apparently settled conclusion depended on a constraint that no longer holds.

Research memory also supports programme accountability. Later researchers can examine whether criticism was answered, whether counterevidence was incorporated, whether negative findings were selectively forgotten, whether external correction changed the programme, and whether a claimed innovation had already appeared in an earlier branch. Provenance therefore contributes to both knowledge accumulation and fair attribution of intellectual development.

Definition 25.233 (Research-memory loss). *Research-memory loss* occurs when disappearance, inaccessibility, undocumented transformation, semantic drift, or provenance failure removes information needed to reconstruct a consequential programme state or to evaluate its relation to later work.

Proposition 25.234 (Memory-to-re-epistemization principle). *GRE's capacity for future correction increases when preservation maintains not only research outputs but also the provenance relations, unresolved alternatives, negative results, and revision histories required for later investigators to ask materially new questions of earlier programme states.*

Preservation and provenance therefore supply the temporal infrastructure of an open GRE programme. Concepts remain interpretable through semantic lineage; claims remain answerable through warrant lineage; data remain assessable through evidential transformation records; models remain comparable through assumption and implementation provenance; negative results and alternative interpretations remain available for renewed discrimination; and revision histories preserve the reasons through which programme states changed. Research memory emerges from these connected records and gives contestability a cumulative rather than episodic form. The next section develops the corresponding future-facing process: re-epistemization under new evidence, methods, technologies, historical positions, domains, and normative frameworks.

25.11 Future Re-Epistemization

Section 25.10 established the preservation and provenance conditions under which a later research community can reconstruct the meanings, warrants, evidential transformations, assumptions, alternatives, negative results, and revision decisions of an earlier GRE programme state. Preservation creates an epistemic option; the present section examines how that option can be exercised. Its role is to specify future re-epistemization as a programme-level process through which inherited GRE objects

are reopened under materially changed conditions of inquiry. Its objective is to distinguish the principal triggers of reopening, identify what can legitimately change in an inherited claim or interpretation, and preserve the difference between later knowledge and the historical epistemic position from which the earlier object was produced. The discussion proceeds through new evidence, methods, technologies, historical positions, domains, and normative frameworks before distinguishing reanalysis from reinterpretation. The method is comparative and provenance-sensitive: a later epistemic state is compared with a reconstructable earlier state, and revision is attributed to identifiable changes rather than to an undifferentiated assumption of intellectual progress.

The book has used re-epistemization in several contexts. Chapter 17 developed it as a capacity of an epistemic economy to reopen inherited knowledge under changed evidential, methodological, conceptual, technological, institutional, or normative conditions. Chapter 20 treated future re-epistemization as a requirement of provisional programme closure. The present section gives the concept a narrower closing function. It asks how GRE itself should be reopened after preservation has made comparison possible.

Definition 25.235 (GRE re-epistemization). A *GRE future re-epistemization process* is a provenance-preserving comparison between an earlier GRE research object and a later epistemic configuration in which materially changed evidence, methods, technologies, historical position, domain knowledge, normative frameworks, analytical operations, or interpretations can alter the object's warranted meaning, scope, status, or programme role.

The research object can be a concept, claim, hypothesis, model, dataset, historical reconstruction, value judgment, domain translation, institutional recommendation, or unresolved disagreement. Re-epistemization does not require that every inherited object change. A later inquiry may strengthen the earlier claim, leave it substantially intact, narrow its scope, reveal a latent ambiguity, split it into domain-specific variants, or defeat it. The defining feature is renewed answerability under changed epistemic conditions.

Definition 25.236 (Re-epistemization trigger). A *re-epistemization trigger* is a documented change in the conditions of inquiry that provides a reason to reopen an inherited research object because the change can materially affect its evidential support, conceptual interpretation, evaluative standing, domain scope, or practical consequence.

A trigger should be material rather than merely chronological. The passage of time alone does not require a new judgment. Materiality arises when later conditions alter what can responsibly be observed, inferred, represented, compared, valued, or acted upon. The same discipline also prevents novelty from becoming an automatic source of epistemic authority. A newer dataset, model, method, technology, or normative vocabulary can improve inquiry, but its later date does not establish superiority by itself.

Table 25.11 summarizes the principal pathways developed in this section and the safeguards that keep reopening historically and epistemically disciplined.

Proposition 25.237 (Reconstructive comparison condition). A *GRE re-epistemization*

Table 25.11: Principal pathways of future re-epistemization in GRE

Pathway	Material change	Primary safeguard
New evidence	Additional observations, archives, testimony, measurements, consequences, or linked records	Separate newly observable evidence from what was available in the earlier epistemic state
New methods	Changed identification, measurement, comparison, interpretation, or formal procedure	Show which result depends on method and preserve comparability with the earlier procedure
New technologies	Changed observability, computation, linkage, simulation, access, or representational capability	Distinguish greater technical capability from stronger substantive validity and record technology-induced selection
New historical positions	Later consequences, temporal distance, altered institutions, or changed category meanings	Reconstruct contemporaneous knowledge and avoid projecting later visibility backward
New domains	Corrections or structures supplied by neighboring fields or newly relevant economic domains	Preserve domain-specific predicates, translation loss, and non-transferable remainder
New normative frameworks	Changed standing, values, duties, harms, rights, or evaluative vocabulary	Distinguish revised evaluation from revised descriptive or causal inference
Reanalysis	New analytical operation on preserved or extended evidence	Record the analytical delta and compare outputs under explicit assumptions
Reinterpretation	New account of meaning, significance, attribution, classification, or programme relevance	Preserve the inferential bridge between evidence and interpretation together with serious alternatives

claim is strongest when the earlier epistemic state and the later change are both reconstructable enough to identify which part of the resulting confirmation, revision, localization, branching, or defeat is attributable to changed conditions of inquiry.

Proposition 25.237 links re-epistemization directly to the provenance architecture of Section 25.10. Without an earlier baseline, later inquiry can identify a current conclusion but cannot reliably explain how or why the warranted state changed. With a baseline, theoretical evolution becomes inspectable rather than merely successive.

25.11.1 New Evidence

New evidence is the most direct trigger for reopening an inherited GRE object. Evidence can become available because additional observations accumulate, consequences unfold, archives are opened, records are digitized, datasets are linked, measurements improve, previously excluded testimony enters inquiry, institutions disclose internal processes, or a new comparison case appears. These additions can alter the warrant of earlier claims without changing the historical events to which those claims refer.

Definition 25.238 (Evidential reopening event). An *evidential reopening event* occurs when newly available or newly admissible evidence has a plausible material bearing on the support, scope, interpretation, or defeat conditions of a preserved GRE research object.

The phrase *new evidence* requires care. A source can be newly discovered while describing an old event. A long-horizon outcome can become observable only after sufficient time has passed. A previously available source can become evidentially usable because provenance has been recovered or because a relevant relation to other records has been established. A testimony can become newly admissible when an earlier research design wrongly excluded the speaker's position. These cases change the later evidence set in different ways and can therefore justify different kinds of revision.

Definition 25.239 (Evidential delta record). An *evidential delta record* identifies the evidence available to an earlier inquiry, the evidence added, removed, reclassified, or newly linked in a later inquiry, the reason for the change, and the claims or interpretations whose warrant may consequently differ.

An evidential delta can strengthen as well as weaken an inherited claim. Later observations can show that a proposed mechanism persists across settings, or they can reveal that an apparent regularity depended on an institutional configuration that was temporary. Additional evidence can also leave a claim's direction intact while changing its scale, frequency, mechanism, or domain boundary. Re-epistemization should preserve these differentiated outcomes instead of reducing them to confirmation or refutation.

Later consequences create a particularly important evidential class. A policy, technology, institution, or allocation can have effects that were genuinely unavailable for direct observation at the time of the original analysis. Once those effects become observable, later inquiry can reassess the earlier prediction, causal account, or evaluation. The reassessment should distinguish the epistemic question of what later evidence supports from the historical question of what contemporaneous actors could reasonably have anticipated.

Definition 25.240 (Later-consequence evidence). *Later-consequence evidence* is evidence produced by outcomes, feedbacks, adaptations, path dependencies, or cumulative effects that become observable only after the earlier epistemic state whose claims are being reassessed.

This distinction matters for responsibility and evaluation. Later harm can reveal that an earlier model was incomplete. It does not by itself establish that the omission was culpable or avoidable at the time. Conversely, a preserved warning, ignored

counterexample, or available alternative can show that an adverse consequence was more foreseeable than later institutional memory suggests. Provenance therefore allows re-epistemization to improve retrospective judgment without collapsing hindsight into contemporaneous knowledge.

New evidence can also transform the object of inquiry. A category initially treated as homogeneous may become internally differentiated after disaggregated records are recovered. An institution initially represented through formal rules may require reinterpretation after implementation records or participant accounts become available. In such cases the later inquiry revises more than a parameter estimate; it can revise the relational object to which the earlier claim referred.

Proposition 25.241 (Evidence-sensitive reopening principle). *GRE should reopen a preserved research object when materially relevant new evidence changes the defensible evidential basis of that object, while retaining enough of the earlier evidence state to distinguish later correction from retrospective projection.*

25.11.2 New Methods

Methods determine which relations can be observed, identified, estimated, compared, reconstructed, or interpreted. Later methodological developments can therefore reopen an earlier GRE result even when the underlying records remain unchanged. New causal designs, measurement procedures, archival methods, qualitative protocols, comparative strategies, formal tools, computational techniques, or mixed-method architectures can expose structures that earlier procedures could not resolve.

Definition 25.242 (Methodological reopening event). *A methodological reopening event occurs when a later method changes the feasible identification, measurement, reconstruction, comparison, formal representation, or interpretation of an inherited research object in a way that can materially affect its warranted status.*

Methodological novelty should remain question-relative. A method that improves prediction can be poorly suited to causal identification. A highly parameterized model can fit observations while obscuring the historical constitution of its categories. A new qualitative protocol can recover meanings excluded by a standardized instrument while providing limited population-level inference. GRE's methodological pluralism therefore treats new methods as changes in access conditions rather than as a universal hierarchy of epistemic advancement.

Definition 25.243 (Method-comparison bridge). *A method-comparison bridge records the target object, assumptions, data requirements, inferential purpose, output semantics, and known limitations of two or more methods so that differences in their results can be interpreted without presuming methodological equivalence.*

The bridge is needed because a later method may answer a different question while appearing to replace the earlier one. A new measure can improve reliability while changing the construct represented. A new estimator can reduce bias under assumptions absent from the earlier analysis. A new historical method can shift attention from institutional outcomes to category formation. These developments can be valuable while remaining non-substitutable. Re-epistemization should specify whether

the method changes precision, identification, object definition, interpretation, or the question itself.

Method changes can also reveal earlier robustness. If materially different methods with different failure modes converge on a bounded conclusion, the claim can acquire stronger comparative support. Divergence is equally informative when provenance makes its source traceable. The divergence may arise from data requirements, assumptions, temporal scale, unit of analysis, interpretive framing, or model structure. A programme that preserves methodological disagreement can convert such divergence into a research object rather than treating it as noise to be averaged away.

Definition 25.244 (Method-conditioned claim state). A *method-conditioned claim state* is a version of a claim whose warrant and scope are recorded together with the method-dependent assumptions and access conditions required to support it.

This object is particularly useful when a claim is robust within one analytical mode but unresolved across modes. Historical evidence can support a relational sequence that current quantitative data cannot identify. Quantitative evidence can establish a population pattern whose generative mechanism remains interpretively uncertain. Formal analysis can derive consequences from assumptions whose empirical adequacy remains open. Re-epistemization can preserve these differences rather than forcing them into one evidential scale.

Proposition 25.245 (Methodological non-supersession principle). A *later method should supersede an earlier GRE result only to the extent that the methods address sufficiently comparable objects and inferential purposes and the later method provides stronger warrant for the relevant claim; methodological novelty alone does not establish substantive supersession.*

25.11.3 New Technologies

Technological change can alter the practical frontier of inquiry. Digitization can make dispersed archives searchable; sensors can increase temporal or spatial resolution; secure computation can permit analysis that privacy constraints previously blocked; simulation can explore regimes inaccessible to direct experiment; language technologies can assist multilingual comparison; and improved compute can make previously infeasible models tractable. These developments can materially change what a later GRE inquiry can examine.

Definition 25.246 (Technological epistemic affordance). A *technological epistemic affordance* is a technology-dependent capacity to observe, preserve, search, link, compute, simulate, represent, communicate, or inspect research material that changes the feasible epistemic operations available to an inquiry.

Technological affordance differs from evidential warrant. Greater resolution can expose new patterns, but it can also amplify artifacts. Larger corpora can widen coverage while inheriting platform selection, documentation gaps, unequal digitization, or systematic absence. Automated extraction can accelerate analysis while introducing classification errors that are difficult to detect at scale. Computational tractability can make a model executable without making its assumptions more appropriate. Re-epistemization should therefore record how technology changes access and where it

creates new dependencies.

Definition 25.247 (Technology-conditioned evidence). A *technology-conditioned evidence profile* records which observations, transformations, linkages, representations, or analytical operations became possible through a specified technological configuration, together with the configuration's selection effects, failure modes, dependencies, and access constraints.

Artificial intelligence makes this distinction especially important. AI-assisted coding, translation, retrieval, classification, synthesis, or simulation can expand the volume and heterogeneity of material a researcher can engage. It can also reshape the pathway by which evidence reaches the researcher. Model training histories, retrieval coverage, interface design, prompting, system updates, confidence calibration, and human review can become part of the evidential and methodological provenance. A later AI system can reopen an earlier archive, yet the system's output remains an epistemically mediated representation whose reliability depends on the task and validation procedure.

Technologies can additionally transform the object being studied. Digital platforms, automated decision systems, new payment infrastructures, and AI-mediated institutions can generate economic relations that did not previously exist in the same form. Reopening an earlier GRE concept under such conditions may require distinguishing two questions: whether new technology reveals an old relation more clearly, and whether it creates a materially new relational configuration. The first supports reanalysis of a preserved object. The second can require concept or domain revision.

Definition 25.248 (Technological object-change test). A *technological object-change test* asks whether a later technology primarily changes epistemic access to an inherited economic object or materially changes the relational object itself through new actors, interfaces, dependencies, capacities, constraints, or modes of value circulation.

The distinction prevents technological novelty from being treated only as an improved research instrument when it has become constitutive of the economic configuration. It also prevents the reverse mistake of declaring a wholly new object whenever a better instrument reveals a structure that was already present.

Proposition 25.249 (Technology-mediated reopening principle). *GRE should treat new technologies as potential re-epistemization triggers when they materially alter epistemic affordances or the economic object itself, while preserving the distinction between improved access, technology-induced evidence selection, and genuine transformation of the relations under study.*

25.11.4 New Historical Positions

A research programme occupies historical time. Later researchers inherit outcomes, institutions, vocabularies, political arrangements, technologies, and comparative cases unavailable to earlier inquiry. Temporal distance can disclose long-horizon consequences, reveal the durability or transience of a mechanism, alter the salience of a category, and create new possibilities for comparison. Future re-epistemization

therefore depends partly on the changing historical position from which inquiry occurs.

Definition 25.250 (Historical-position shift). A *historical-position shift* is a change in the temporal and institutional location of inquiry that materially alters the consequences visible, comparison cases available, categories intelligible, records accessible, or practical questions through which an inherited research object can be examined.

Historical position differs from new evidence alone. Later inquiry may possess many of the same records while understanding their significance differently because institutions have evolved or a once-local pattern has become historically consequential. An early institutional arrangement can appear marginal at inception and later become a template reproduced across jurisdictions. A temporary emergency measure can become infrastructurally entrenched. A concept can acquire new political or legal meaning. The later position changes the relational field in which earlier evidence is interpreted.

This creates a retrospective asymmetry. Later researchers know at least some outcomes that earlier researchers did not. That advantage can improve explanation, yet it can also generate presentism and inevitability narratives. A successful institution can make its emergence appear predictable; a failed project can make warning signs seem obvious; a later category can be projected into a period in which actors organized experience differently. Re-epistemization should therefore preserve the earlier horizon of alternatives and uncertainty.

Definition 25.251 (Contemporaneous epistemic baseline). A *contemporaneous epistemic baseline* reconstructs, as far as the surviving record permits, the evidence, concepts, methods, institutional knowledge, feasible alternatives, and uncertainties available at the historical position from which an earlier claim or decision was formed.

The baseline does not prohibit later judgment. It makes the object of judgment more precise. A later inquiry can conclude that an earlier claim was unsupported by evidence available at the time, that it was reasonable but later defeated, that a neglected warning was already accessible, or that the question itself could not yet be formulated in its later form. These are materially different historical conclusions.

New historical positions can also change the practical relevance of GRE concepts. A concept developed around one technological, institutional, or geopolitical configuration may require revision when the relations it describes are reorganized. Historical revisability from Section 25.7 therefore has an evidential complement: conceptual history and programme history should be revisited when later conditions make inherited classifications inadequate.

Definition 25.252 (Retrospective warrant distinction). The *retrospective warrant distinction* separates a later judgment about what current evidence supports from a historical judgment about what an earlier epistemic position could reasonably support under the evidence and concepts then available.

Proposition 25.253 (Historically situated re-epistemization principle). *Future GRE inquiry should use later historical position to revise explanation and evaluation where warranted while preserving the contemporaneous epistemic baseline needed to distin-*

guish later visibility from earlier knowability.

25.11.5 New Domains

A later domain of inquiry can reopen an economic claim by revealing relations, predicates, mechanisms, or constraints that the original economic analysis did not represent adequately. Chapter 23 developed interfaces with history, governance, law, political theory, education, ecology, artificial-intelligence studies, social theory, and aesthetics. Future domains may add further interfaces. Re-epistemization occurs when such domain knowledge changes what GRE can responsibly claim about an inherited economic object.

Definition 25.254 (Domain-triggered re-epistemization). *Domain-triggered re-epistemization* is the reopening of a GRE object because evidence, concepts, mechanisms, or validity conditions developed in another domain materially alter the economic object's description, explanation, evaluation, or scope.

The process is bidirectional. A legal development can alter the institutional predicates under which an economic relation exists. Historical reconstruction can show that a supposedly general economic category was constituted through a particular sequence. Ecological evidence can reveal material dependencies excluded from a value account. Educational research can alter assumptions about capability formation. AI studies can revise the technical object represented in an economic model of automation. These corrections can enter GRE without requiring the neighboring domain to become economics.

Definition 25.255 (Domain correction return). A *domain correction return* is a provenance-preserving result from a neighboring inquiry that identifies a GRE claim, concept, model, translation, or application requiring confirmation, qualification, reinterpretation, branching, or revision because of domain-specific evidence or reasoning.

A correction return should preserve the predicate under which it has authority. A legal determination can settle the content of an authoritative legal rule without settling the economic consequences of implementation. An ecological model can constrain claims about material regeneration without deciding a distributive principle. A historical reconstruction can defeat a timeless origin story without providing a complete contemporary causal estimate. Cross-domain re-epistemization therefore depends on typed jurisdiction over claims.

New domains can also generate genuinely new economic questions. An interface can reveal a relation that was previously outside GRE's active object set but has economic consequences once translated. Such expansion should remain distinguishable from retroactively claiming that GRE already contained the domain insight. Provenance should show when the new object entered the programme and which concepts required alteration to accommodate it.

Definition 25.256 (Domain-expansion event). A *domain-expansion event* occurs when a neighboring field or newly salient substantive domain introduces an economic question, relation, or constraint that warrants extending GRE's active research objects while preserving the independent domain knowledge on which the extension

depends.

Section 580 develops GRE's continuing openness to domain evidence in greater detail. The present point is narrower: domain evidence can act retrospectively on inherited GRE states. Cross-domain learning therefore provides a mechanism of programme correction as well as a source of future research questions.

Proposition 25.257 (Domain-correction principle). *GRE should permit neighboring domains to reopen inherited economic claims when their domain-specific evidence or reasoning materially reaches those claims, while preserving domain predicates, translation losses, jurisdictional limits, and non-transferable remainders.*

25.11.6 New Normative Frameworks

Normative inquiry also changes historically. New accounts of standing, rights, duties, capability, recognition, care, ecological responsibility, intergenerational obligation, participation, or justice can alter how an inherited economic arrangement is evaluated. A later normative framework can reveal harms, exclusions, dependencies, or value conflicts that an earlier programme state did not represent adequately. Such developments can justify re-epistemization even when the underlying descriptive evidence changes little.

Definition 25.258 (Normative reopening event). *A normative reopening event occurs when a materially changed evaluative framework alters the relevant subjects, values, standing relations, duties, harms, rights, comparison criteria, or justificatory burdens applied to a preserved GRE object.*

Normative reopening should remain analytically typed. A new evaluative framework can change the judgment assigned to an economic arrangement without changing the descriptive claim that the arrangement existed or the causal claim about how it operated. In other cases the normative change can also expose descriptive omissions. If earlier data collection excluded a class of affected subjects because they lacked recognized standing, later normative correction can motivate new evidence collection and thereby alter both evaluation and empirical description.

Definition 25.259 (Normative-description record). *A normative-descriptive separation record identifies which components of a re-epistemized conclusion arise from changed evaluative premises and which arise from changed descriptive, causal, historical, or evidential claims.*

This separation protects against two errors. One is to present a changed moral judgment as though new empirical facts alone produced it. The other is to treat normative revision as merely subjective preference and thereby overlook how altered standing or value recognition can change what evidence should have been gathered in the first place. GRE's value plurality requires the programme to record both the normative framework and the evidential consequences of its adoption.

Normative re-epistemization can also reopen the programme's own concepts. A definition of participation can prove too procedural when later justice analysis shows that effective standing depended on capability or access. A value framework can require distinction among benefits that were previously aggregated. A power analysis can require attention to subjects whose vulnerability was omitted. These revisions

belong to programme history and should remain attributable to the normative arguments that motivated them.

Definition 25.260 (Normative inheritance test). A *normative inheritance test* asks whether a later GRE evaluation retains, revises, supplements, or rejects the evaluative premises of an earlier programme state and records the consequences of that choice for standing, value comparison, justice, and practical recommendation.

Later normative frameworks need not be assumed superior simply because they are later. They remain open to argument, contestation, cross-cultural criticism, and future revision. Re-epistemization records the change in evaluative architecture and the reasons for it; it does not convert historical sequence into moral proof.

Proposition 25.261 (Normative re-epistemization principle). *GRE should permit later normative frameworks to reopen inherited evaluations and, where warranted, the categories of evidence and standing on which those evaluations depend, while preserving the distinction among normative revision, descriptive correction, and historical judgment.*

25.11.7 Reanalysis

Reanalysis is an operational pathway through which several preceding triggers become research practice. A preserved dataset can be recomputed with a new estimator; an archive can be recoded under a revised classification; a model can be re-run with altered assumptions; a qualitative corpus can be reexamined using a different sampling or coding procedure; a historical sequence can be reconstructed after records are linked; or a comparative analysis can be extended to cases unavailable in the earlier study. The central object is a change in analytical operation whose effects can be compared with a preserved earlier result.

Definition 25.262 (GRE reanalysis). *GRE reanalysis* is a provenance-preserving repetition or reconstruction of an earlier analytical task in which one or more evidence, measurement, method, assumption, model, sample, classification, or computational conditions are deliberately changed and the consequences for the inherited result are assessed.

Reanalysis differs from replication. Replication, developed in Section 25.9, asks whether an earlier result can be reproduced or supported under specified repetition conditions. Reanalysis intentionally changes one or more analytical conditions in order to learn how the result depends on them. A successful replication can therefore precede reanalysis, but neither is a prerequisite for every case. Historical inquiry may reanalyze a source corpus that cannot be replicated as a past collection event. Sensitive data can support controlled reanalysis even when public reproduction is impossible.

Definition 25.263 (Analytical delta specification). An *analytical delta specification* records the differences between the earlier and later analytical configurations, including changes in data, sample, categories, assumptions, methods, parameters, software, comparison sets, or inferential targets that can materially affect the result.

The delta specification prevents a later output from being compared with an earlier output as though only one thing had changed when several dimensions moved

simultaneously. When feasible, staged reanalysis can vary conditions separately or in documented combinations. The objective is not always causal isolation of each analytical choice; it is reconstructable attribution of why later results differ enough to inform programme revision.

Reanalysis can produce several programme outcomes. It can demonstrate robustness across alternative specifications. It can localize a result to one sample or institutional setting. It can show sensitivity to a classification choice. It can reveal that an earlier computational approximation materially shaped the conclusion. It can also produce a new unresolved disagreement when several defensible analyses remain incompatible. Such disagreement belongs in the programme record rather than being hidden by selecting the most convenient specification.

Definition 25.264 (Reanalysis disposition). A *reanalysis disposition* classifies the effect of a reanalysis on an inherited research object as, for example, corroboration, precision change, scope localization, mechanism revision, specification sensitivity, branching, unresolved conflict, or defeat, together with the analytical delta that produced the classification.

Reanalysis is particularly valuable for GRE because many of its objects are relational and historically conditioned. A result can depend on network boundary, temporal window, institutional classification, value representation, scale, or the relation chosen as analytically focal. Reanalysis can expose these dependencies and thereby improve the scope statement of the original claim.

Proposition 25.265 (Reanalysis traceability condition). A GRE reanalysis contributes to cumulative programme knowledge when the analytical delta and resulting claim-state change are traceable enough to show which dependencies of the inherited result have been strengthened, weakened, localized, or left unresolved.

25.11.8 Reinterpretation

Reinterpretation concerns a different pathway. An inherited body of evidence can remain substantially unchanged while its meaning, explanatory significance, attribution, classification, or programme relevance changes. A historical archive can acquire a different interpretation after category provenance is reconstructed. A quantitative association can receive a different relational explanation after institutional evidence becomes available. A policy record can be reevaluated when affected-party testimony alters the understanding of participation. A formal model can remain mathematically valid while its economic interpretation is narrowed.

Definition 25.266 (GRE reinterpretation). GRE *reinterpretation* is a provenance-preserving revision of the meaning, explanatory significance, attribution, classification, normative significance, or programme role assigned to an inherited research object under changed conceptual, historical, relational, domain, or evaluative conditions.

Reinterpretation should preserve the inferential bridge between evidence and meaning. Evidence rarely carries a complete theoretical interpretation by itself. Categories, background assumptions, comparison classes, causal narratives, value frameworks, and domain knowledge mediate the move from record to meaning.

Future inquiry can revise those mediating structures while retaining much of the underlying record.

Definition 25.267 (Interpretive delta record). An *interpretive delta record* identifies the earlier and later interpretations of a substantially shared evidential object, the conceptual or contextual changes that motivate the later interpretation, the evidence that discriminates between them where available, and the programme consequences of retaining, regionalizing, or retiring either interpretation.

The interpretive delta complements the branch records developed in Section 25.10. A dormant interpretation can regain standing when later evidence or concepts change. A previously dominant interpretation can become one regional account among several. Two interpretations can also remain jointly viable because they answer different questions or operate at different scales. Re-epistemization should therefore support revival and differentiation as well as replacement.

Reinterpretation has a special relation to programme identity. Sections 25.3 and 25.8 distinguished core commitments from plural formulations. A sufficiently deep reinterpretation may preserve GRE's relational and generative problem orientation while changing a formalism, value theory, or account of power. Another reinterpretation may reject enough core commitments that it is better represented as a successor programme. Provenance allows that boundary to be argued historically rather than enforced by vocabulary alone.

Definition 25.268 (Programme-level re-epistemization portfolio). A *programme-level re-epistemization portfolio* is a versioned collection of reopened GRE objects, their triggers, preserved earlier states, evidential and interpretive deltas, reanalysis results, domain corrections, normative revisions, dispositions, unresolved alternatives, and resulting changes to programme dependencies.

The portfolio turns future revision into cumulative programme memory. It can show which claims have repeatedly survived new evidence, which concepts remain method-sensitive, which interpretations have branched, which negative results became informative after technology changed, and which domain corrections forced architectural revision. It can also identify research objects that remain open because the necessary evidence or discriminating test is still unavailable.

Proposition 25.269 (Reanalysis–reinterpretation distinction). *GRE should preserve reanalysis and reinterpretation as distinct but combinable re-epistemization pathways because changes in analytical operation do not determine changes in meaning, while changes in meaning can occur without materially different analytical operations.*

Proposition 25.270 (Re-epistemization condition). *GRE remains re-epistemizable when preserved earlier states can be reopened under materially changed epistemic conditions, revised conclusions can be traced to identifiable evidential, methodological, technological, historical, domain, normative, analytical, or interpretive changes, and the resulting programme state retains both its new warrant and the lineage of the state it supersedes, regionalizes, or leaves unresolved.*

Future re-epistemization therefore gives preservation an active programme function. Research memory is valuable because later communities can form new epistemic relations with inherited objects. New evidence can revise warrant; new methods can alter access to mechanisms; new technologies can widen observation

and computation; new historical positions can disclose consequences and category change; new domains can return corrections; new normative frameworks can alter standing and evaluation; reanalysis can test dependency on analytical choices; and reinterpretation can change meaning without erasing the evidential past. None of these pathways guarantees progress in advance. Their value lies in making later inquiry capable of correcting, differentiating, or reaffirming inherited GRE states through reconstructable comparison.

The next section turns from the general mechanisms of reopening to a continuing source of correction: domain evidence. Section 580 examines how GRE should remain answerable to evidence emerging from economics and neighboring domains while preserving the domain-specific predicates and limits that make such evidence interpretable.

25.12 Openness to Domain Evidence

Section 25.11 developed future re-epistemization as a general process through which preserved GRE objects can be reopened when evidence, methods, technologies, historical positions, domains, normative frameworks, analytical operations, or interpretations materially change. The present section specifies one source of such reopening in greater detail: evidence generated within domains whose objects, methods, institutional settings, and validity conditions are partly distinct from GRE. Its role is to establish an ingress architecture through which economics, history, governance, law, education, ecology, artificial-intelligence studies, and other fields can correct GRE without being reduced to GRE vocabulary. Its objective is to identify what each domain can contribute, what translation work is required, and which source-domain predicates should remain attached to the evidence after it enters a GRE argument. The discussion is interface-based and provenance-sensitive. Domain evidence is admitted through reconstructable relevance relations, while differences in scale, category, authority, method, and normative standing remain available for later contestation.

Openness to domain evidence is stronger than a willingness to cite neighboring literatures. A research programme is substantively open when findings produced elsewhere can alter the warrant, scope, interpretation, or architecture of its own claims. Such openness does not require theoretical identity. A legal judgment, ecological threshold, historical archive, administrative record, educational trajectory, economic estimate, or AI deployment audit can constrain a GRE claim even when the source domain organizes its objects through concepts that GRE does not reproduce.

Definition 25.271 (Domain evidence interface). A *domain evidence interface* is a documented relation between an evidential object produced or warranted within a source domain and a GRE research object whose support, scope, interpretation, assumptions, or practical implications can be materially affected by that evidence.

The interface contains more than a thematic resemblance. It identifies what the source object is, how it was produced, the validity conditions recognized within the source domain, the GRE object to which it is relevant, and the inferential path connecting the two. The interface can remain partial. Evidence can bear on one premise of a GRE argument without validating the rest of the framework from which that

premise was drawn.

Definition 25.272 (Domain evidence packet). A *domain evidence packet* records the source-domain object, provenance, method of production, relevant validity conditions, temporal and spatial scope, target GRE object, relevance relation, translation operations, known remainder, and possible revision consequences needed for a domain contribution to enter GRE in reconstructable form.

A domain evidence packet does not convert every contribution into the same evidential format. Its purpose is to preserve heterogeneity while making the correction relation explicit. Some packets will contain statistical estimates; others will contain archival sequences, doctrinal materials, administrative process evidence, qualitative testimony, biophysical measurements, or system-version-specific technical observations. GRE can compare their programme consequences without pretending that their warrants are identical.

Table 25.12 summarizes the principal domain interfaces developed in this section.

Proposition 25.273 (Domain-evidence openness condition). *GRE is substantively open to a source domain when evidence warranted within that domain can revise a relevant GRE object through a reconstructable interface without requiring the source evidence to lose the predicates on which its original warrant depends.*

Proposition 25.273 makes openness asymmetric in a useful sense. A source domain need not accept GRE in order for its evidence to constrain GRE. The burden falls on the GRE argument to show why the evidence is relevant, which parts of the source warrant survive translation, and where residual uncertainty remains. Domain evidence thereby functions as an external correction channel rather than as an annex to programme vocabulary.

25.12.1 Economics

Economics is the nearest evidential domain for GRE because GRE is itself proposed as an economic research programme. This proximity increases rather than reduces the need for explicit correction. Established and emerging economic research can test whether GRE distinctions add explanatory value, whether proposed mechanisms survive empirical scrutiny, whether relational accounts reproduce already known results under new terminology, and whether GRE neglects mechanisms that conventional economic analysis identifies more precisely.

Definition 25.274 (Economic-domain correction event). An *economic-domain correction event* occurs when economic evidence or analysis materially changes the warranted status, scope, mechanism, measurement, comparative relevance, or practical implication of a GRE research object.

Economic evidence can enter through many forms: price and quantity data, household and firm behavior, labor-market outcomes, organizational records, distributional measures, national accounts, experiments, quasi-experimental designs, surveys, market design, institutional comparison, behavioral studies, and theoretical results whose assumptions are explicit enough to compare with GRE claims. The evidential contribution depends on the object. A causal estimate can constrain a proposed mechanism; a measurement study can reveal that a GRE concept is poorly

Table 25.12: Principal domain-evidence interfaces for GRE

Source domain	Characteristic evidential contribution	Primary preservation requirement
Economics	Prices, quantities, organizations, incentives, institutions, distributions, causal estimates, expectations, and behavioral responses	Retain model, identification, measurement, market, institutional, and population conditions
History	Archives, sequences, trajectories, category change, institutional emergence, long-run consequences, and historically situated testimony	Retain temporal position, source formation, sequence, category provenance, and contemporaneous alternatives
Governance	Administrative records, implementation processes, participation, organizational capacity, policy feedback, and street-level practice	Retain implementation setting, authority structure, affected populations, discretion, and feedback conditions
Law	Legal texts, judgments, procedures, rights, duties, status categories, jurisdiction, enforcement, and legal practice	Retain jurisdiction, temporal validity, source hierarchy, interpretive status, and law-in-practice distinctions
Education	Learning trajectories, capability formation, institutional selection, curricula, credentials, participation, and pedagogical environments	Retain learner population, educational setting, measurement construct, selection process, and longitudinal horizon
Ecology	Biophysical stocks and flows, ecosystem states, material constraints, thresholds, dependencies, and long-horizon effects	Retain ecological scale, measurement system, uncertainty, irreversibility, and non-economic remainder
AI studies	Benchmarks, audits, deployment records, failure modes, human–AI interaction, labor effects, system behavior, and versioned capabilities	Retain system version, task, deployment context, access conditions, evaluation design, and sociotechnical mediation
Other domains	Domain-specific evidence capable of correcting a GRE object through an explicit relevance relation	Retain the source domain’s own validity conditions and specify translation limits before generalization

operationalized; a theoretical model can expose an omitted equilibrium effect; a distributional analysis can show that a purportedly generative intervention reallocates risk or surplus in ways the initial GRE account overlooked.

Definition 25.275 (Economic evidential compatibility record). An *economic evidential compatibility record* identifies the GRE claim under examination, the economic evidence or model brought to bear on it, the relevant population and institutional setting, the identification or inferential assumptions where applicable, the dimensions of agreement or conflict, and the resulting programme disposition.

Compatibility should be assessed at the level actually tested. A result concerning one labor market does not establish a general proposition about labor relations. An experimental treatment effect does not by itself establish the long-run generative architecture of the intervention. A macroeconomic regularity does not automatically determine its micro-relational mechanism. Conversely, a GRE relational reconstruction cannot dismiss a robust economic finding merely because the finding was produced within a different conceptual vocabulary.

Proposition 25.276 (Economic evidence priority principle). *When a GRE claim makes an empirically addressable economic assertion, relevant economic evidence should constrain that assertion at the level supported by the evidence, while broader relational or generative interpretation remains separately arguable.*

This principle protects GRE from becoming insulated by conceptual novelty. Relational attention can reorganize an economic question, but it does not create exemption from economic evidence. The productive relation is reciprocal: GRE can identify variables, relations, timescales, and value forms that deserve economic study, while economics can confirm, localize, revise, or defeat the resulting claims.

Proposition 25.277 (Economic non-redundancy test). *A GRE contribution to an economic problem gains programme significance when its relational or generative distinctions change the question, evidence requirements, mechanism account, scope statement, or practical implication in ways that remain distinguishable from an equivalent reformulation of already sufficient economic analysis.*

The non-redundancy test is deliberately demanding. GRE can remain useful when it offers synthesis across mechanisms or timescales, but the programme should preserve the possibility that an existing economic framework already answers a particular question more efficiently. Such cases refine GRE's domain of contribution rather than threatening programme identity.

25.12.2 History

Historical evidence is indispensable to a programme that treats economic subjects, categories, institutions, relations, and capacities as historically constituted. History supplies more than illustrative background. Archives, administrative records, correspondence, material traces, oral histories, institutional sequences, changing classifications, and long-run trajectories can determine whether a proposed relation existed, when it emerged, which alternatives were available, and how later structures inherited earlier decisions.

Definition 25.278 (Historical correction packet). *A historical correction packet records the sources, source-formation conditions, temporal position, sequence claims, category provenance, contemporaneous alternatives, and interpretive uncertainties through which historical evidence bears on a GRE object.*

Historical evidence often changes the identity of the object under study. Terms such as market, household, worker, property, welfare, firm, public, private, or education can refer to institutions whose relational constitution changes over time. A dataset that carries a stable column name across decades can therefore conceal a changing category. GRE's interest in historical generativity makes such category drift

theoretically consequential rather than merely terminological.

Definition 25.279 (Historical validity horizon). *A historical validity horizon is the temporal and institutional range within which a GRE claim is supported by the historical configuration on which its mechanism, categories, or comparison depend.*

A validity horizon can be narrow or extended. Its purpose is to make historical scope explicit. A mechanism observed under a particular monetary regime, property arrangement, administrative technology, demographic structure, or geopolitical order may persist after that configuration changes, but persistence requires evidence. Historical continuity should be demonstrated rather than inferred from vocabulary alone.

Proposition 25.280 (Historical sequence constraint). *A GRE mechanism that depends on an asserted sequence of institutional, relational, or economic formation should remain revisable by historical evidence concerning chronology, category change, contemporaneous alternatives, and path dependence.*

Historical evidence can also correct retrospective necessity. Outcomes that appear structurally inevitable after the fact may have depended on contingent decisions, unrealized alternatives, or temporary coalitions. Preserving these alternatives matters for GRE because generativity concerns possible continuations as well as realized outcomes.

Proposition 25.281 (Retrospective contingency principle). *When historical evidence supports multiple contemporaneously viable pathways, GRE should represent later stabilization as historically generated rather than treating the realized path as evidence that competing paths were structurally unavailable.*

This principle links historical correction to future openness. Recovering unrealized or suppressed possibilities can change the interpretation of present constraints and can reveal which apparent necessities are products of inherited institutions rather than fixed features of economic life.

25.12.3 Governance

Governance evidence bears on the organization, implementation, mediation, and feedback of collective action. GRE discussions of intervention, participation, institutional capacity, power, and relational consequences require evidence about how governing arrangements operate after formal decisions are made. Administrative records, implementation studies, organizational processes, service-delivery data, consultation records, complaints, audits, local practice, and affected-party testimony can reveal the difference between an announced policy and the relations through which it is enacted.

Definition 25.282 (Implementation-relational evidence). *Implementation-relational evidence is evidence concerning the organizational, interpersonal, procedural, infrastructural, and discretionary relations through which a governing decision is translated into experienced effects.*

Implementation-relational evidence is especially important when formal policy instruments are similar but outcomes diverge across places or populations. Variation can arise through administrative capacity, frontline discretion, access barriers, local

trust, information asymmetry, institutional coordination, enforcement, or unequal ability to contest decisions. These mediating relations can be part of the causal object rather than noise around policy design.

Definition 25.283 (Governance mediation record). *A governance mediation record identifies a governing intervention, its formal authority, implementing organizations, relevant discretionary points, participation channels, affected populations, observed implementation pathways, feedback processes, and divergences between formal design and realized practice.*

Governance evidence can also reveal recursive effects. An intervention changes incentives and services, but it can also alter trust, organizational routines, classification practices, expectations, political participation, or the capacity of groups to make later claims. Such feedback is directly relevant to GRE's concern with generative consequences.

Proposition 25.284 (Implementation correction principle). *A GRE evaluation of a governing intervention should remain revisable by evidence concerning implementation relations and feedback whenever those relations materially mediate the intervention's realized distributional, generative, participatory, or institutional effects.*

Governance evidence does not automatically determine normative judgment. Administrative efficiency can coexist with exclusion; broad participation can coexist with weak capacity; rapid implementation can produce irreversible harms; and procedural compliance can coexist with relational domination. The evidence interface should therefore preserve the distinction between observed governing performance and the evaluative framework used to judge it.

Proposition 25.285 (Governance evidence separation principle). *GRE should distinguish evidence about how governance operates from the normative criteria used to evaluate that operation, while permitting empirical findings about participation, burden, capability, and power to reopen the adequacy of the evaluative framework itself.*

25.12.4 Law

Law supplies evidence about formally constituted rights, duties, powers, statuses, procedures, jurisdictions, remedies, prohibitions, authorizations, and institutional competencies. These legal relations can shape economic possibilities directly. They can determine who can own, contract, inherit, organize, work, claim benefits, access procedures, challenge administrative action, or obtain remedies. GRE therefore requires a legal evidence interface that preserves the specificity of legal authority and interpretation.

Definition 25.286 (Juridical evidence object). *A juridical evidence object is a legally situated source or practice whose evidential significance depends on jurisdiction, temporal validity, source type, institutional authority, procedural posture, interpretive status, or enforcement context.*

Legal texts should not be treated as interchangeable statements. A constitution, statute, regulation, judgment, administrative guidance, contract, customary practice, and scholarly interpretation can occupy different positions in a legal order. The relevance of each source also depends on time and jurisdiction. A GRE analysis that

extracts a legal category while dropping these conditions can transform a legally specific relation into an inaccurate social abstraction.

Definition 25.287 (Legal-relational evidence packet). A *legal-relational evidence packet* records the juridical source, jurisdiction, relevant date, source hierarchy or authority, interpretive posture, legally constituted relation, enforcement or implementation context where material, and the GRE object whose analysis may be revised by that legal configuration.

Law can be constitutive as well as regulatory. Legal categories can participate in producing firms, property forms, contractual capacities, public authorities, family statuses, financial instruments, and institutional boundaries. Evidence of such constitution can correct GRE accounts that treat these objects as prior to the legal relations that partly generate them.

Proposition 25.288 (Legal constitution principle). *When a GRE economic object depends materially on legal status, authority, entitlement, procedure, or enforceability, the relevant legal relations should enter the account as constitutive conditions rather than as external context alone.*

Law in formal sources and law in experienced practice can also diverge. A formally available right may be difficult to exercise because of cost, information, procedure, retaliation risk, administrative delay, or unequal representation. GRE can therefore use empirical legal and governance evidence together while preserving their distinct claims.

Proposition 25.289 (Legal source specificity principle). *The programme consequence of legal evidence should be limited to the authority, jurisdiction, temporal scope, interpretive status, and practical realization supported by the source rather than generalized from the mere existence of legal language.*

25.12.5 Education

Education provides evidence concerning the formation, distribution, recognition, and conversion of capabilities across time. GRE's interest in generative capacity makes education especially important because educational processes can alter what subjects are able to learn, produce, interpret, contest, coordinate, and transmit later. Educational evidence includes learning trajectories, classroom practice, institutional selection, curricula, credentials, peer relations, teacher capacity, access conditions, participation, and longer-run transitions into work, civic life, or further learning.

Definition 25.290 (Capability evidence). *Educational capability-formation evidence* is evidence concerning changes in learners' knowledge, skills, interpretive resources, relational capacities, opportunities, recognized credentials, or subsequent action possibilities that can be attributed, with stated uncertainty, to educational environments or processes.

Capability formation should not be reduced to a single observable proxy. Test scores, credentials, employment outcomes, earnings, participation, persistence, creativity, social learning, or later educational access can each illuminate particular dimensions while leaving others unmeasured. GRE's value plurality therefore creates an obligation to specify which educational capability is being represented and which

dimensions remain outside the measurement.

Definition 25.291 (Educational conversion record). An *educational conversion record* traces how an educational resource or experience is converted, under specified institutional and relational conditions, into one or more later capabilities, recognitions, opportunities, constraints, or economic outcomes, including observed barriers to conversion.

Selection is a major source of evidential difficulty. Educational institutions sort as well as teach. Access, tracking, peer composition, family resources, language, disability accommodation, geographic location, institutional prestige, and prior attainment can shape both educational experience and later outcomes. A GRE interpretation that treats the observed output as direct evidence of educational generation can therefore confuse formation with selection or recognition.

Proposition 25.292 (Educational attribution principle). *GRE claims about educational generativity should distinguish evidence of capability formation from selection, credential recognition, institutional sorting, and later conversion conditions whenever those processes can materially account for the observed outcome.*

Educational evidence also extends the temporal horizon of economic analysis. Some educational effects emerge only after later opportunities, institutions, or relationships permit a capability to be exercised. Others decay when environments do not support use. Longitudinal evidence can therefore test whether a capability is generated, sustained, converted, or foreclosed across subsequent stages.

Proposition 25.293 (Educational horizon principle). *The programme significance of educational evidence increases when the evidential horizon is matched to the capability or conversion claim, so that immediate performance, durable formation, later opportunity, and long-run relational consequence are not treated as equivalent outcomes.*

25.12.6 Ecology

Ecological evidence can impose constraints on economic analysis that cannot be adequately represented as preferences, prices, or monetary values alone. Biophysical stocks and flows, ecosystem states, material throughput, energy requirements, spatial dependencies, biodiversity conditions, thresholds, recovery times, and irreversible losses can determine whether an economic trajectory is feasible or whether its apparent value generation depends on degrading conditions of future reproduction.

Definition 25.294 (Biophysical constraint evidence). *Biophysical constraint evidence* is empirically grounded information about material, energetic, ecological, spatial, or temporal conditions that bound, enable, degrade, or transform the feasible operation and continuation of an economic process.

Such evidence can enter GRE even when no agreed monetary conversion exists. A watershed limit, soil condition, habitat dependency, emissions pathway, or ecosystem recovery time can constrain a project without first being reduced to a common value metric. The economic relevance arises through dependence and consequence, not solely through exchange value.

Definition 25.295 (Ecological dependence record). An *ecological dependence record* identifies the economic process under study, the ecological systems or material con-

ditions on which it depends or acts, the relevant scale and time horizon, the evidential measures and uncertainties, potential thresholds or irreversibilities, and the GRE claims affected by those dependencies.

Scale is especially important. An activity can appear sustainable within one organizational boundary while shifting extraction, waste, risk, or ecological burden elsewhere. Local recovery can coexist with deterioration at a larger scale. Conversely, a global aggregate can conceal place-specific dependencies and unequal exposure. GRE's relational approach can help trace these couplings, but ecological evidence determines the substantive biophysical content of the relation.

Proposition 25.296 (Ecological non-conversion principle). *Ecological evidence can constrain a GRE economic claim without first being converted into a monetary or otherwise commensurable value measure when the evidence bears directly on feasibility, dependence, threshold, irreversibility, or reproduction conditions.*

Ecological findings also carry uncertainty. Threshold locations, recovery dynamics, interacting systems, and future responses can be incompletely known. Uncertainty does not eliminate evidential relevance; it changes the form of responsible inference and may increase the importance of reversibility, monitoring, and option preservation.

Proposition 25.297 (Ecological uncertainty principle). *GRE should preserve ecological uncertainty in the claim state when uncertain biophysical conditions materially affect feasibility, reversibility, burden distribution, or future generative capacity, rather than replacing that uncertainty with unwarranted point estimates for analytical convenience.*

25.12.7 Artificial Intelligence

Artificial-intelligence evidence is unusually dynamic because the technical object, deployment environment, access conditions, and surrounding institutional practices can change rapidly. GRE's analysis of AI-era capability asymmetry therefore requires evidence that is versioned, task-specific, deployment-sensitive, and sociotechnically situated. Benchmarks, controlled evaluations, red-team findings, audits, deployment logs, user studies, labor outcomes, organizational adoption records, incident reports, human–AI interaction evidence, and longitudinal capability measurements can each address different parts of the problem.

Definition 25.298 (AI-conditioned evidence). *AI-conditioned evidence* is evidence whose interpretation depends materially on the identity and version of an AI system, the task and evaluation procedure, access and tool conditions, user or organizational context, deployment configuration, and relevant human or institutional mediation.

A capability demonstrated under one evaluation condition does not automatically establish capability in another. Benchmark performance can differ from reliable deployment. Model access through an interface can differ from API access with tools or retrieval. Organizational outcomes can depend on training, workflow redesign, oversight, incentives, complementary expertise, and the distribution of authority around the system. GRE should therefore resist treating an AI model as an isolated actor when the observed economic effect belongs to a coupled sociotechnical arrangement.

Definition 25.299 (AI evidence version record). An *AI evidence version record* identifies the evaluated system and version where available, evaluation or deployment date, task, access configuration, tools, comparison baseline, user population or organization, measurement procedure, observed outcome, and conditions under which the evidence may cease to transport to later systems or settings.

Rapid technical change creates a distinctive re-epistemization problem. Evidence can become historically informative without remaining current for capability assessment. A finding that a system class could not perform a task at one date can later document the speed of capability change even after it ceases to describe current systems. Preservation should therefore distinguish present applicability from historical evidential value.

Proposition 25.300 (AI version-dependence principle). *GRE claims about AI capability, substitution, complementarity, dependence, or asymmetry should preserve system, task, access, and deployment conditions whenever changes in those conditions can materially alter the result.*

AI evidence can also be endogenous to the systems being studied. Synthetic content can enter training corpora, benchmarks can influence development priorities, and widespread model use can change human behavior or institutional workflows that later evaluations treat as background. These feedbacks make provenance and temporal sequencing especially important.

Proposition 25.301 (AI sociotechnical attribution principle). *When an observed AI-era economic outcome depends materially on complementary human labor, organizational design, data access, infrastructure, institutional authority, or feedback from prior deployment, GRE should attribute the outcome to the relevant sociotechnical configuration rather than to model capability alone.*

25.12.8 Other Domains

The preceding domains are important interfaces, but they do not constitute an exhaustive list of admissible evidence. Demography, sociology, anthropology, psychology, political science, geography, public health, science and technology studies, organization studies, linguistics, media studies, design research, engineering, and other fields may become relevant when their objects bear materially on a GRE claim. Fixing a closed list would conflict with the programme's historical and disciplinary revisability because future economic problems can create interfaces that are presently unanticipated.

Definition 25.302 (Open-domain admission protocol). An *open-domain admission protocol* is a procedure for incorporating evidence from a source domain not already stabilized within GRE by documenting the source object's warrant, the target GRE object, the relevance relation, necessary translation, non-translated remainder, scope conditions, and possible programme consequences before broader generalization is attempted.

The protocol makes relevance problem-specific. Public-health evidence may matter for labor capacity, care relations, inequality, or institutional resilience. Demographic evidence may matter for household structure, intergenerational transfer, mi-

gration, or fiscal systems. Anthropological evidence may matter for value categories, exchange practices, kinship, or institutional meaning. Engineering evidence may matter for infrastructure feasibility and material constraints. None of these examples licenses unrestricted transfer from the source discipline to GRE.

Definition 25.303 (Domain relevance claim). A *domain relevance claim* states why a source-domain evidential object bears materially on a specified GRE object and identifies the inferential steps required for that bearing to hold.

Relevance claims should remain contestable. A source domain can provide strong evidence about one component of an economic process while remaining silent about another. Expertise should therefore be distributed by object and warrant rather than ranked globally. The appropriate question is which domain can responsibly constrain which part of the GRE account under the conditions at issue.

Definition 25.304 (Programme domain-evidence register). A *programme domain-evidence register* is a versioned record of domain evidence packets, their target GRE objects, translation decisions, source-domain validity conditions, unresolved remainders, correction outcomes, and later re-epistemization events.

The register creates continuity across cases. It can reveal that a GRE concept repeatedly fails when confronted with one domain, that a relation appears across several domains under different names, or that an apparent cross-domain regularity disappears once source predicates are restored. Such patterns can motivate the next stage of inquiry, but they do not themselves establish a general theory.

Proposition 25.305 (Domain relevance non-exhaustion principle). *The set of domains relevant to GRE should remain open because relevance is generated by the research object and available evidence rather than fixed by a permanent disciplinary inventory.*

Proposition 25.306 (Domain evidence before generalization). *Cross-domain generalization within GRE should be preceded by domain-specific evidence interfaces that preserve source validity conditions, translation losses, and counterexamples sufficiently well to distinguish a recurring structure from an artifact of vocabulary or abstraction.*

Proposition 25.306 marks the boundary of the present section. Openness to domain evidence establishes how external and neighboring knowledge can enter GRE as correction, constraint, extension, or defeat. It does not yet establish that similar findings across domains instantiate one common structure. The following section therefore turns to cross-domain learning under a stricter question: how shared questions, structures, translations, and candidate generalizations can be investigated while domain-specific vocabulary, failed translation, and deferred unification remain visible.

25.13 Cross-Domain Learning with Scoped Generalization

Section 25.12 established an ingress architecture through which evidence from economics and neighboring domains can correct GRE while retaining the source-domain predicates on which that evidence depends. The present section addresses the next programme-level problem: how inquiry can learn across domains after those differences have been preserved. Its role is to distinguish several forms of cross-domain

learning from stronger claims of theoretical unification. Its objective is to identify the conditions under which shared questions, recurrent structures, counterexamples, vocabulary, translations, and non-translations can alter inquiry without being redescribed prematurely as evidence for one general theory. The discussion proceeds comparatively and provenance-sensitively. Domain-specific warrants remain attached to the objects being compared, and generalization is treated as one possible outcome among several rather than as the default endpoint of comparison.

Cross-domain learning can occur even when domains remain theoretically distinct. A legal account can reveal that an economic category depends on enforceable status. Ecological evidence can expose a material boundary omitted by an economic representation. Historical inquiry can show that an apparently stable institution is temporally specific. Educational research can reveal a conversion process between resources and capabilities that economic measurement only partially observes. These contributions can change GRE without implying that law, ecology, history, education, and economics instantiate one fully specified theoretical structure.

Definition 25.307 (Cross-domain learning episode). *A cross-domain learning episode is a documented change in a question, distinction, interpretation, hypothesis, model, scope condition, or research priority that results from comparison among domain-specific objects while preserving the warrants and limitations that make those objects meaningful within their source domains.*

This definition makes learning broader than successful translation. A failed translation can expose a hidden assumption. A counterexample can narrow a candidate structure. A shared question can create collaboration without shared answers. A vocabulary difference can reveal that two apparently similar terms organize distinct objects. Cross-domain learning therefore concerns changes in understanding produced by disciplined comparison, including changes that reduce the plausible scope of a generalization.

Definition 25.308 (Cross-domain comparison unit). *A cross-domain comparison unit is a domain-identified object prepared for comparison by recording its local meaning, evidential or interpretive warrant, relevant relations, historical and institutional conditions, intended comparison dimension, and known limits of portability.*

Comparison units can be concepts, mechanisms, events, institutional forms, evidential patterns, normative distinctions, models, or research questions. Their preparation prevents a recurring error: comparing words detached from the objects and warrants that gave them analytical content.

Table 25.13 summarizes the principal learning states developed in this section.

Proposition 25.309 (Cross-domain learning condition). *Cross-domain comparison constitutes programme learning when it produces a reconstructable change in inquiry while preserving enough source-domain information to identify what was compared, what was learned, what remains domain-specific, and which stronger conclusions remain unwarranted.*

The condition allows GRE to benefit from comparison without assigning every useful correspondence the same theoretical status. The following subsections develop the eight learning states separately.

Table 25.13: Cross-domain learning states and safeguards against premature unification

Learning state	Programme contribution	Primary safeguard
Shared question	Coordinates inquiry around a related problem without presuming common answers	Preserve domain-specific predicates and correction authorities
Shared structure	Identifies a candidate correspondence among relations, roles, or transformations	Distinguish independently reconstructed recurrence from shared vocabulary
Domain counterexample	Exposes a hidden scope condition, assumption, mechanism difference, or translation failure	Match the counterexample to the claimed scope before revising it
Domain-specific vocabulary	Retains distinctions that carry local constitutive, evidential, historical, or normative content	Compare meanings and uses before treating terminology as equivalent
Translation	Makes a partial mapping explicit for a stated analytical purpose	Record preserved content, transformation, and translation remainder
Non-translation	Preserves a material difference when a responsible mapping is unavailable or misleading	State the reason, consequences, and reopening conditions
Candidate generalization	Proposes a broader, testable correspondence supported by several domain-specific inquiries	Control for shared origin, adverse cases, and loss of analytical content
Deferred generalization	Keeps a broader claim open while current evidence remains insufficient or unstable	Record what is missing and what future evidence could alter the status

25.13.1 Shared Questions

Cross-domain inquiry often begins with a relation among questions rather than a relation among answers. Different disciplines can investigate dependence, recognition, allocation, constraint, participation, institutional persistence, capability formation, historical change, or value conflict because these phenomena intersect their respective problem-spaces. The questions remain differently typed. Economics may ask how an institution changes incentives or distributions; law may ask how the same institution constitutes rights and duties; governance research may ask how it is implemented; history may ask how it emerged; and political theory may ask how its authority can be justified.

Definition 25.310 (Shared question family). A *shared question family* is a set of domain-specific research questions whose objects or consequences materially intersect while their predicates, evidential burdens, explanatory aims, or normative authorities remain partly distinct.

A shared question family coordinates attention without homogenizing the inquiries. The intersecting object can be a policy, institution, technology, population,

resource system, or historical process. What makes the questions related is that answers in one domain can alter assumptions, boundary conditions, or consequences relevant to another.

Definition 25.311 (Question correspondence record). A *question correspondence record* identifies the participating domains, each domain's question in its own vocabulary, the common empirical or relational object where one exists, the dependency relations among the questions, possible answer pathways, and the points at which domain-specific inquiry should remain separate.

The record helps distinguish genuine question sharing from a broad theme. A study of an AI-supported educational system, for example, can generate economic questions about cost and labor, educational questions about learning and capability formation, legal questions about data or responsibility, governance questions about institutional oversight, and AI-studies questions about system behavior. The presence of one empirical object does not make these questions interchangeable.

Proposition 25.312 (Question-sharing non-equivalence principle). *The fact that several domains investigate the same empirical setting or relational process supports coordination among their questions but does not by itself establish equivalence among their explanatory predicates, methods, or standards of adequate answer.*

Proposition 25.313 (Question-portability condition). *A question can be transported across domains responsibly when the target inquiry restates the question in target-domain terms, identifies which source assumptions remain relevant, and records which predicates require independent reconstruction rather than lexical substitution.*

Shared questions therefore create a low-commitment form of cross-domain learning. They can identify missing expertise, expose dependencies among research tasks, and organize collaborative agendas before any shared structure has been established.

25.13.2 Shared Structures

A stronger form of learning arises when independently examined domains exhibit related structures. The relevant correspondence can concern roles, relations, transformations, constraints, sequences, feedbacks, conversion processes, or patterns of persistence. Structural comparison requires more than recurrence of words such as relation, power, value, institution, or generation. Those terms may have entered several domains through common theoretical ancestry or may denote materially different objects.

Definition 25.314 (Candidate shared structure). A *candidate shared structure* is a proposed correspondence among domain-specific relations, roles, transformations, or constraints that remains identifiable after each participating domain has reconstructed the relevant object according to its own evidence, concepts, and correction conditions.

The definition assigns priority to domain reconstruction. A recurring structure becomes more informative when it survives the possibility that a receiving domain could modify or reject the vocabulary in which the comparison was first proposed.

Definition 25.315 (Structural correspondence profile). A *structural correspondence profile* records the participating domain objects, proposed corresponding elements,

relational or transformational roles, conditions under which the correspondence holds, domain-specific differences, alternative mappings, and the residual content that the proposed correspondence does not preserve.

A profile can reveal partial correspondence. Two domains may share a dependence relation while differing in how the dependent position is constituted. They may share a conversion architecture while differing in the objects being converted and the authority governing the conversion. Partiality is analytically valuable because it indicates which features might support broader comparison and which should remain local.

Proposition 25.316 (Independent-reconstruction priority). *Evidence for a shared structure is strengthened when the relevant correspondence survives domain-specific reconstruction that could have produced divergence, and it is weakened when the apparent correspondence is largely inherited from common terminology or modeling assumptions.*

Proposition 25.317 (Structural similarity non-equivalence). *A structural correspondence across domains supports comparison at the level actually preserved by the mapping; it does not automatically establish equivalence of mechanisms, meanings, normative status, causal roles, or ontological interpretation.*

This principle keeps structural learning modular. A recurring relational form can remain useful even when its mechanisms differ, provided the comparison states precisely which structural features are being preserved.

25.13.3 Domain Counterexamples

Cross-domain learning becomes more reliable when comparison includes cases capable of resisting the proposed correspondence. Domains can supply counterexamples because their objects, histories, methods, scales, or normative structures strain assumptions that appear unproblematic within the source domain. A candidate derived from market institutions may fail under kinship-based exchange; a concept developed for human subjects may require modification for collective or artificial systems; a smooth quantitative model may fail where legal status changes discontinuously; and a short-run economic mechanism may become misleading under ecological irreversibility.

Definition 25.318 (Cross-domain learning counterexample). *A cross-domain learning counterexample is a domain-specific case that falls within the stated comparison scope of a proposed cross-domain correspondence yet fails a required semantic, structural, mechanistic, evidential, historical, formal, or normative condition of that correspondence.*

Counterexamples should be matched to claims. A case outside the declared scope may reveal a boundary worth studying without refuting the claim. A case within the declared scope has stronger revisionary force because it shows that the proposed correspondence omitted a condition or combined unlike objects.

Definition 25.319 (Counterexample propagation record). *A counterexample propagation record documents the failed condition, the domain in which failure occurred, the candidate claims and translations affected by the failure, alternative diagnoses,*

revisions made in response, and the programme objects that remain unaffected.

The propagation record prevents a local failure from being either ignored or over-generalized. A counterexample to one translation can leave the source-domain claim intact. A failure of one candidate generalization need not defeat a broader relational research programme. Conversely, a failure that reveals a foundational hidden assumption can legitimately propagate across several dependent claims.

Proposition 25.320 (Counterexample asymmetry principle). *A cross-domain counterexample can justify narrowing, decomposing, or rejecting a candidate correspondence more directly than a single successful comparison can justify broadening it, because positive transfer requires additional evidence that the preserved relation survives other domain differences.*

Proposition 25.321 (Adversarial-domain selection principle). *Cross-domain learning is more informative when comparison includes domains or cases selected for material differences likely to expose hidden assumptions, rather than relying only on domains already organized through similar concepts or institutions.*

Adversarial comparison makes difference productive. It allows a research programme to learn where its concepts stop traveling and why.

25.13.4 Domain-Specific Vocabulary

Vocabulary carries analytical history. Terms such as value, right, recognition, capability, efficiency, resilience, learning, agency, person, institution, or power can have specialized meanings that depend on disciplinary debates, measurement practices, legal authority, historical usage, or normative commitments. Cross-domain inquiry loses information when these terms are treated as interchangeable merely because their ordinary-language meanings overlap.

Definition 25.322 (Domain semantic profile). *A domain semantic profile records how a term or concept is used within a specified domain, including its referent, constitutive relations, inferential role, measurement or evidential access where relevant, historical or institutional context, normative loading, and contrasts with nearby concepts.*

Semantic profiles make apparent agreement testable. If two domains use the word *capability*, for example, the comparison should identify whether each refers to technical performance, human opportunity, organizational capacity, legal competence, or another object. A common label can conceal different predicates; different labels can also describe related structures.

Definition 25.323 (Cross-domain semantic collision). *A cross-domain semantic collision occurs when the same or closely related term is used across domains for objects whose materially relevant meanings, warrants, or implications differ enough that unqualified substitution produces a misleading correspondence.*

The inverse problem also matters. Domain-specific terms can appear incommensurable while serving related structural roles. Careful comparison should therefore avoid both terminological assimilation and terminological isolation.

Proposition 25.324 (Vocabulary-retention principle). *Cross-domain comparison should retain domain-specific vocabulary whenever the vocabulary carries constitu-*

tive, evidential, historical, formal, or normative distinctions that would be weakened by immediate replacement with a more general term.

Proposition 25.325 (Terminological recurrence non-evidence). *Recurrence of the same vocabulary across domains does not by itself constitute evidence for a shared structure, especially when the vocabulary was inherited from a common framework or circulated through interdisciplinary borrowing.*

Domain-specific vocabulary thereby functions as a diagnostic resource. It can reveal where translation requires work and where a proposed general language has become too coarse to preserve the objects being studied.

25.13.5 Translation

Translation creates an explicit relation between domain-specific objects. Its purpose can be comparative explanation, hypothesis generation, data coordination, model transfer, institutional analysis, or interdisciplinary communication. The appropriate translation depends on that purpose. A mapping sufficient for identifying a shared research question may be too weak for transferring a causal mechanism or normative criterion.

Definition 25.326 (Typed cross-domain translation). *A typed cross-domain translation is a purpose-specific, partial mapping from a source-domain object and its relevant predicates or relations to a target-domain object, together with a record of preserved content, transformed content, omitted content, uncertainty, and translation remainder.*

The translation is typed because concepts, mechanisms, evidential relations, institutional roles, formal structures, and normative criteria require different forms of correspondence. A semantic translation does not automatically transfer causal warrant; a structural translation does not automatically transfer normative authority.

Definition 25.327 (Translation purpose profile). *A translation purpose profile states the analytical task for which a cross-domain mapping is constructed, the minimum content that must be preserved for that task, the losses that remain acceptable, and the inferences that the mapping does not authorize.*

Purpose profiles constrain overreach. They allow a translation to be useful without pretending to be complete. A legal category may be translated into an economic constraint for one model while its doctrinal meaning and normative authority remain outside that model. An ecological threshold may enter an economic feasibility analysis while its ecological significance remains richer than the economic representation.

Definition 25.328 (Reciprocal translation check). *A reciprocal translation check examines whether domain experts or domain-grounded reconstructions can recover the materially relevant source distinction after translation, and records distortions that appear when the translated object is interpreted from the receiving domain.*

Reciprocity need not imply symmetry. Some translations are legitimately one-directional because one domain supplies a constraint or constitutive fact to another. The check asks whether the translation preserves enough information for its declared purpose and whether receiving-domain interpretation has silently changed the source object.

Proposition 25.329 (Translation adequacy condition). *A cross-domain translation is adequate for a stated purpose when its preserved content is sufficient for the intended inference, its transformation and remainder are explicit, source-domain warrant is not falsely transferred, and relevant target-domain reconstruction does not reveal a material distortion that defeats the intended use.*

Translation under this condition becomes a revisable research result. Later evidence can refine the mapping, split one translation into several typed translations, or replace it with non-translation.

25.13.6 Non-Translation

Some cross-domain relations are more accurately represented by an explicit absence of translation. Non-translation can arise because the source concept depends on constitutive authority absent in the target domain, because the relevant evidence has no defensible counterpart, because normative predicates cannot be transported without independent argument, because historical meanings diverge, or because the available comparison is too coarse to preserve the distinction at issue.

Definition 25.330 (Programme non-translation state). *A programme non-translation state is an explicit, revisable determination that a source-domain object should remain untranslated for a specified cross-domain purpose because the available mapping would erase or misstate materially relevant content.*

A non-translation state is therefore a positive research record. It identifies where comparison currently reaches its limit and prevents later users from treating absence of a common term as absence of an analytical problem.

Definition 25.331 (Non-translation rationale). *A non-translation rationale records the source and target domains, focal object, attempted or considered mappings, the material content that would be lost or distorted, comparisons that remain permissible, and evidence or conceptual development that could justify reopening translation later.*

Non-translation can coexist with coordination. Researchers can share questions, exchange evidence, or compare consequences while leaving a constitutive concept untranslated. Legal validity, aesthetic judgment, ecological integrity, lived cultural meaning, or educational formation may intersect an economic problem without becoming economic variables of equivalent meaning.

Proposition 25.332 (Informative non-translation principle). *A well-specified non-translation can increase cross-domain knowledge by locating a boundary of correspondence, identifying the content responsible for that boundary, and preventing a misleading generalization from entering the programme.*

Proposition 25.333 (Non-translation revisability principle). *A programme non-translation state should remain reopenable when new concepts, evidence, methods, or domain reconstructions provide a mapping that preserves the content previously lost or distorted.*

This combination of preservation and revisability keeps non-translation from becoming disciplinary isolation. The boundary is documented because the present mapping is inadequate, not because cross-domain inquiry is forbidden.

25.13.7 Candidate Generalization

A candidate generalization becomes appropriate when several domain-specific inquiries support a correspondence that remains analytically informative after translation losses, vocabulary differences, and adverse cases are considered. The status remains provisional. The candidate proposes a broader scope for testing; it does not convert recurrence into universality.

Definition 25.334 (Cross-domain candidate generalization). A *cross-domain candidate generalization* is a scoped, contestable hypothesis that a specified relation, structure, transformation, constraint, or generative pattern recurs across more than one domain under stated conditions and retains analytical content after domain-specific reconstruction.

Candidate status requires identifiable content. A formulation so abstract that every domain can satisfy it by reinterpretation supplies little basis for testing. Conversely, a candidate can remain narrow: a particular kind of conversion relation or dependence structure may generalize farther than the substantive objects connected by that relation.

Definition 25.335 (Candidate-generalization record). A *candidate-generalization record* contains the proposed generalized content, participating domain comparison units, evidence of independent reconstruction, translations and non-translations, counterexamples sought and found, shared-origin dependencies, current scope conditions, remaining domain-specific content, and explicit revision or rejection triggers.

The record separates programme memory from rhetorical breadth. A candidate can accumulate support, be narrowed, branch into typed variants, return to a domain-specific status, or be abandoned while its history remains reconstructable.

Proposition 25.336 (Independence-sensitive support principle). *Support for a cross-domain candidate generalization should increase with independently warranted recurrence across materially different domains and should be discounted when recurrence is substantially explained by shared vocabulary, common theoretical ancestry, coordinated modeling choices, or closely related institutional settings.*

Proposition 25.337 (Generalization content-preservation principle). *A broader cross-domain formulation remains analytically useful only if abstraction preserves enough content to distinguish supporting cases from relevant counterexamples and to generate consequences that can be contested in participating domains.*

Proposition 25.338 (Candidate-generalization admission condition). *GRE can admit a cross-domain generalization as a programme-level candidate when the proposed recurrence is reconstructed through domain-specific evidence, semantic differences and translation remainders are explicit, relevant counterexamples have been sought, shared-origin dependence is recorded, and the resulting claim remains narrower than the evidence needed for a completed general theory.*

The condition permits ambitious comparison while preserving the book's ontological and disciplinary restraint. A candidate can guide future GR or GRT research without being presented as an established cross-domain law.

25.13.8 Deferred Generalization

Cross-domain inquiry does not require a decision between immediate unification and permanent separation. Many comparisons will remain evidentially immature, semantically unstable, historically narrow, or dependent on domains that have not yet developed sufficiently independent formulations. In such cases, deferral can preserve a promising question without overstating what current comparison establishes.

Definition 25.339 (Deferred generalization). A *deferred generalization* is a documented programme state in which a broader cross-domain claim remains open for future inquiry while current evidence, translation quality, domain independence, counterexample coverage, or conceptual stability is judged insufficient for candidate-generalization status.

Deferral differs from rejection. A rejected generalization has encountered evidence or argument sufficient to withdraw the proposed claim in its current form. A deferred generalization lacks sufficient warrant to promote the claim and may also lack sufficient evidence to defeat it. The distinction preserves uncertainty as an explicit research state.

Definition 25.340 (Generalization deferral record). A *generalization deferral record* identifies the proposed cross-domain relation, current supporting observations, unresolved semantic or evidential differences, missing domains or adverse cases, translation problems, shared-origin concerns, and concrete conditions under which the claim could be promoted, revised, decomposed, or rejected.

Deferral can protect domain learning from theoretical pressure. Researchers remain free to develop independent concepts and methods rather than fitting early work to a general architecture announced before adequate comparison exists. The resulting diversity can later provide stronger evidence because agreement, when it occurs, has survived genuine opportunities for divergence.

Proposition 25.341 (Deferral without theoretical loss). *Deferring cross-domain generalization need not reduce programme knowledge when the comparison has already produced shared questions, domain-specific corrections, structural correspondences, counterexamples, translations, or non-translations that remain useful independently of a unifying claim.*

Definition 25.342 (Cross-domain learning portfolio). A *cross-domain learning portfolio* is a versioned programme record linking shared question families, structural correspondence profiles, counterexample propagation records, domain semantic profiles, translations, non-translations, candidate-generalization records, deferred generalizations, and later revisions across participating domains.

The portfolio prevents cross-domain inquiry from being remembered only through its successful generalizations. Failed mappings, domain-specific remainders, rejected candidates, and deferred questions remain part of the programme's evidence about where broader claims do and do not travel.

Proposition 25.343 (Learning-before-unification principle). *GRE can sustain productive cross-domain learning without premature unification when comparison is allowed to terminate provisionally in several legitimate states, including shared questions, partial structural correspondence, counterexample, translation, non-translation,*

candidate generalization, and deferral, with each state retaining explicit conditions for later revision.

The principle gives cross-domain inquiry an open temporal structure. Some correspondences may accumulate enough independently warranted support to become stronger candidates for a future general theory. Others may branch into typed families, remain domain-specific, or disappear after counterevidence. The next section therefore turns from the status of cross-domain learning to the more general dynamics through which a research programme changes over time: accumulation, critique, revision, branching, hybridization, abandonment, re-emergence, and programme transformation.

25.14 Theoretical Evolution

Section 25.13 established that cross-domain learning can end provisionally in several states, including translation, non-translation, candidate generalization, and deferral. The present section addresses the temporal problem that follows from such plurality: how a research programme changes when evidence, criticism, alternative formulations, imported concepts, failed models, and reopened questions accumulate across successive versions. Its role is to characterize theoretical evolution without assuming that later formulations are automatically more adequate, more unified, or closer to a final theory. Its objective is to distinguish several modes of programme change and to specify the lineage information needed to reconstruct continuity, divergence, retirement, and transformation. The discussion is version-sensitive and dependency-sensitive. Changes are evaluated according to what they alter, what they preserve, which dependent objects they affect, and whether programme identity remains continuous.

The term *evolution* is used descriptively. It does not import a biological mechanism, a criterion of fitness, or a presumption of progress. A theoretical lineage can become more empirically adequate in one respect while losing explanatory economy in another. It can gain domain reach while accumulating translation problems. It can branch into incompatible descendants, abandon once-central concepts, recover earlier ideas under new conditions, or change enough that successor-programme language becomes more accurate than continuity language. The relevant object is therefore a reconstructable history of theoretical change rather than an assumed trajectory of improvement.

Definition 25.344 (Theoretical programme state). A *theoretical programme state* is a versioned configuration of programme commitments, concepts, distinctions, hypotheses, formal representations, methods, domain interfaces, evidential warrants, normative assumptions, unresolved alternatives, and dependency relations that is identifiable at a specified stage of inquiry.

Definition 25.345 (Theoretical change event). A *theoretical change event* is a documented alteration between programme states that identifies the objects added, challenged, revised, branched, hybridized, abandoned, reactivated, or transformed, together with the reasons, affected dependencies, and resulting epistemic status changes.

Table 25.14: Modes of theoretical evolution and their principal lineage requirements

Mode	Characteristic programme change	Principal lineage requirement
Accumulation	Adds evidence, distinctions, methods, domains, or derived results while preserving earlier objects provisionally	Record compatibility, redundancy, and integration effects
Critique	Challenges assumptions, warrants, scope, interpretation, or consequences	Preserve target, objection, response, and unresolved remainder
Revision	Alters an existing programme object or its status	Track retained, replaced, added, withdrawn, and dependent objects
Branching	Produces divergent descendants from a shared programme state	Preserve common ancestry, branch conditions, and later compatibility
Hybridization	Combines resources with an external or distinct theoretical lineage	Preserve provenance, translation interfaces, and incompatibilities
Abandonment	Retires an object or line of inquiry from active programme use	Preserve reasons, dependency effects, and residual historical value
Re-emergence	Reactivates an inactive or abandoned object under changed conditions	Re-evaluate original assumptions rather than restoring the object unchanged
Programme transformation	Changes the architecture or commitments sufficiently to alter programme identity	Record continuity, discontinuity, and possible successor relations

These definitions make programme history granular enough to distinguish change in content from change in status. A concept can remain textually unchanged while its warrant weakens. A formalism can survive while its interpretation changes. A domain application can be abandoned without altering core programme commitments. Conversely, a brief revision to a foundational distinction can propagate through many downstream claims.

Table 25.14 summarizes the principal modes of theoretical evolution developed in this section.

Proposition 25.346 (Non-teleological evolution principle). *A later GRE programme state should not be treated as epistemically superior merely because it is later; improvement, deterioration, diversification, simplification, loss, and unresolved tradeoff are all possible outcomes of theoretical change.*

The proposition provides the common discipline for the eight modes that follow.

25.14.1 Accumulation

The simplest appearance of theoretical growth is addition. A programme can acquire new evidence, distinctions, datasets, domain studies, formal tools, historical cases, methodological procedures, or derived propositions without immediately changing the status of its existing objects. Yet accumulation is theoretically meaningful only when the relation between new and inherited material is known. Mere volume can

obscure contradiction, redundancy, and incompatible assumptions.

Definition 25.347 (Programme accumulation). *Programme accumulation* is the addition of a research object to an existing theoretical programme state while the previously registered objects remain provisionally active unless the addition supplies a reason to reconsider them.

Accumulation can be evidential, conceptual, methodological, formal, historical, normative, or domain-specific. These types need not have the same consequences. New evidence can strengthen or weaken a claim; a new concept can differentiate objects previously grouped together; a new method can expose a measurement limitation; and a new domain can reveal a hidden scope condition. Addition therefore initiates a compatibility question even when no explicit contradiction is apparent.

Definition 25.348 (Accumulation integration record). An *accumulation integration record* identifies the added object, its provenance and epistemic status, the programme objects to which it is related, compatibility or tension with inherited assumptions, redundancies, new dependencies, and any questions reopened by the addition.

The record prevents accumulation from becoming an append-only archive. If several studies repeatedly add evidence that depends on the same unexamined measurement convention, their numerical multiplicity should not be confused with independent support. If a new distinction divides an inherited category, earlier conclusions may require reclassification even when they remain locally valid.

Proposition 25.349 (Integrated accumulation condition). *An addition constitutes theoretically integrated accumulation when its relation to existing programme objects is explicit enough to determine whether it supplies independent support, refinement, redundancy, tension, or a reason for later revision.*

Proposition 25.350 (Accumulation non-monotonicity). *The accumulation of programme objects need not produce monotonic growth in confidence or scope, because additional evidence, concepts, and domains can reveal dependencies, conflicts, or limitations that narrow earlier claims.*

Accumulation is therefore a temporal input to theoretical evolution rather than a metric of progress. Its value depends on how the added material changes the programme's reconstructable structure.

25.14.2 Critique

Critique makes theoretical change answerable to reasons that challenge an existing programme state. The relevant challenge can concern empirical support, conceptual coherence, formal assumptions, historical interpretation, normative adequacy, domain transfer, institutional consequences, or omitted alternatives. Critique can originate inside GRE or from another discipline, affected community, empirical setting, or competing theoretical tradition.

Definition 25.351 (Programme critique event). A *programme critique event* is a documented challenge to a specified programme object that states the contested claim, assumption, method, interpretation, scope, or consequence; the basis of the challenge; and the programme response required to evaluate it.

Critique becomes more informative when its target is precise. A criticism of one empirical operationalization should not automatically be treated as a criticism of relational analysis as such. A challenge to one normative criterion may leave descriptive claims unaffected. Conversely, a critique that exposes a foundational assumption can propagate beyond the object where it first appeared.

Definition 25.352 (Critique target map). A *critique target map* identifies the directly challenged programme object, its supporting assumptions and warrants, dependent objects, parallel formulations, plausible repair paths, and portions of the programme that the critique does not presently reach.

The target map gives criticism a dependency structure. It also protects the programme from two symmetrical responses: insulating a central claim by redescribing every objection as local, and treating every local objection as defeat of the entire programme.

Definition 25.353 (Critique uptake state). A *critique uptake state* records whether a challenge is presently unanswered, under investigation, provisionally answered, partially sustained, sustained, displaced by reformulation, or judged outside the declared scope, together with the reasons for that status.

Proposition 25.354 (Critique traceability principle). *Programme criticism contributes to theoretical evolution when the challenge, target, response, remaining disagreement, and downstream consequences remain traceable even when the programme ultimately rejects the criticism.*

Proposition 25.355 (Critique without forced convergence). *A research programme can learn from critique without requiring agreement among the participating positions, provided the disagreement clarifies assumptions, evidential burdens, scope conditions, or alternative explanations in a form that later inquiry can revisit.*

Critique thereby changes the programme even when it does not produce immediate revision. It can make previously tacit assumptions explicit, identify tests that had not been considered, or preserve a live alternative against which later formulations remain answerable.

25.14.3 Revision

Revision alters an inherited programme object in response to evidence, critique, internal inconsistency, conceptual refinement, domain learning, methodological change, or normative reconsideration. Theoretical revisability becomes substantive only when a revision can be reconstructed. A rewritten claim without a record of what changed obscures both learning and responsibility.

Definition 25.356 (Programme revision event). A *programme revision event* is a versioned modification of a programme object that records the prior formulation, revised formulation, reason for revision, retained content, altered or withdrawn content, changed epistemic status, and consequences for dependent objects.

Revision can be local, intermediate, or architectural. A local revision may alter a parameterization or domain boundary. An intermediate revision may change a concept that organizes several sections or models. An architectural revision may change a foundational distinction, core commitment, or dependency pattern across the pro-

gramme. These categories describe propagation potential rather than prestige.

Definition 25.357 (Revision radius). The *revision radius* is the documented range of programme objects whose interpretation, warrant, scope, or active status requires reconsideration because of a specified revision.

A revision radius can be smaller or larger than the textual extent of the edit. Replacing one sentence can have a large radius if many later claims depend on it. Rewriting several pages can have a small radius if the changes improve exposition without altering substantive commitments.

Definition 25.358 (Revision propagation record). A *revision propagation record* identifies the revised object, direct dependencies, indirect dependencies, unaffected objects, required revalidation tasks, unresolved consequences, and later programme states in which the revision has been incorporated.

Proposition 25.359 (Dependency-sensitive revision principle). *The adequacy of a theoretical revision depends partly on whether materially affected downstream objects are re-evaluated rather than silently carried forward under assumptions that the revision has altered.*

Proposition 25.360 (Revision continuity condition). *A revised formulation remains reconstructably continuous with its predecessor when the lineage record makes clear which problem is being retained, which content is preserved, why the alteration occurred, and which earlier conclusions remain valid under the new formulation.*

Revision thus combines change with memory. It does not require maximal conservation, but it requires enough continuity information to distinguish a developed claim from an unrelated replacement presented under the same name.

25.14.4 Branching

Revision need not converge on one successor formulation. Evidence can remain underdetermining, values can differ, formal choices can emphasize different structures, and domain applications can require incompatible simplifications. Under these conditions, a common programme state can generate several descendants. Branching makes such divergence explicit rather than forcing premature synthesis.

Definition 25.361 (Theoretical branch). A *theoretical branch* is a descendant formulation that preserves a reconstructable relation to a shared programme ancestor while developing a materially distinct set of claims, assumptions, methods, interpretations, or domain commitments.

A branch can remain internal to GRE when its divergence occurs within the programme's current identity conditions. Greater divergence can create a successor candidate whose relation to GRE is genealogical rather than simply internal. The classification should follow the content of the divergence rather than the preference of its proponents.

Definition 25.362 (Branch point record). A *branch point record* identifies the common ancestor, question or tension generating divergence, alternative commitments adopted by each descendant, evidence available at the time, shared content retained after divergence, and conditions under which comparison or recombination remains meaningful.

Definition 25.363 (Branch compatibility profile). A *branch compatibility profile* records which concepts, evidence, methods, formal objects, normative premises, and conclusions can be transferred or compared across branches, which require translation, and which remain incompatible under their current formulations.

Branches can serve different domains or questions without standing in direct competition. Other branches can make incompatible claims about the same object. A programme should therefore avoid treating plurality itself as evidence of complementarity.

Proposition 25.364 (Branch legitimacy condition). *Branching is a legitimate mode of programme evolution when divergence is explicit, common ancestry remains reconstructable, branch-specific assumptions are identifiable, and the branches remain open to comparison, criticism, and possible defeat.*

Proposition 25.365 (Branch plurality non-complementarity). *The coexistence of several programme branches does not establish that their claims are mutually compatible or jointly exhaustive; compatibility and complementarity require separate analysis at the level of the objects in dispute.*

Branching therefore turns underdetermination and disagreement into an organized research state. It can preserve alternatives long enough for later evidence or conceptual development to discriminate among them.

25.14.5 Hybridization

Theoretical programmes also change through contact with external or partly independent lineages. GRE can incorporate a concept, method, formal device, historical interpretation, empirical instrument, or normative distinction developed elsewhere. Such incorporation can be productive, but it creates a stronger provenance burden than ordinary accumulation because the imported object carries assumptions and meanings formed within another theoretical environment.

Definition 25.366 (Theoretical hybridization). *Theoretical hybridization* is a programme change in which objects from distinct theoretical or disciplinary lineages are combined into a new formulation whose operation depends materially on resources inherited from more than one lineage.

Hybridization differs from citation or loose inspiration. The external object becomes part of the programme's active analytical machinery. Its incorporation can change GRE, the imported object, or both.

Definition 25.367 (Hybridization interface). A *hybridization interface* records the imported object, source lineage, original role and assumptions, GRE target object, translation or modification performed during incorporation, preserved content, discarded content, new dependencies, and known incompatibilities.

Definition 25.368 (Hybrid compatibility audit). A *hybrid compatibility audit* examines whether the combined formulation relies on assumptions, ontological readings, evidential standards, scales, or normative commitments that conflict in ways material to the intended use.

Compatibility does not require complete theoretical agreement. A statistical method can be used within GRE without importing the source tradition's entire

ontology. A legal distinction can constrain an economic model without becoming reducible to an economic variable. The audit instead asks which differences matter for the local construction.

Proposition 25.369 (Hybridization provenance principle). *A hybrid GRE formulation should preserve enough source-lineage information to distinguish inherited content, GRE-specific modification, and genuinely new consequences produced by their combination.*

Proposition 25.370 (Hybridization non-additivity). *The adequacy of a hybrid formulation cannot be inferred from the separate adequacy of its components, because their combination can create new incompatibilities, dependencies, interpretations, or empirical requirements.*

Hybridization thus expands the programme while keeping imported authority local. An external concept earns its role through the work it performs in the combined formulation, not through the prestige or breadth of its source theory.

25.14.6 Abandonment

An open research programme requires procedures for losing theoretical objects as well as gaining them. A claim may be defeated; a formalism may prove uninformative; a distinction may collapse under better evidence; a domain transfer may repeatedly fail; a research path may become ethically unacceptable; or an object may become redundant after a more adequate formulation is developed. Continued inclusion in such cases can create theoretical inertia.

Definition 25.371 (Programme abandonment). *Programme abandonment* is the explicit retirement of a claim, concept, formalization, method, translation, branch, or research path from active programme use under a stated rationale and with its historical record preserved.

Abandonment does not assign one epistemic meaning to every retired object. Some objects are rejected as false or incoherent. Others are superseded, rendered unnecessary, judged too costly for their informational yield, or suspended because their required evidence is unavailable. These reasons should remain distinguishable.

Definition 25.372 (Retirement dossier). *A retirement dossier* records the abandoned object, its prior programme role, reasons for retirement, evidence or argument supporting the decision, affected dependencies, replacement objects where any exist, residual uses, and conditions under which reconsideration would be appropriate.

Definition 25.373 (Residual theoretical value). *Residual theoretical value* is the remaining research significance of an inactive object as historical evidence, a documented failed path, a source of distinctions, a negative result, a comparison case, or a possible resource for later reanalysis.

Proposition 25.374 (Abandonment without erasure). *Retiring a programme object should remove its active authority without deleting the provenance needed to understand why it was once adopted, why it was later abandoned, and which conclusions depended on it.*

Proposition 25.375 (Inactive-status distinction). *Inactive programme objects should retain differentiated statuses such as defeated, superseded, redundant, deferred, ethi-*

cally discontinued, or evidentially dormant when those distinctions affect the possibility and meaning of later reuse.

The distinction is important because theoretical memory should not flatten every discontinued object into error. Some abandoned paths remain informative precisely because later conditions may change the basis on which they were judged.

25.14.7 Re-Emergence

Preserved theoretical objects can become relevant again when evidence, methods, technologies, historical circumstances, normative frameworks, or research questions change. Section 25.11 treated this possibility as re-epistemization. The present subsection concerns its programme-history consequence: a previously inactive object can re-enter active theoretical work while remaining marked by the history of its earlier use and retirement.

Definition 25.376 (Theoretical re-emergence). *Theoretical re-emergence* is the reactivation of an inactive, abandoned, or marginal programme object because changed epistemic or historical conditions make its questions, distinctions, methods, or representational resources newly relevant.

Re-emergence is therefore neither simple restoration nor vindication. A concept can return because a new domain gives it a productive role even if its original claim remains rejected. A model can become useful after computational conditions change while still requiring revised assumptions. An earlier normative concern can acquire new significance under an institutional configuration that did not exist when the concern was first formulated.

Definition 25.377 (Re-emergence review). A *re-emergence review* compares the object's earlier programme state with the conditions of proposed reactivation, including original assumptions, reasons for inactivity, changed evidence or methods, altered historical context, modifications required for current use, and unresolved reasons for caution.

Definition 25.378 (Reactivated-object status). A *reactivated-object status* records whether a re-emerging object is reused as a historical comparison, heuristic, revised concept, methodological resource, formal representation, empirical hypothesis, or active programme commitment.

The status prevents re-emergence from silently upgrading an object. Historical recovery can be valuable without restoring prior epistemic authority.

Proposition 25.379 (Re-emergence non-restoration principle). *The re-emergence of a theoretical object should be evaluated under current evidence and conditions rather than treated as restoration of its former status merely because the object has become relevant again.*

Proposition 25.380 (Historical-distance safeguard). *A re-emergence review should preserve the difference between the historical problem for which an object was originally formulated and the present problem for which it is being reconsidered, especially when institutions, technologies, categories, or normative conditions have changed.*

Re-emergence thereby links programme memory to theoretical novelty. Old objects can participate in new constructions, but their return becomes a new theoretical

event with its own warrant.

25.14.8 Programme Transformation

Accumulation, critique, revision, branching, hybridization, abandonment, and re-emergence can occur while GRE remains recognizably the same research programme. Their cumulative effects can also alter the programme's architecture. A future formulation might change the role of relational analysis, redefine generativity, reorganize value plurality, replace major ontological or epistemological distinctions, shift the relation between economics and broader GR inquiry, or adopt methods and domain boundaries that make continuity increasingly genealogical rather than programmatic.

Definition 25.381 (Programme transformation). A *programme transformation* is a coordinated change across several programme components that materially alters the architecture, identity conditions, or characteristic problem-space through which the programme organizes inquiry.

Transformation is a matter of structure rather than the number of edits. Many revisions can leave the programme's identity kernel stable, while a small number of changes to foundational commitments can reorganize the whole dependency structure.

Definition 25.382 (Programme continuity profile). A *programme continuity profile* compares two programme states across their core commitments, characteristic questions, conceptual distinctions, methodological permissions, domain scope, dependency architecture, theoretical language, and recognized defeat or revision conditions.

The profile supports graded analysis without making identity purely subjective. Some dimensions can remain continuous while others change sharply. The relevant judgment is whether describing the later state as GRE still communicates a sufficiently stable programme identity for criticism, comparison, and historical reconstruction.

Definition 25.383 (Transformation threshold record). A *transformation threshold record* documents the changes judged material to programme identity, the continuity dimensions retained, competing interpretations of whether identity persists, and the reasons for describing the later formulation as an internal revision, a transformed GRE branch, or a successor programme.

Such records should allow disagreement. Programme identity is partly historical and interpretive, especially when a living research community changes over time. Explicit criteria are preferable to settling the issue through naming alone.

Proposition 25.384 (Programme succession condition). *Successor-programme language becomes appropriate when a later formulation preserves reconstructable descent from GRE while altering enough of the programme's core commitments, problem architecture, or correction conditions that ordinary internal-revision language would conceal material discontinuity.*

Definition 25.385 (Theoretical evolution portfolio). A *theoretical evolution portfolio* is a versioned programme record linking accumulation integration records, critique target maps, revision propagation records, branch point records, hybridization in-

terfaces, retirement dossiers, re-emergence reviews, and transformation threshold records across successive programme states.

The portfolio gives theoretical history more structure than a sequence of publications. It preserves unsuccessful paths, unresolved disagreements, imported lineages, retired objects, and identity changes alongside currently active formulations. This record also makes retrospective re-epistemization less dependent on institutional memory or retrospective reconstruction from final texts alone.

Proposition 25.386 (Lineage-preserving evolution principle). *GRE remains an open and historically reconstructable research programme when theoretical change can add, challenge, revise, branch, hybridize, retire, reactivate, or transform programme objects while preserving enough lineage to identify what changed, why it changed, what consequences followed, and when continuity itself became contestable.*

The principle gives programme openness a temporal form. GRE need not survive by keeping every present concept, formalism, or conclusion intact. Its stronger continuity lies in preserving a recognizable problem-space, explicit correction conditions, and reconstructable relations among successive formulations while allowing evidence and argument to alter their content. The next section turns from the evolution of the research programme to the economic futures that such an open programme is prepared to study: futures characterized by contingency, plural values and subjects, participation, option preservation, and continued revisability rather than a predetermined economic endpoint.

25.15 Open Generative Economic Futures

Section 25.14 established that GRE can evolve without assuming that later theoretical states are automatically superior or that programme development converges toward one final formulation. The present section addresses the corresponding economic-order question. Its role is to clarify what follows, and what does not follow, when an open research programme studies economic futures that are themselves historically generated. Its objective is to characterize economic future openness without converting openness into a universal institutional blueprint, an injunction to maximize options, or a refusal of durable commitments. The discussion develops eight connected dimensions: endpoint openness, plural economic orders, historical contingency, heterogeneous values, heterogeneous subjects, generative participation, option preservation, and future revisability. The method is relational and future-formative. It evaluates economic arrangements through the possibilities, constraints, participation structures, value relations, inherited dependencies, and revision capacities they generate for later participants.

The argument extends the future-formation architecture developed earlier in Chapter 20. That earlier analysis distinguished prediction from future formation and treated represented, admissible, and practically reachable possibilities as different economic objects. The present section adds a programme-level conclusion: GRE does not derive one preferred terminal economic order from the fact that economic life is relational and generative. Relational analysis can reveal dependencies, exclusions, power concentrations, capability formation, value conflicts, and path-creation

effects. Generative analysis can show how present arrangements alter later possibilities. Neither form of analysis, by itself, selects a final constitutional, ownership, market, planning, technological, or welfare architecture for every historical setting.

Definition 25.387 (Open generative economic future). An *open generative economic future* is a historically situated economic future in which consequential commitments coexist with sufficient plural standing, path-creation capacity, option preservation, institutional memory, contestability, and revision capability for later participants to continue forming, evaluating, and where materially possible altering the economic order they inherit.

The definition is intentionally conditional. Openness is not equivalent to permissiveness. Rights, safety constraints, ecological limits, fiduciary duties, anti-discrimination rules, public-health protections, technical standards, and other warranted forms of closure can be constitutive of an open future when they protect the conditions through which plural participants can continue to act and revise. Conversely, an arrangement can offer many nominal choices while concentrating the capability to generate consequential alternatives in a small number of actors.

Definition 25.388 (Economic-future openness profile). An *economic-future openness profile* records, for a specified economic configuration, the plurality of practically reachable orders and trajectories, historically contingent constraints, represented value structures, recognized subject positions, distributions of generative participation, preserved and foreclosed options, irreversible commitments, and institutional capacities for later review, repair, reinterpretation, and revision.

Table 25.15 summarizes the eight dimensions developed below.

Proposition 25.389 (Open-future non-prescription principle). *The GRE commitment to relational and generative analysis does not by itself warrant one universal economic endpoint; any preferred future order requires additional empirical, historical, institutional, and normative argument under stated scope conditions.*

This principle gives the section its main restraint. GRE can evaluate how an order generates capacity, concentrates power, distributes risk, converts values, preserves or destroys options, or enables participation without claiming that those observations uniquely determine one final design.

25.15.1 Economic Endpoint Openness

An economic theory can become teleological when its analytical architecture is treated as evidence that history should, or will, culminate in one preferred institutional form. GRE should resist that move. Relationality does not imply one ownership regime. Generativity does not imply one planning mechanism. Value plurality does not imply one procedural settlement. Historical analysis does not imply that existing institutions are either necessary or disposable. The programme can identify conditions under which particular arrangements become more or less adequate without treating adequacy in one domain or period as a terminal conclusion for economic order as such.

Definition 25.390 (Economic endpoint). An *economic endpoint* is a proposed terminal or privileged configuration of institutions, ownership, allocation, production, ex-

Table 25.15: Dimensions of open generative economic futures and their principal safeguards

Dimension	Principal analytical object	Principal safeguard
Endpoint openness	Programme relation to possible economic endpoints	Separate diagnosis and evaluation from universal terminal prescription
Plural economic orders	Coexisting and competing institutional configurations	Compare configurations without presuming convergence or equivalence
Historical contingency	Path-dependent formation of feasible and intelligible arrangements	Reconstruct conditions that made alternatives reachable, latent, or foreclosed
Heterogeneous values	Several value structures with incomplete commensurability	Preserve value-specific losses, gains, conversion limits, and evaluative remainder
Heterogeneous subjects	Differentiated persons, collectives, artificial agents, and non-human positions	Avoid deriving common standing from one model of subjecthood
Generative participation	Capacity to influence later economic possibilities	Distinguish formal participation from consequential path-shaping capacity
Option preservation	Maintenance of meaningful later reachability	Preserve selected capabilities and pathways without maximizing option count
Future revisability	Capacity to reconsider inherited economic arrangements	Combine records, review, repair, successor capacity, and explicit irreversibility

change, governance, technological organization, welfare provision, or social reproduction that is treated as the expected or normatively preferred culmination of economic development.

Endpoints can be explicit, as in a declared ideal order, or implicit, as when evaluation consistently assumes that movement toward one institutional architecture is synonymous with progress. GRE can analyze endpoint proposals as historically situated normative and institutional objects. It should not infer their authority from the existence of a generative-relational framework.

Definition 25.391 (Endpoint-openness condition). The *endpoint-openness condition* is satisfied when a GRE analysis distinguishes its diagnostic and evaluative findings from any claim that one economic configuration constitutes the generally required terminal state, and when alternative arrangements remain assessable under explicit evidence, values, and scope conditions.

Endpoint openness does not prohibit strong recommendations. A specific jurisdiction can have compelling reasons to adopt universal health coverage, strengthen competition policy, prohibit a hazardous practice, build public infrastructure, or regulate a concentrated platform. The analytical discipline concerns the inference from local or domain-specific warrant to universal historical destination.

Proposition 25.392 (Local adequacy and terminal inference). *Evidence that one economic arrangement is preferable under specified conditions does not establish that the same arrangement is the final or generally optimal organization of economic life across other domains, periods, technologies, value structures, and subject configurations.*

Proposition 25.393 (Commitment without finality). *An economic order can make durable commitments while remaining future-open when the reasons for those commitments are explicit, their relevant scope is specified, and later participants retain institutional capacity to interpret their purpose, repair their consequences, and revise their implementation where revision is materially and normatively admissible.*

Endpoint openness therefore separates decisiveness from finality. Economic institutions must act, invest, prohibit, tax, contract, insure, maintain, and allocate. Openness concerns the status of those commitments within historical time, not an absence of commitment.

25.15.2 Plural Economic Orders

If no universal endpoint is derived from GRE itself, economic futures can contain several possible orders. The relevant plurality is not merely a list of named systems. Economic orders can vary across ownership, coordination, market structure, public provision, fiscal capacity, labor organization, social reproduction, digital infrastructure, ecological governance, knowledge institutions, legal regimes, and distributions of decision authority. Hybrid configurations are common, and the same named institutional category can operate differently under different historical relations.

Definition 25.394 (Possible economic order). *A possible economic order is a historically and materially specifiable configuration of institutions, relations, capabilities, allocation mechanisms, infrastructures, governance arrangements, value practices, and participation structures that could become sufficiently organized to reproduce and transform economic life under stated conditions.*

This definition excludes purely verbal alternatives whose enabling conditions are unspecified. Possibility is graded. Some orders are immediately reachable from a present configuration; others require intermediate institutional development, new capabilities, political coalitions, technologies, ecological conditions, or legal change. Still others are conceptually imaginable but presently unsupported.

Definition 25.395 (Economic-order possibility set). *An economic-order possibility set is a bounded, historically situated representation of economic orders and trajectories that are currently reachable, conditionally reachable, latent, or materially foreclosed, together with the transitions and support conditions associated with each status.*

The set should not be treated as complete. Novel economic forms can arise through institutional experimentation, technological change, crisis response, social movement, ecological pressure, legal innovation, or recombination of inherited practices. A generative framework therefore includes the capacity to produce later alternatives not represented in the current set.

Proposition 25.396 (Plural-order comparison principle). *Plural economic orders should be compared through their domain-specific consequences, generative mechanisms, distributions of capability and risk, value effects, participation structures, and future-formation properties rather than ranked solely by their proximity to a presupposed terminal model.*

Proposition 25.397 (Plurality non-equivalence condition). *Recognition of several possible economic orders does not imply that the orders are equally adequate, mutually*

compatible, or normatively interchangeable; plurality preserves the space of comparison while evidence and argument remain responsible for discrimination among alternatives.

Plurality thus differs from relativism. Some arrangements can be rejected because they predictably destroy capabilities, violate rights, impose severe unreciprocated burdens, generate unsustainable ecological dependence, or entrench domination. Openness requires that such judgments be argued through explicit criteria rather than inferred from an assumed historical destination.

25.15.3 Historical Contingency

Economic orders are formed within histories they do not choose from an empty starting point. Legal categories, infrastructures, property arrangements, fiscal institutions, organizational routines, cultural expectations, technologies, ecological conditions, geopolitical relations, and accumulated capabilities shape what can be imagined and implemented. Historical contingency therefore concerns both realized order and unrealized possibility.

Definition 25.398 (Economic-order contingency profile). *An economic-order contingency profile records the inherited conditions, sequence-sensitive events, institutional complementarities, capability stocks, path dependencies, critical junctures, external pressures, and unrealized alternatives that materially shaped the emergence and persistence of a specified economic arrangement.*

Contingency does not mean causelessness. A contingent order can be strongly constrained by previous events. Nor does it mean that any alternative was historically available. The methodological task is to reconstruct degrees of reachability and the support conditions of unrealized paths, consistent with the historically disciplined option-space inquiry developed earlier in the book.

Definition 25.399 (Historical possibility window). *A historical possibility window is a temporally bounded configuration in which a specified economic alternative becomes materially more reachable because relevant institutional, political, technological, ecological, financial, or social support conditions temporarily align.*

Possibility windows can open and close without producing a realized transition. Their existence matters because a later observer can otherwise mistake the surviving order for the only feasible order. Conversely, retrospective imagination can overstate alternatives that lacked contemporaneous support.

Proposition 25.400 (Contingency reconstruction principle). *Claims about alternative economic futures become stronger when they reconstruct the historical conditions that generate reachability, including the capabilities and dependencies inherited from prior paths, rather than treating institutional alternatives as context-free designs.*

Proposition 25.401 (Path inheritance condition). *Future economic openness depends partly on inherited path structures because present arrangements can preserve, deepen, or remove the capabilities, infrastructures, records, and coordination relations needed for later transitions.*

Historical contingency therefore links past and future through generative inheritance. A society does not simply choose among economic systems; it acts from a

path-dependent configuration that can itself be modified over time.

25.15.4 Heterogeneous Values

Open economic futures also remain normatively plural. Economic arrangements affect income, security, autonomy, care, ecological integrity, dignity, knowledge, community, cultural continuity, public capability, innovation, resilience, and other values whose relations can be complementary, substitutable, conflicting, or incommensurable. The Chapter 20 analysis of plural-value economic order treated value plurality as an economic problem rather than a residual obstacle. The present subsection draws its future-facing implication: later economic orders should not be assessed through the assumption that one currently dominant value representation exhausts what future participants may reasonably care about.

Definition 25.402 (Future value horizon). A *future value horizon* is the set of value structures currently represented as relevant to future economic evaluation together with acknowledged uncertainty about values, interpretations, and forms of significance that later participants may develop or recover.

The horizon is broader than current preference aggregation. Some values are institutionally weak, difficult to quantify, culturally specific, poorly represented by market exchange, or held by groups with limited present standing. Other values can emerge as technology and social relations change. Preserving a future value horizon therefore requires both representation and epistemic humility.

Definition 25.403 (Value-foreclosure event). A *value-foreclosure event* occurs when an economic commitment materially removes the conditions through which a value practice, relation, capability, or form of life could continue or later be reconsidered, especially where the affected value is weakly represented in the decision process.

Value foreclosure can be warranted in some cases. A society can prohibit a profitable practice because it violates rights or imposes severe harms. The analytical purpose of the concept is to make the loss visible, not to establish an automatic presumption against closure.

Proposition 25.404 (Plural-value future condition). *Future-facing economic evaluation has stronger plural-value adequacy when it preserves materially relevant value gains, losses, conversion limits, conflicts, and unrepresented remainder rather than treating one aggregate metric as sufficient evidence of overall improvement.*

Proposition 25.405 (Value-horizon revisability). *A future value horizon should remain revisable because later evidence, social experience, ecological change, technological development, and previously marginalized perspectives can alter which values are recognized and how their relations are interpreted.*

Value plurality therefore supports openness without dissolving judgment. The programme can endorse specific protections or priorities while preserving the distinction between a justified present judgment and a complete representation of future value.

25.15.5 Heterogeneous Subjects

Future economic orders will also be inhabited by heterogeneous subjects and relational beings. Earlier chapters distinguished human persons, collective formations, artificial agents, institutions, and non-human positions without assigning them one ontology, phenomenology, utility structure, or moral status. The Chapter 18 analysis of heterogeneous subjects and value structures applied that discipline to AI-mediated economies. The future-facing consequence is that economic design should avoid assuming that one standardized subject model will remain adequate as participants, capabilities, representation systems, and ecological relations change.

Definition 25.406 (Future subject configuration). *A future subject configuration is a historically situated arrangement of subject forms and relational beings that participate in, are represented by, are affected by, or exercise consequential agency within an economic order, together with their differentiated capacities, dependencies, standing, representation channels, and value relations.*

The category is intentionally wider than the model of an individual market actor. Households, firms, communities, public bodies, ecosystems represented through institutions, artificial agents, future persons represented by present fiduciary structures, and other collectives can enter economic relations in different ways. Their standing should be specified rather than inferred from nominal inclusion in a common category.

Definition 25.407 (Subject-representation gap). *A subject-representation gap is the difference between the set of positions materially affected by an economic arrangement and the set of positions whose interests, values, knowledge, or claims are effectively represented in the processes that form or revise that arrangement.*

Representation gaps are future-formative because excluded positions can bear costs that later narrow social possibility. Ecological degradation borne outside the decision boundary, unpaid care displaced from formal accounting, or technical dependence imposed on users without effective exit can alter later capabilities even when the affected positions were weakly represented at the moment of decision.

Proposition 25.408 (Heterogeneous-subject standing principle). *The standing of heterogeneous subjects in future economic analysis should be justified through the relevant legal, ethical, relational, institutional, and empirical arguments rather than inferred from a single model of agency or utility.*

Proposition 25.409 (Representation-gap effect). *A persistent subject-representation gap can reduce future openness when the unrepresented consequences it permits degrade capabilities, relations, ecological conditions, institutional trust, or option structures required for later participation and revision.*

Heterogeneous subjecthood thus links inclusion to future formation. The question is not simply who is counted in the present economy, but whose continued capacity to participate in later economic formation is generated or depleted by present arrangements.

25.15.6 Generative Participation

The Chapter 20 analysis of economic participation treated participation as more than employment, exchange, or formal membership. For open futures, the relevant threshold is stronger: participants require some practical relation to the processes through which later economic options, institutions, knowledge, infrastructures, and value arrangements are formed. Formal voice can coexist with weak generative influence when agenda control, technical capability, finance, information, or institutional access remains highly concentrated.

Definition 25.410 (Future-forming participation). *Future-forming participation* is the practical capacity of a subject or collective to contribute to, contest, initiate, maintain, redirect, or terminate processes that materially shape later economic relations, institutions, capabilities, infrastructures, values, and reachable alternatives.

Future-forming participation can occur through work, entrepreneurship, care, research, public administration, community organization, political action, maintenance, standard setting, investment, education, technical development, legal contestation, or other pathways. The relevant form depends on the domain. Participation therefore cannot be reduced to one institutional procedure.

Definition 25.411 (Generative-participation distribution). A *generative-participation distribution* records how future-forming capacities are distributed across positions, including access to agenda formation, knowledge, finance, infrastructure, coordination, experimentation, maintenance, contestation, and recognized decision authority.

This distribution can differ substantially from the distribution of present consumption or income. A group can receive material benefits while remaining unable to shape the infrastructure on which those benefits depend. Another actor can have modest current consumption but substantial authority over standards, data, capital allocation, or platform design that structure later possibility.

Proposition 25.412 (Participation-consequence condition). *Participation contributes more strongly to future openness when participants possess practicable pathways through which their knowledge, claims, experimentation, maintenance, and contestation can alter consequential economic processes rather than remaining merely consultative or symbolic.*

Proposition 25.413 (Generative participation non-uniformity). *Open economic futures do not require identical future-forming authority for every subject in every domain, but material concentrations of generative participation should remain visible and contestable where they structure the opportunities and dependencies of others.*

The second proposition prevents participation from becoming an undifferentiated equality requirement. Expertise, delegated authority, fiduciary responsibility, emergency powers, and differentiated institutional roles can be legitimate. The future-formative concern is whether concentrated authority becomes self-reinforcing, unreviewable, or capable of foreclosing the conditions under which affected positions can later challenge it.

25.15.7 Option Preservation

Future openness requires some possibilities to remain materially reachable across time. The Chapter 20 future-formation analysis distinguished option preservation from maximizing the number of options. The present subsection emphasizes its programme-level role: preserving selected capabilities and transition pathways can be valuable precisely because current actors cannot exhaustively know which future combinations of values, technologies, risks, and institutions later participants will face.

Definition 25.414 (Generative option preservation). *Generative option preservation* is the maintenance of capabilities, infrastructures, knowledge, ecological conditions, institutional permissions, interoperability, reserves, or transition pathways that keep specified classes of later economic action practically reachable or allow new options to be generated.

Preservation can concern redundancy in infrastructure, maintenance of public capability, ecological buffers, diversified knowledge, interoperable standards, retraining capacity, archives, legal pathways for institutional innovation, or the continued existence of organizations able to develop alternatives. Its object is therefore broader than keeping a menu item formally available.

Definition 25.415 (Option-preservation burden). An *option-preservation burden* is the material, institutional, ecological, fiscal, organizational, or opportunity cost required to maintain a future option or class of options at a specified level of practical reachability.

Not every option warrants its burden. Maintaining obsolete infrastructure can consume resources needed for safer or more inclusive alternatives. Preserving a harmful practice because it is an “option” can impose unacceptable costs on others. Option preservation therefore requires evaluation of consequences, standing, scarcity, substitutability, and irreversibility.

Definition 25.416 (Foreclosure significance profile). A *foreclosure significance profile* records the possibilities removed by a proposed commitment, affected positions, substitutable and non-substitutable losses, expected duration, reversibility, path dependencies created, capabilities lost, reasons for closure, and the degree of uncertainty concerning later value.

Proposition 25.417 (Selective option-preservation principle). *Option preservation is warranted selectively rather than maximally: priority is stronger where foreclosure is difficult to reverse, later value is materially uncertain, the option supports broad path-creation capacity, and preservation costs are proportionate to the consequences of irreversible loss.*

Proposition 25.418 (Capability-before-catalogue condition). *The preservation of capabilities that can generate several later pathways can provide greater future openness than preserving a large catalogue of nominal options whose practical support conditions are weak or dependent on a single fragile structure.*

Option preservation therefore focuses attention on generative substrates. Education, repair capability, institutional memory, ecological resilience, open standards, and public coordination capacity can preserve classes of possibility that current de-

cision makers cannot enumerate in advance.

25.15.8 Future Revisability

The final dimension concerns the capacity of later participants to reconsider inherited order. Revisability does not imply that every consequence can be undone. Infrastructure ages, ecological losses can be irreversible, institutions create expectations, contracts generate reliance, skills decay, and technological standards accumulate complements. The relevant question is whether an economic order preserves practical mechanisms for learning and correction where revision remains possible and whether unavoidable irreversibilities are made explicit before they are imposed.

Definition 25.419 (Economic future revisability). *Economic future revisability* is the practical capacity of later participants to reassess inherited economic arrangements, recover the reasons and evidence behind them, contest their continuation, repair harmful consequences, alter implementation, create successor institutions, or redirect trajectories where material and normative conditions permit change.

Revisability depends on more than formal amendment rules. It can require archives, data continuity, legal standing, organizational competence, fiscal capacity, interoperable infrastructure, plural expertise, maintenance knowledge, and institutions capable of carrying transitions without catastrophic loss of essential functions. The preservation and provenance architecture of Section 25.10 is therefore directly relevant to economic order: arrangements that cannot be reconstructed are harder to revise intelligently.

Definition 25.420 (Revision-capacity profile). A *revision-capacity profile* records the legal, institutional, epistemic, technical, fiscal, organizational, and participatory capacities through which an inherited economic arrangement can be reviewed, modified, repaired, replaced, or succeeded, together with the irreversibilities and dependencies that limit those operations.

Definition 25.421 (Irreversibility disclosure). An *irreversibility disclosure* identifies, before or during a consequential economic commitment, the known and materially plausible losses, lock-ins, dependency accumulations, ecological thresholds, capability erosions, or institutional closures that could make later revision substantially more difficult or impossible.

The disclosure does not eliminate uncertainty. It makes the expected asymmetry between commitment and reversal part of present evaluation.

Proposition 25.422 (Future-revisability condition). *An economic arrangement contributes more strongly to an open generative future when its important commitments are accompanied, where feasible, by records, review pathways, repair capacity, successor capacity, and distributed standing sufficient for later participants to reconsider inherited arrangements in light of changed evidence, values, technologies, and historical conditions.*

Proposition 25.423 (Irreversibility accountability principle). *Where an economic commitment predictably creates severe or durable irreversibility, future openness requires stronger present justification and clearer accounting of affected positions, alternatives considered, preservation losses, and the reasons that reversible or staged*

pathways were judged inadequate.

Definition 25.424 (Open-economic-future portfolio). An *open-economic-future portfolio* is a versioned programme record that links endpoint assumptions, possible economic orders, contingency profiles, future value horizons, future subject configurations, generative-participation distributions, option-preservation decisions, foreclosure significance profiles, revision-capacity profiles, and irreversibility disclosures for a specified economic setting.

The portfolio is not a planning algorithm. It is a discipline for keeping the future-formative consequences of economic order visible. It allows researchers and practitioners to distinguish a present recommendation from a claim about historical destiny, a plural possibility field from an assertion of equivalence, participation from consequential future-forming capacity, and option preservation from indiscriminate delay.

Proposition 25.425 (Open generative future principle). *GRE supports the analysis of open generative economic futures when present arrangements are evaluated not only by current outputs but also by the value plurality, subject standing, participation pathways, generative capabilities, option structures, irreversible losses, and revision capacities they create for later economic formation.*

The principle does not turn openness into the sole economic value. Stability, security, justice, ecological protection, reliability, care, coordination, and other values can justify commitments that narrow possibility. Its contribution is to make one additional class of consequences explicit: economic decisions help constitute the future field within which later participants can know, value, coordinate, contest, create, and revise. An open generative future is therefore neither a final system nor an indefinitely postponed decision. It is a historically situated economic order whose closures remain accountable to the capabilities and relations through which economic futures continue to be formed.

The next section turns from the character of possible economic futures to the research attention required to study them. It identifies the relations, generative conditions, histories, manifestations, positions, value plurality, power, and foreclosed possibilities that GRE asks researchers to keep analytically visible.

25.16 Research Attention in Generative Relational Economics

The preceding sections have described GRE as a revisable programme, specified its openness to domain evidence, disciplined cross-domain learning, and treated both theoretical development and economic futures as historically open. The present section turns from programme architecture to research attention. Its role is to state which kinds of objects a GRE inquiry is expected to keep analytically visible when formulating questions, selecting evidence, constructing representations, and interpreting results. Its objective is not to provide an exhaustive checklist or to claim that every research project must study every object at equal depth. It instead identifies eight recurring attentional commitments that help distinguish a generative-relational investigation from an analysis that treats economic entities, values, observations, or out-

comes as self-contained. The section develops relations, generative conditions, conversion, circulation, historical position, value plurality, power, and foreclosed possibilities. The method is diagnostic and inferential: each attentional object is paired with the kinds of omissions or overextensions that can distort interpretation.

Research attention matters because what becomes visible in an inquiry partly depends on what the inquiry is prepared to represent. An entity-centred dataset can be entirely adequate for a narrowly specified question while remaining unable to represent the relation through which an observed state was produced. A measured transfer can record an amount while omitting the conversion by which one kind of value became another. A historically later observer can possess evidence unavailable to contemporaneous actors and thereby misread past action as if later knowledge had already been accessible. A formally available option can appear preserved even when power, capability, or institutional dependence makes the option practically unreachable. GRE therefore treats attentional design as part of research design rather than as a stylistic supplement added after analysis.

Definition 25.426 (GRE research-attention profile). *A GRE research-attention profile records, for a specified research question, which relational structures, generative conditions, conversion processes, circulation paths, historical positions, value forms, power relations, and possibility foreclosures are treated as analytically relevant; which are represented directly, indirectly, or not at all; and what inferential limitations follow from those choices.*

The profile is intentionally question-relative. A price-elasticity estimate, archival reconstruction, institutional case study, network model, legal-economic analysis, or ethnographic inquiry can each have a different adequate profile. The GRE requirement is not maximal inclusion. It is explicitness about which consequential relational and generative objects remain outside the chosen representation.

Definition 25.427 (Attentional omission). *An attentional omission occurs when an analytically consequential object, relation, process, position, or unrealized possibility is absent from a research representation in a way that can materially alter the interpretation, scope, or warrant of the resulting claim.*

An omission is therefore different from an ordinary boundary of scope. A study can responsibly exclude many objects. The problem arises when an excluded object bears directly on the inference being made and the exclusion is left unexamined.

Proposition 25.428 (Research-attention sufficiency condition). *A GRE research-attention profile is sufficient for a stated inquiry when it represents, or explicitly bounds, the relational and generative objects whose omission could materially change the intended inference, while avoiding the claim that the resulting profile exhausts the economic situation.*

Table 25.16 summarizes the eight attentional objects developed below and the principal inferential risk associated with neglecting each one.

Proposition 25.429 (Attentional non-exhaustiveness principle). *The eight objects in the present section define a recurring GRE research orientation rather than a closed ontology or universal template; additional domain-specific objects should take priority whenever they are necessary for adequate inquiry.*

Table 25.16: Research-attention objects in GRE and their principal inferential risks

Attention object	Principal research concern	Principal inferential risk when omitted
Relations	Dependence, interaction, mediation, and co-constitution among economic objects	Treating relationally produced properties as intrinsic or independent
Generative conditions	Conditions that enable, constrain, reproduce, or transform later possibilities	Reading observed outcomes without the conditions that made them reachable
Conversion	Transformation among heterogeneous resources, values, capacities, rights, or representations	Treating transformation as frictionless equivalence or simple transfer
Circulation	Movement, interruption, return, capture, dissipation, and regeneration	Inferring system-wide movement from one local transfer or transaction
Historical position	Temporal, institutional, evidential, and conceptual location of observer and observed actors	Projecting later categories, knowledge, or possibilities into earlier situations
Value plurality	Coexisting evaluative forms and partial or absent commensurability	Hiding value-specific gains, losses, and remainder through premature aggregation
Power	Typed asymmetry, relational realization, agenda effects, and control over interfaces	Inferring voluntariness or neutrality from formally available choices
Foreclosed possibilities	Alternatives made unreachable, unintelligible, unaffordable, or institutionally unavailable	Treating the observed path as if it represented the relevant possibility field

25.16.1 Relations

GRE begins research attention with relations because many economically consequential properties depend on structured connections among persons, organizations, institutions, technologies, environments, rules, representations, and historical inheritances. The relevant relation can be contractual, legal, organizational, epistemic, infrastructural, ecological, symbolic, affective, technical, political, or otherwise domain-specific. Relational attention does not require replacing entities with relations. It requires asking which apparently entity-level properties are produced, sustained, or altered through relations and which entity boundaries are themselves consequential products of relational organization.

Definition 25.430 (Relational unit of inquiry). A *relational unit of inquiry* is a research object specified together with the relations, counterparties, mediating structures, and boundary conditions required to interpret the property or process under investigation.

A firm studied as a relational unit may require attention to workers, suppliers, creditors, customers, regulators, standards, infrastructures, ownership arrangements, and ecological dependencies. A household may require attention to care relations, legal status, income flows, kinship, housing, public provision, and unpaid work. The appropriate unit remains question-dependent; GRE does not presume that

every possible relation belongs in every study.

Definition 25.431 (Relation specification). A *relation specification* records the relations relevant to a research question, the type of relation among them, its directionality or reciprocity where applicable, its temporal extent, mediating institutions or representations, and the evidence through which the relation is inferred.

Relation specification protects against vague relationalism. Merely asserting that “everything is related” supplies little analytical content. A useful relational claim identifies which relation matters, by what mechanism or interpretive pathway it matters, and what evidence could revise the claim.

Definition 25.432 (Relational attribution error). A *relational attribution error* occurs when a property substantially generated or sustained through specified relations is attributed to an entity as if the property were independent of those relations for the purpose of the inference being made.

Examples can include treating creditworthiness as wholly individual when it depends on institutional scoring systems and labor-market position, treating market access as a simple possession when access depends on infrastructure and legal standing, or treating organizational productivity as separable from coordination and knowledge relations. The diagnosis remains empirical: some properties may be relatively robust across relational changes, while others can be highly relation-dependent.

Proposition 25.433 (Relational-attention condition). *When a target property changes materially with the structure, quality, or availability of relevant relations, a GRE analysis should represent those relations or limit its claim so that the property is not interpreted as relation-independent.*

Relational attention also concerns relations among mechanisms. A policy can alter a financial relation, which changes organizational bargaining, which changes labor conditions, which changes household capacity. The relation between mechanisms can itself be part of the economic object rather than a complication to be removed in advance.

25.16.2 Generative Conditions

Observed economic outcomes do not reveal by themselves the conditions that made those outcomes reachable. GRE therefore asks researchers to attend to generative conditions: arrangements that enable, constrain, reproduce, redirect, or suppress the production of later relations, capacities, institutions, values, and possibilities. This attention differs from a search for one sufficient cause. A generative condition can be necessary in one domain, enabling in another, probabilistically supportive in a third, or merely one component of a larger conjuncture.

Definition 25.434 (Generative-condition set). A *generative-condition set* is a research-specified collection of historically situated material, institutional, relational, epistemic, normative, ecological, or technological conditions whose presence, configuration, or interaction bears on the production or reproduction of the target process under study.

The set should be treated as provisional. New evidence can reveal omitted conditions, while comparative work can show that a condition important in one setting is

substitutable or irrelevant in another.

Definition 25.435 (Possibility-conditioning profile). *A possibility-conditioning profile records how identified conditions expand, narrow, differentiate, stabilize, or reorganize the set of practically reachable states, actions, relations, or institutional arrangements relevant to a research question.*

The profile shifts attention from outcome occurrence alone to structured reachability. Two populations can display the same current outcome while facing very different future possibility fields. Conversely, the same formal opportunity can generate different practical possibilities when capabilities, relations, information, or institutional access differ.

Proposition 25.436 (Generative-conditionality principle). *A GRE explanation of a generated outcome should identify the conditions that make the proposed generative pathway plausible and should avoid treating the observed outcome as sufficient evidence that those conditions were present in the form assumed by the explanation.*

Proposition 25.437 (Generative non-determinism condition). *The identification of a generative condition does not by itself establish deterministic production of the associated outcome; the warranted claim depends on the mechanism, evidence, competing conditions, stochastic structure, and historical scope of the case.*

Generative attention therefore joins explanation to counterfactual discipline. Researchers should ask not only what occurred, but which conditions allowed the occurrence, what alternative conditions might have produced similar outcomes, and what changes in those conditions would alter later possibility formation.

25.16.3 Conversion

Economic processes frequently transform one kind of object into another: money into access, credentials into employment opportunities, labor into income, data into prediction, legal rights into practical claims, social recognition into cooperation, infrastructure into mobility, or ecological capacity into production. GRE uses conversion attention to prevent these transformations from being represented as if heterogeneous inputs and outputs were already commensurable or as if transfer automatically preserved meaning and value.

Definition 25.438 (Conversion event record). *A conversion event record specifies a transformation in which an input resource, value, capacity, right, representation, or relational position contributes to an output of a different analytical type, together with the conversion mechanism, participating actors or institutions, enabling conditions, losses, gains, uncertainty, and non-converted remainder.*

The record can be qualitative, quantitative, formal, historical, or mixed. What matters is that conversion be made visible as a process rather than hidden inside an assumed equivalence.

Definition 25.439 (Conversion interface). *A conversion interface is the relational and institutional site through which a conversion is enabled, evaluated, authorized, priced, constrained, or denied.*

Interfaces include markets, credentialing systems, eligibility rules, payment infrastructures, organizational procedures, technical standards, algorithms, legal

processes, and social norms. Control over an interface can therefore influence which forms of value or capacity become convertible and on what terms.

Definition 25.440 (Conversion remainder). A *conversion remainder* is the portion of meaning, value, capacity, risk, obligation, or relational significance that is not preserved by the conversion representation used in an analysis.

Remainder does not imply that conversion is illegitimate. Monetary valuation, scoring, indexing, legal classification, and statistical aggregation can be indispensable. The analytical requirement is to distinguish a useful conversion from a complete equivalence claim.

Proposition 25.441 (Conversion-attention principle). *When an inference depends on movement between analytically heterogeneous forms, a GRE analysis should identify the conversion interface and preserve materially relevant conversion remainder rather than treating the input and output as interchangeable by default.*

Conversion attention also creates an interface with power analysis. If one actor can set the admissible units, thresholds, categories, or exchange terms through which heterogeneous objects become convertible, then the conversion process can itself become a site of economic power rather than a neutral technical step.

25.16.4 Circulation

A transfer observed at one point in an economic process does not establish that value, resources, information, or capacity circulate through the wider system. GRE therefore asks researchers to trace movement beyond the focal transaction where the research question requires it. Circulation attention concerns pathways of movement, interruption, accumulation, return, capture, dissipation, and regeneration. It is particularly important when policy or institutional evaluation assumes that an initial allocation will propagate benefits through later relations.

Definition 25.442 (Circulation path). A *circulation path* is a temporally ordered sequence of transfers, conversions, uses, returns, or relational changes through which a specified economic object or effect moves across actors, institutions, locations, or value forms.

The identity of the moving object may change along the path. A grant can become wages, purchased services, knowledge, infrastructure, institutional capacity, or later revenue. A circulation analysis should therefore distinguish continuity of causal or relational contribution from identity of substance.

Definition 25.443 (Circulation interruption). A *circulation interruption* is a point at which an expected or hypothesized movement is blocked, captured, dissipated, delayed, redirected, or transformed so that the downstream path differs materially from the one assumed by the research model.

Interruption can be a failure, a legitimate retention, a protective barrier, or a productive transformation. The term is descriptive. Its normative significance depends on the purpose of the circulation and the values affected.

Definition 25.444 (Return-regeneration relation). A *return-regeneration relation* records whether and how a circulation path contributes back to the capacities, relations, institutions, communities, infrastructures, or ecological conditions from which

later generative activity can continue.

This relation helps distinguish extraction from circulation that supports renewal, while avoiding the assumption that every economic process should literally return resources to its point of origin.

Proposition 25.445 (Local-transfer non-completion principle). *Evidence of a local transfer or conversion does not by itself establish successful circulation, downstream realization, return, or regeneration; those later relations require their own evidence or an explicitly limited claim.*

Circulation attention is therefore especially useful for identifying where a promising intervention ceases to have the effect attributed to it. It can also reveal that apparent leakage at one level is productive circulation at another, which is why the relevant system boundary must remain explicit.

25.16.5 Historical Position

GRE treats economic knowledge as historically positioned. Researchers observe past and present economic objects from particular temporal, institutional, conceptual, technological, and evidential locations. Historical position shapes which categories appear natural, which records survive, which alternatives are visible, which actors can speak in the archive, and which later outcomes are already known to the researcher. Attention to historical position does not make knowledge arbitrary. It makes the conditions of knowledge part of the inquiry.

Definition 25.446 (Research-position profile). *A research-position profile records the temporal location, institutional setting, conceptual vocabulary, available evidence, methodological instruments, and relevant social or technological conditions from which a researcher constructs an interpretation of the target economic object.*

The profile can also record positional advantages and blind spots. A later researcher may possess longitudinal data unavailable to contemporaries while lacking tacit knowledge that was obvious to participants. An institutionally embedded researcher may gain access while facing organizational constraints on interpretation. These conditions affect warrant in different ways.

Definition 25.447 (Contemporaneous accessibility boundary). *A contemporaneous accessibility boundary distinguishes information, concepts, alternatives, technologies, and causal knowledge reasonably available to actors at the historical moment under study from those that became available only later or were available only to differently positioned actors.*

The boundary is often heterogeneous rather than universal. Elites, administrators, workers, households, communities, and external observers can occupy different epistemic positions within the same period.

Definition 25.448 (Retrospective projection error). *A retrospective projection error occurs when later knowledge, categories, institutional possibilities, or normative settlements are attributed to earlier actors or situations in a way that materially distorts the interpretation of their available choices, beliefs, or constraints.*

Proposition 25.449 (Historical-position disclosure principle). *When a GRE inference depends materially on later evidence, later categories, or a historically specific research*

position, the analysis should disclose that dependence and distinguish retrospective reconstruction from contemporaneously available understanding.

Historical-position attention also applies to present research. Categories such as platform, labor, household, intelligence, risk, property, market, or public interest can shift as institutions and technologies change. The researcher should therefore preserve concept provenance where category change could alter the object being compared across time.

25.16.6 Value Plurality

Economic inquiry often requires evaluation across several forms of value whose relations are partial, contested, context-dependent, or absent. GRE asks researchers to notice when a common metric is doing analytical work and when it is silently converting a plural evaluative field into a single scale. Value plurality does not prohibit aggregation. It requires an account of what the aggregation preserves, what it excludes, and which judgments authorize the conversion.

Definition 25.450 (Research value register). A *research value register* records the value forms materially relevant to a research question, the subjects or communities for whom they matter, the evidence through which they are represented, and the known relations of comparability, conversion, conflict, complementarity, or incommensurability among them.

The register can include monetary, welfare, capability, ecological, legal, cultural, epistemic, relational, aesthetic, care-related, or other domain-specific values. Inclusion depends on the question and evidence rather than on a fixed GRE taxonomy.

Definition 25.451 (Commensuration event). A *commensuration event* is an analytical, institutional, political, or practical act through which heterogeneous value forms are placed on a shared ordering, metric, threshold, score, or decision rule for a specified purpose.

Commensuration is itself an object of inquiry. It can make decision possible, reveal trade-offs, or support accountability. It can also suppress value dimensions that do not fit the chosen representation or assign authority to those who control the metric.

Definition 25.452 (Value-attention remainder). A *value-attention remainder* is a materially relevant value claim, loss, gain, conflict, or evaluative perspective that remains outside or only partially represented by the metric or comparison used in a study.

Proposition 25.453 (Plural-value attention condition). *When a research conclusion depends on aggregating, comparing, or converting heterogeneous value forms, a GRE analysis should make the governing commensuration rule visible and retain materially relevant value-attention remainder in the interpretation of the result.*

This condition protects against a common inferential shortcut: a result can be optimal under one metric while imposing severe losses in another value domain. GRE does not determine in advance how such conflicts should be settled. It requires that the conflict remain analytically visible until an explicit evaluative or institutional argument addresses it.

25.16.7 Power

Power attention asks how differentiated capacities become relationally realized in the economic situation under study. The book has distinguished typed asymmetry from power relevance and from realized power relations. The research implication is that neither equality nor domination should be inferred from a single scalar difference. Researchers should identify the relevant asymmetry, the relation through which it becomes consequential, the mechanism by which alternatives or outcomes are shaped, and the evidence available for that mechanism.

Definition 25.454 (Research-facing power trace). A *research-facing power trace* is an evidentially supported indication that a typed asymmetry is relationally realized through agenda setting, access control, conversion control, dependence, sanction capacity, information control, institutional authority, infrastructural position, option shaping, or another specified mechanism relevant to the research question.

A trace is weaker than a complete theory of power. Its purpose is to prevent power from disappearing merely because the research representation contains voluntary transactions, formal equality, or aggregate outcomes.

Definition 25.455 (Power-sensitive inference check). A *power-sensitive inference check* asks whether the observed choices, exchanges, classifications, or outcomes would support the same interpretation if the relevant asymmetries, dependencies, agenda controls, exit capacities, and interface controls were materially different.

The check can reveal where an apparently preference-based outcome depends on constrained alternatives, where a market price depends on concentrated bargaining position, or where a classification reflects authority over the categories through which participation is recognized.

Definition 25.456 (Observational power effect). An *observational power effect* occurs when power relations materially shape what evidence becomes available, whose testimony is recorded, which categories are institutionally recognized, what data are collected, or which outcomes become legible to the research process.

Power can therefore operate on the object of study and on the evidential field through which that object is known. This does not imply that marginalized evidence is automatically correct or institutional evidence automatically distorted. It requires that asymmetries in evidence production be considered where they affect inference.

Proposition 25.457 (Power-attention condition). *When a GRE claim concerns choice, participation, exchange, access, conversion, institutional response, or distribution under materially relevant asymmetry, the analysis should examine whether and how that asymmetry becomes relationally realized before interpreting the observed outcome as evidence of unconstrained preference or neutral coordination.*

Power attention also connects to reflexivity. Research classifications, rankings, and measurements can enter the economic field and alter behavior, access, or expectations. Where such feedback is material, the research object includes the relation between observation and the transformed field rather than only the pre-observation state.

25.16.8 Foreclosed Possibilities

The final attentional object concerns possibilities that do not appear among observed choices because they have already been made unreachable, unintelligible, unaffordable, institutionally inadmissible, technologically unavailable, or socially unsustainable. Section 25.15 treated option preservation and future revisability as dimensions of open generative economic futures. The research-facing implication is that the observed path should not automatically be treated as evidence for the full possibility field from which actors could choose.

Definition 25.458 (Foreclosure trace). A *foreclosure trace* is evidence that a previously possible, potentially constructible, or relevantly imaginable economic path has become practically unreachable or materially harder to reach through institutional commitment, resource depletion, capability loss, legal restriction, infrastructural lock-in, power concentration, ecological change, knowledge loss, or another specified mechanism.

Not every foreclosure is undesirable. Safety rules can foreclose hazardous practices; rights can remove discriminatory options; ecological constraints can properly prohibit destructive uses. Research attention is required because the act of foreclosure changes the possibility structure and can distribute benefits, losses, and revision capacity unevenly.

Definition 25.459 (Relevant possibility horizon). A *relevant possibility horizon* is the research-bounded set of alternatives that are historically plausible, institutionally or technically constructible, or sufficiently grounded in evidence to matter for evaluating the observed economic path.

The horizon is intentionally narrower than an unrestricted set of imaginable worlds. Counterfactual analysis gains discipline when alternatives are connected to historical conditions, capabilities, institutional designs, or evidenced pathways rather than introduced solely because they are logically conceivable.

Definition 25.460 (Silent foreclosure). A *silent foreclosure* occurs when an analysis treats the absence of an option from observed choice or institutional practice as evidence of irrelevance even though the option's absence is materially explained by earlier constraints, suppression, capability loss, or unrepresented path dependence.

Silent foreclosure can bias causal and normative inference. If a community cannot select an institutional alternative because it lacks legal authority or implementation capacity, non-selection is weak evidence against the alternative's desirability. If an industry lacks a low-carbon pathway because earlier infrastructure investment locked in another technology, current cost comparisons can embed the history that produced the cost structure.

Definition 25.461 (Research possibility-loss record). A *research possibility-loss record* identifies a relevant foreclosed possibility, the mechanism and timing of foreclosure, affected subjects and value forms, available evidence, residual pathways of recovery or substitution, and the uncertainty surrounding the counterfactual assessment.

Proposition 25.462 (Observed-path non-exhaustiveness principle). An *observed economic path should not be interpreted as exhausting the relevant possibility horizon*

when evidence indicates that consequential alternatives were foreclosed before, or during, the period in which observed choices were made.

The principle does not require speculative reconstruction of every unrealized alternative. It requires attention to foreclosures that are evidenced strongly enough to affect the interpretation of the path that did occur.

Definition 25.463 (GRE research-attention portfolio). *A GRE research-attention portfolio is a project-level record that connects the research question to its relational units, generative-condition sets, conversion interfaces, circulation paths, research-position profile, value register, power traces, and relevant possibility-loss records, while documenting omissions, uncertainty, and domain-specific additions.*

The portfolio is not a mandatory reporting form. It is a conceptual device for asking whether the research design has preserved the objects on which its own inference depends. In a small study, several components may be brief or explicitly out of scope. In a large programme, the same components may be distributed across methods, datasets, historical work, formal models, and collaborative disciplines.

Proposition 25.464 (Research-attention integration principle). *GRE research is most consistent with the programme developed in this book when its claims remain traceable to the relations, generative conditions, conversions, circulation paths, historical positions, value structures, power mechanisms, and relevant foreclosures that materially condition those claims, while the limits of the chosen representation remain explicit and revisable.*

This integration principle closes the researcher-facing synthesis without turning GRE into a compulsory method. Different questions will require different methods and different attentional depth. The programme contribution is a discipline of visibility: relations should not disappear behind isolated entities, generative conditions behind outcomes, conversions behind commensurated numbers, circulation behind local transfers, historical position behind retrospective certainty, value plurality behind a single metric, power behind formally available choice, or foreclosed possibilities behind the path that happened to remain observable. The next section will translate the same programme orientation into the distinct problem of practical action, where decisions must often be made before comparable evidential completeness is available.

25.17 Practitioner Attention in Generative Relational Economics

Section 25.16 translated GRE's open-programme architecture into a discipline of research attention. The present section turns to practical action. Its role is to identify the recurring objects that practitioners should keep visible when decisions must be made before evidence is complete and when action itself can alter the relational field being evaluated. Its objective is neither to provide a universal decision procedure nor to imply that practical judgment can be reduced to a checklist. It develops eight practitioner-facing attentional objects: incomplete knowledge, relational consequences, long-horizon effects, reversibility, participation, value conflict, power asymmetry, and learning through action. The method is action-conditional and reflexive.

Each object is treated as a feature of a practical situation that can affect the warrant, legitimacy, adaptability, or downstream consequences of intervention.

The distinction from research attention is important. Researchers can sometimes narrow a question until the available evidence supports a defensible inference. Practitioners often face a different constraint: postponement can itself have consequences, institutional windows can close, harms can accumulate, budgets can expire, technologies can diffuse, and affected subjects can be required to live with an arrangement before its effects are well understood. Practical action therefore cannot generally be conditioned on complete knowledge. At the same time, uncertainty does not remove responsibility for how an intervention redistributes relationships, capabilities, exposure, participation, and future options. GRE treats this combination as a problem of situated action under epistemic and relational incompleteness.

Definition 25.465 (GRE practitioner-attention profile). A *GRE practitioner-attention profile* records, for a specified decision or intervention, the material uncertainties, relational consequences, time horizons, reversibility conditions, participation structure, value conflicts, power asymmetries, and learning channels that are relevant to acting and revising action in that situation.

The profile is action-relative rather than exhaustive. A monetary-policy decision, school reform, platform rule, procurement choice, community programme, ecological restoration project, organizational redesign, or household intervention can require different levels of attention to each dimension. The GRE requirement is not that every practical situation be modeled with equal complexity. It is that dimensions capable of materially changing the consequences or legitimacy of action should not disappear merely because they are difficult to quantify.

Definition 25.466 (Practical attentional omission). A *practical attentional omission* occurs when a materially consequential uncertainty, relation, delayed effect, reversibility condition, affected participant, value conflict, power mechanism, or learning opportunity is excluded from practical reasoning in a way that can alter the decision, its implementation, or its capacity for later correction.

A practical omission is distinct from ordinary simplification. Action always requires selection. The relevant question is whether the omitted object is sufficiently consequential that treating it as absent produces an avoidable distortion of the action situation.

Proposition 25.467 (Practitioner-attention sufficiency condition). A *practitioner-attention profile* is sufficient for a specified intervention when it represents, or explicitly bounds, the uncertainties and relational consequences capable of materially changing the action's expected effects, legitimacy, reversibility, or revision pathway, without claiming that the resulting representation exhausts the practical situation.

Table 25.17 summarizes the eight practitioner-facing objects and the principal practical risk associated with neglecting each one.

Proposition 25.468 (Practical non-exhaustiveness principle). *The eight objects in the present section define a recurring GRE practitioner orientation rather than a complete ethics of action, policy algorithm, or universal governance template; domain-specific legal, technical, ecological, medical, safety, cultural, or professional requirements retain priority where they govern the action in question.*

Table 25.17: Practitioner-attention objects in GRE and their principal practical risks

Attention object	Principal practical concern	Principal risk when neglected
Incomplete knowledge	Acting while causal, distributive, or contextual knowledge remains partial	Treating uncertainty as certainty, or paralysis as epistemic caution
Relational consequences	Changes in dependence, trust, coordination, access, identity, and institutional position	Evaluating only immediate outputs while the relational field is being altered
Long-horizon effects	Delayed, cumulative, path-dependent, intergenerational, and regenerative consequences	Optimizing a short horizon while transferring costs or fragility into later periods
Reversibility	Capacity to stop, repair, compensate, redesign, or exit an intervention	Treating formally reversible action as practically recoverable when restoration is costly or impossible
Participation	Who can enter, contest, shape, implement, monitor, and revise action	Confusing consultation or formal access with consequential participation
Value conflict	Heterogeneous gains, losses, claims, and non-equivalent values	Hiding distributive or normative conflict inside one metric or aggregate objective
Power asymmetry	Unequal capacity to set agendas, control interfaces, impose costs, or refuse terms	Treating consent, choice, or implementation as neutral where dependencies structure the field
Learning through action	Feedback, monitoring, adaptation, and revision generated by intervention	Repeating error or scaling uncertainty without preserving the conditions for learning

25.17.1 Incomplete Knowledge

Practical action often occurs before the relevant causal structure, future environment, distributional effect, or implementation response is fully known. GRE therefore asks practitioners to distinguish what is known, what is uncertain, what is presently unknowable, and what could be learned only by acting or observing further. This distinction supports neither reckless action nor indefinite postponement. It makes the epistemic condition of the decision visible so that the intervention can be proportioned to the quality of its warrant and the cost of error.

Definition 25.469 (Practical uncertainty register). A *practical uncertainty register* records the claims on which an intervention depends, the available evidence for each claim, the principal unresolved uncertainties, plausible alternative interpretations, the consequences of being wrong, and the conditions under which new evidence would justify changing course.

The register can contain quantitative uncertainty where estimation is possible, but it also includes structural uncertainty, model uncertainty, interpretive disagreement, unknown implementation responses, and uncertainty about which value dimensions will become salient after intervention. Treating every uncertainty as a probability distribution can create false precision; leaving uncertainty wholly unstructured can create equally serious opacity.

Definition 25.470 (Decision deadline). A *decision deadline* is the latest practically relevant point at which an actor can defer a decision without materially changing the available options, expected harms, institutional conditions, or opportunity structure of the action situation.

The deadline can be externally imposed or generated by the situation itself. A disease outbreak, ecological threshold, budget cycle, contract expiry, rapidly diffusing technology, or accumulating infrastructural failure can make waiting consequential. Conversely, artificial urgency can be used strategically to suppress scrutiny. The practical question is therefore whether the deadline is itself well grounded.

Definition 25.471 (Epistemic action threshold). An *epistemic action threshold* is the context-specific level and type of warrant judged sufficient to permit a specified action given the action's stakes, reversibility, urgency, available alternatives, and expected distribution of error costs.

The threshold should normally be higher for interventions that are difficult to reverse, widely scaled, weakly monitored, or capable of imposing concentrated harms on subjects with little ability to contest them. A lower threshold can be defensible for bounded, reversible, closely monitored trials when delay itself is costly. The principle is proportionality rather than one fixed standard of evidence.

Definition 25.472 (Uncertainty-bearing arrangement). An *uncertainty-bearing arrangement* identifies which actors or groups bear the material, legal, financial, ecological, relational, or capability consequences if the assumptions supporting an intervention prove mistaken.

This arrangement matters because uncertainty is rarely distributed evenly. An institution can make a decision while households, workers, communities, future users, or ecosystems absorb most of the downside. Practical attention should therefore examine not only how uncertain a decision is, but who bears the uncertainty.

Proposition 25.473 (Incomplete-knowledge action principle). *When practical action cannot reasonably wait for complete evidence, a GRE-consistent intervention should make its principal uncertainties and error-bearing arrangements explicit, proportion the scale and reversibility of action to the quality of available warrant, and specify conditions for revision as new evidence emerges.*

This principle permits decisive action. Its purpose is to prevent decisiveness from being confused with epistemic certainty. It also guards against the opposite error in which uncertainty is used to avoid action even though inaction has foreseeable consequences and is itself a choice within the relational field.

25.17.2 Relational Consequences

An intervention can achieve its immediate target while altering relationships that matter for later coordination, dependence, trust, legitimacy, access, care, learning, and institutional capacity. GRE therefore asks practitioners to attend to the relational field changed by action, not only to the focal output. A subsidy can change bargaining relations; an automated decision system can reconfigure authority and appeal; a performance metric can alter cooperation; a procurement rule can restructure supply dependence; a benefit programme can change the relation between citizens and

administrative institutions.

Definition 25.474 (Practical relational consequence). A *practical relational consequence* is a change produced or materially influenced by an intervention in the structure, quality, accessibility, reciprocity, dependence, authority, trust, coordination, or persistence of a relation relevant to later economic or institutional activity.

Relational consequences may be intended or unintended, beneficial or harmful, temporary or persistent. Their significance depends on the question and affected subjects rather than on a presumption that more relation is always better.

Definition 25.475 (Relational consequence field). A *relational consequence field* records the principal relations directly and indirectly altered by an intervention, the mechanism of alteration, the affected subjects, expected direction and duration of change, uncertainty, and the downstream capacities or constraints associated with those relational changes.

The field expands practical analysis beyond the immediate transaction without requiring unlimited tracing. The relevant boundary is set by material consequence. If an intervention's success depends on trust, cooperation, administrative legitimacy, supplier diversity, knowledge sharing, or ecological stewardship, changes in those relations belong within the practical evaluation.

Definition 25.476 (Relational burden transmission). *Relational burden transmission* occurs when an intervention reduces a burden or risk at one location partly by shifting dependence, monitoring, coordination cost, insecurity, or exposure to another relation or group.

Burden transmission can be justified, unavoidable, or harmful depending on context. The analytical requirement is to make the transfer visible. A reduction in organizational risk can increase worker precarity; a simplified administrative process can transfer documentation burden to applicants; a resilient supply strategy can transfer ecological or labor pressure to another region.

Definition 25.477 (Relational capacity effect). A *relational capacity effect* is the change in later collective or individual capability generated by an intervention through its alteration of coordination, trust, access, shared knowledge, institutional reliability, or other relation-mediated capacities.

This concept links immediate intervention to later generativity. Some actions create durable relational capacities even when their short-run output is modest; others produce strong immediate output while eroding the relations required for maintenance or adaptation.

Proposition 25.478 (Relational-consequence attention principle). *When an intervention materially changes relations on which later coordination, access, legitimacy, dependence, or generative capacity relies, evaluation should include those relational consequences rather than treating the intervention's immediate output as a sufficient account of its practical effect.*

Relational attention does not make every indirect consequence attributable to the practitioner. It asks for a defensible boundary around reasonably foreseeable and materially relevant relational effects, together with explicit uncertainty where causal responsibility is difficult to establish.

25.17.3 Long-Horizon Effects

Economic and institutional actions often have temporal profiles that differ sharply from their immediate effects. Infrastructure can persist for decades; education and capability formation can yield delayed returns; environmental degradation can accumulate invisibly; debt structures can shift burdens across cohorts; standards can become path dependent; trust can erode slowly and recover slowly. GRE asks practitioners to distinguish immediate performance from the longer horizon over which an intervention alters capacities, dependencies, options, and regenerative conditions.

Definition 25.479 (Practical horizon portfolio). A *practical horizon portfolio* records the time horizons relevant to an intervention, the effects expected to appear within each horizon, the subjects affected, the confidence of those expectations, and the monitoring or review mechanisms appropriate to effects that emerge at different speeds.

The portfolio avoids selecting one universal long term. Different effects mature on different temporal scales. A policy may require daily operational monitoring, annual distributional review, decadal infrastructure assessment, and still longer ecological or intergenerational attention.

Definition 25.480 (Delayed relational effect). A *delayed relational effect* is a material change in a relation, capacity, dependence, institution, or possibility structure that becomes observable only after a time lag following the intervention that contributed to it.

Delayed effects complicate evaluation because short-run indicators can systematically misrepresent the direction of the longer process. An intervention that initially increases cost can build capacity; another that initially lowers cost can produce later dependence or maintenance deficits.

Definition 25.481 (Temporal burden displacement). *Temporal burden displacement* occurs when an intervention secures present benefits or reduces present costs partly by transferring material, ecological, fiscal, institutional, or capability burdens into later periods or onto later participants.

The category is descriptive rather than automatically condemnatory. Borrowing can rationally transfer costs to future beneficiaries; infrastructure can require future maintenance. The practical issue is whether later burdens are recognized, proportionate, resourced, and borne by subjects with meaningful standing in the decision architecture.

Definition 25.482 (Path-dependent commitment). A *path-dependent commitment* is an intervention-induced change that raises the cost of moving to relevant alternative arrangements because complementary infrastructure, skills, expectations, contracts, institutions, or dependencies accumulate around the chosen path.

Path dependence does not imply irreversibility. It indicates that future comparison must include the endogenous change in switching costs produced by the current decision.

Proposition 25.483 (Multi-horizon evaluation principle). *When an intervention plausibly produces delayed, cumulative, path-dependent, regenerative, or intergenerational effects, practical evaluation should use more than the immediate performance horizon and should state which later effects remain unmeasured or uncertain.*

This principle is compatible with emergency action. A practitioner may need to privilege an immediate horizon when severe near-term harm dominates. The requirement is not equal weighting of all futures, but an explicit account of which horizons are being prioritized and what longer consequences remain attached to that prioritization.

25.17.4 Reversibility

Reversibility matters because action under uncertainty becomes less hazardous when mistakes can be detected and corrected without disproportionate loss. Yet practical reversibility is often overstated. A policy can be formally repealed while reputational damage, capability loss, ecological change, sunk infrastructure, contractual dependence, or institutional distrust remains. GRE therefore asks practitioners to distinguish stopping an action from restoring the relational and material conditions that existed before it.

Definition 25.484 (Practical reversibility profile). A *practical reversibility profile* records, for a proposed intervention, the feasibility and cost of stopping, rolling back, repairing, compensating, redesigning, or exiting the intervention across the material, legal, institutional, relational, ecological, and capability dimensions relevant to the case.

Reversibility is multidimensional. A software deployment can be technically reversible but institutionally sticky; a land-use decision can be legally reversible but ecologically costly; an organizational restructuring can be contractually reversible while lost tacit knowledge is not readily restored.

Definition 25.485 (Recovery distance). A *recovery distance* is the practical difference between terminating an intervention and restoring, replacing, or adequately compensating for the relations, capacities, resources, and possibilities materially altered by that intervention.

A large recovery distance identifies situations in which simple repeal is a weak proxy for reversibility. The concept does not require literal return to an earlier state, which may be impossible or undesirable. It requires attention to what must be rebuilt or substituted for affected subjects to recover meaningful capacities and options.

Definition 25.486 (Reversibility asymmetry). A *reversibility asymmetry* exists when the actor authorized to initiate or terminate an intervention can reverse its own commitment more easily than affected subjects can reverse the consequences imposed on their relations, capabilities, assets, or environments.

This asymmetry is common in interventions where organizations can exit markets, terminate projects, or change rules while communities, workers, users, or ecosystems retain long-lived consequences. It should therefore enter practical assessment separately from the initiating actor's own exit cost.

Definition 25.487 (Experimentability envelope). An *experimentability envelope* is the bounded region of scale, duration, population exposure, monitoring capacity, and reversibility within which an intervention can reasonably be treated as a learning-oriented trial rather than as a de facto irreversible commitment.

The envelope narrows as possible harm, persistence, or power asymmetry in-

creases. Calling an intervention a pilot does not make it experimental in the epistemically responsible sense if affected subjects cannot exit, adverse consequences cannot be repaired, or monitoring cannot detect relevant failure.

Proposition 25.488 (Irreversibility-sensitive action principle). *As the expected recovery distance, persistence of consequences, or reversibility asymmetry of an intervention increases, practical justification should require correspondingly stronger warrant, narrower initial exposure where feasible, clearer safeguards, and more explicit responsibility for repair or compensation.*

This principle links reversibility to incomplete knowledge without assuming that irreversible action is impermissible. Many necessary actions are irreversible. The practical demand is that irreversibility be treated as part of the stakes rather than hidden behind formal authority to change course later.

25.17.5 Participation

Participation matters because practical interventions are rarely enacted upon a homogeneous public. Different subjects possess different information, dependencies, vulnerabilities, capabilities, and values. They also occupy different positions in implementation. GRE therefore asks practitioners to distinguish nominal inclusion from participation that can materially shape problem definition, design, implementation, monitoring, contestation, and revision.

Definition 25.489 (Practical participation architecture). *A practical participation architecture* records which subjects can enter a decision process, what information and resources they possess, which stages they can influence, how disagreement is registered, what authority attaches to their participation, and what routes exist for contesting or revising the resulting action.

The architecture can include representative institutions, consultation, co-design, bargaining, community governance, worker participation, user testing, expert review, legal standing, complaint mechanisms, or other domain-appropriate forms. GRE does not prescribe one participation format for every case.

Definition 25.490 (Consequential participation). *Consequential participation* is participation capable of materially affecting at least one relevant component of problem framing, option generation, decision criteria, implementation, monitoring, remedy, or revision rather than merely recording presence or opinion.

This definition does not imply that every participant should possess veto authority. It distinguishes participation that can enter the generative structure of action from participation whose output is institutionally irrelevant by design.

Definition 25.491 (Participation burden). A *participation burden* is the time, knowledge, documentation, language, financial cost, psychological exposure, technological access, organizational capacity, or risk of retaliation required for a subject to exercise the participation formally offered by an intervention.

Participation can therefore be formally open but practically inaccessible. The burden can also be distributed asymmetrically, allowing organized or well-resourced actors to dominate processes that appear procedurally equal.

Definition 25.492 (Implementation knowledge interface). An *implementation knowl-*

edge interface is a structured channel through which the situated knowledge of affected subjects, frontline implementers, users, or local institutions can alter the design, operation, or revision of an intervention.

The interface gives practical significance to knowledge that may not be available in centralized models. Situated knowledge is not automatically correct, and expert evidence is not automatically superior. The purpose of the interface is to preserve epistemically relevant plurality where implementation outcomes depend on locally distributed information.

Proposition 25.493 (Participation adequacy principle). *When affected subjects possess materially relevant knowledge, bear substantial consequences, or face limited exit from an intervention, practical design should evaluate whether their participation is consequential and accessible rather than inferring adequate participation from formal invitation alone.*

Participation also interacts with reversibility. Subjects who cannot influence initial design may still require strong routes for later complaint, appeal, repair, or exit. A practice can therefore improve participation by widening revision authority even when real-time co-decision is infeasible.

25.17.6 Value Conflict

Practical action frequently requires choices among heterogeneous values that cannot be reduced to one metric without remainder. Cost, safety, autonomy, equality, ecological integrity, cultural continuity, capability, care, privacy, knowledge, speed, resilience, and other values can point in different directions. GRE asks practitioners to make these conflicts visible, identify who bears gains and losses, and distinguish a decision rule from a claim that the underlying values have become equivalent.

Definition 25.494 (Practical value-conflict register). *A practical value-conflict register identifies the materially relevant value forms affected by an intervention, the subjects or institutions for whom they matter, the direction and expected magnitude or significance of change where assessable, the relations of comparability or incommensurability among them, and the rule or institution through which conflict is being addressed.*

The register can coexist with cost-benefit analysis, multi-criteria evaluation, legal proportionality, democratic deliberation, professional ethics, or other decision practices. Its purpose is to preserve the distinction between making a decision and demonstrating that every affected value has been represented without loss.

Definition 25.495 (Practical commensuration rule). *A practical commensuration rule is the explicit or implicit procedure through which heterogeneous values are converted, weighted, ranked, thresholded, or otherwise made jointly actionable for the purpose of a decision.*

A rule can be technically useful while remaining normatively contestable. Discount rates, quality-adjusted measures, scoring systems, budget constraints, safety thresholds, and legal priority rules each embed judgments about what can be compared and whose losses can be offset by which gains.

Definition 25.496 (Non-compensated value remainder). *A non-compensated value*

remainder is a materially relevant loss, claim, obligation, or value dimension that remains after the practical decision rule has selected an action and that is not represented as fully offset by gains recognized elsewhere in the decision process.

Preserving remainder does not imply that action should be blocked until every conflict is resolved. It allows the action record to retain obligations for mitigation, compensation, monitoring, reconsideration, or explicit acceptance of unresolved loss.

Definition 25.497 (Value-conflict authority). *Value-conflict authority* identifies the actor, institution, procedure, or legal order authorized to settle a practical conflict among values for the specified decision, together with the scope and contestability of that authority.

This object matters because the existence of a metric does not itself establish authority to impose the metric. Practical reasoning should distinguish technical capacity to calculate from institutional or normative standing to decide.

Proposition 25.498 (Value-conflict disclosure principle). *When an intervention requires trade-offs among materially heterogeneous values, practical justification should disclose the governing commensuration or priority rule, the authority through which it is applied, and significant non-compensated remainder rather than representing the selected option as value-neutral.*

The principle leaves substantive value theory open. GRE does not derive one hierarchy of values from generativity itself. It asks that practical conflict remain visible enough for those affected, later reviewers, and future revisions to reconstruct how the settlement was reached.

25.17.7 Power Asymmetry

Practical action occurs within distributions of authority, resources, information, bargaining capacity, infrastructure, exit options, and agenda control that predate the intervention and can be changed by it. GRE therefore asks practitioners to distinguish asymmetry from realized power while examining the mechanisms through which asymmetry shapes choice, participation, implementation, exposure, and revision. Formal consent or market exchange does not settle this question when relevant dependencies structure what parties can realistically refuse.

Definition 25.499 (Action-facing power profile). An *action-facing power profile* records the typed asymmetries relevant to an intervention, the relations through which those asymmetries may become consequential, the actors controlling key interfaces or sanctions, the distribution of exit and voice capacities, and the expected changes in power produced by the intervention itself.

The profile should remain mechanism-specific. Income difference, legal authority, data access, ownership, expertise, network position, and infrastructural control can each be power-relevant in different ways. No single asymmetry should automatically be treated as a complete measure of power.

Definition 25.500 (Practical dependency leverage). *Practical dependency leverage* exists when an actor can shape another subject's feasible choices or terms of participation because the latter depends materially on a resource, relation, platform, institution, status, infrastructure, or service controlled by the former.

Dependency is not inherently exploitative. Many legitimate institutions organize beneficial dependencies. The practical issue is whether leverage can be exercised without adequate countervailing capacity, appeal, transparency, or exit.

Definition 25.501 (Interface power). *Interface power* is the capacity to set or alter the rules, categories, thresholds, access conditions, conversion terms, procedural steps, or technical standards through which other actors must pass to obtain a resource, right, recognition, service, or opportunity relevant to the intervention.

Interface power can be especially difficult to see because it operates through design rather than direct command. Eligibility rules, algorithmic classifications, procurement standards, application procedures, interoperability choices, and documentation requirements can restructure feasible action without explicit coercion.

Definition 25.502 (Revision-power asymmetry). A *revision-power asymmetry* exists when actors differ materially in their capacity to trigger review, alter implementation, obtain exceptions, demand explanation, secure remedy, or cause an intervention to be reconsidered after it has begun.

Revision power is central to action under uncertainty. A decision can be formally revisable while practically rigid for subjects who lack standing, resources, information, or institutional access to activate the revision process.

Proposition 25.503 (Power-sensitive intervention principle). *When materially relevant asymmetries shape participation, refusal, exposure, implementation, or revision, practical evaluation should examine the mechanisms through which those asymmetries become power and should avoid interpreting formal consent, availability of choice, or procedural equality as sufficient evidence of neutral conditions.*

Attention to power also requires reflexivity. An intervention can create new asymmetries by concentrating data, expertise, infrastructure, authority, or dependency in actors who did not previously possess them. Practical assessment should therefore include the power structure likely to exist after implementation, not only the one that existed before it.

25.17.8 Learning through Action

The preceding dimensions imply that practical action is also an epistemic event. Intervention generates evidence about causal mechanisms, implementation conditions, participant responses, value conflicts, unintended consequences, and the adequacy of the original representation. GRE therefore asks practitioners to design learning into action where feasible. Learning through action is not an excuse to experiment without safeguards. It is a requirement to preserve feedback, detect error, and create revision pathways when action necessarily proceeds under incomplete knowledge.

Definition 25.504 (Action-generated evidence). *Action-generated evidence* is evidence produced through the implementation, monitoring, contestation, failure, adaptation, or consequence of an intervention and capable of revising the assumptions, models, values, or practical design that initially supported the action.

Such evidence can include quantitative outcomes, administrative records, user behavior, frontline observations, complaints, legal challenges, ecological indicators, implementation failures, unexpected adaptations, or the absence of an effect that had

been assumed likely.

Definition 25.505 (Practical learning channel). A *practical learning channel* is a structured pathway through which action-generated evidence can reach actors authorized and capable of interpreting it and changing implementation, safeguards, scale, resource allocation, or the underlying intervention design.

Monitoring without a learning channel can generate information without adaptation. Complaint systems without decision authority can register harm without changing practice. The channel therefore includes both information movement and a relation to revision capacity.

Definition 25.506 (Adaptive intervention). An *adaptive intervention* is an intervention whose implementation architecture specifies review points, observable triggers, permitted modifications, stopping or scaling conditions, and responsibility for acting on new evidence while preserving constraints that protect affected subjects.

Adaptation should not become discretionary instability. Rights, legitimate expectations, legal constraints, safety requirements, and distributional commitments can limit what may be changed. The purpose is disciplined revisability rather than continuous improvisation.

Definition 25.507 (Practical learning debt). *Practical learning debt* is the accumulated difficulty of correcting an intervention created when relevant feedback is not collected, negative results are not preserved, affected subjects lack reporting channels, assumptions are undocumented, or implementation changes occur without provenance.

Learning debt increases the cost of later re-epistemization. It can make persistent failure appear mysterious because the programme no longer knows which assumptions were active, when conditions changed, or which warning signals were previously observed.

Definition 25.508 (Scale-learning relation). A *scale-learning relation* records whether the evidence generated at one intervention scale remains informative when the intervention expands across populations, institutions, jurisdictions, technologies, or ecological conditions with different relational structures.

Success at small scale does not guarantee success after scaling because participation burdens, power effects, coordination requirements, rare harms, infrastructure constraints, and feedback dynamics can change with scale. Conversely, local failure can reveal design defects that are correctable before expansion.

Proposition 25.509 (Action-learning integration principle). *When an intervention proceeds under material uncertainty and can be monitored without violating overriding constraints, practical design should connect implementation to evidence preservation, interpretable feedback, review authority, and explicit revision triggers so that action can improve the warrant of subsequent action rather than merely consume uncertainty.*

Definition 25.510 (Practitioner-attention portfolio). A *GRE practitioner-attention portfolio* is an intervention-level record that connects the practical uncertainty register to relational consequence fields, horizon portfolios, reversibility profiles, participation architectures, value-conflict registers, action-facing power profiles, and practical learning channels, while preserving decisions, revisions, unresolved remainder, and domain-specific constraints.

The portfolio is not a mandatory bureaucratic form. It is a conceptual architecture for maintaining continuity between practical judgment, implementation, monitoring, and revision. In simple settings, the record can be compact. In large public or institutional interventions, its components may be distributed across impact assessment, governance documents, technical monitoring, legal safeguards, participation processes, and evaluation systems.

Proposition 25.511 (Practitioner-attention integration principle). *GRE practice is most consistent with the programme developed in this book when action under incomplete knowledge remains traceable to its expected relational consequences, time horizons, reversibility conditions, participation structure, value conflicts, power asymmetries, and learning pathways, while materially relevant uncertainty and residual disagreement remain explicit and revisable.*

This integration principle closes the practitioner-facing synthesis without reducing practice to optimization or procedural compliance. Practical judgment remains domain-specific and institutionally situated. GRE contributes a discipline of consequential attention: uncertainty should not disappear behind decisiveness, relational change behind output indicators, delayed effects behind short-run success, irreversibility behind formal repeal, participation behind invitation, value conflict behind aggregation, power behind apparent consent, or learning behind implementation. The next section turns from what present researchers and practitioners should keep visible to what the book deliberately leaves unresolved for future work.

25.18 Unresolved Research Agenda in Generative Relational Economics

An open research programme requires more than an admission that further work remains. It requires a disciplined account of which unresolved objects are presently consequential, why their warrant remains incomplete, what kinds of inquiry could advance them, and how future results would revise the programme. The role of this section is therefore to convert selected unresolved problems in Generative Relational Economics (GRE) into a forward research agenda without treating that agenda as exhaustive or as a forecast of the programme's eventual form. The discussion organizes future work around eight research fronts: empirical validation, formal development, value conversion theory, justice under incommensurability, multiscale economic history, AI-era transformation, cross-domain comparison, and the possible maturation of a future general theory. The method is programme-architectural. Each front is specified in terms of its present epistemic status, missing warrant, research tasks, and conditions under which progress would support revision, restriction, branching, or abandonment of current GRE formulations.

Definition 25.512 (Future-work object). *A future-work object is a question, construct, relation, hypothesis, formalism, empirical claim, normative problem, or domain interface whose present treatment is insufficient for a consequential GRE inference and for which the missing warrant can be stated with enough precision to guide further inquiry.*

The definition excludes a purely rhetorical statement that “more research is

Table 25.18: Selected unresolved research fronts in GRE and their principal maturation tests

Research front	Principal maturation test	Premature-closure risk
Empirical validation	Domain-specific operationalization, discriminating evidence, replication, and scope estimation	Treating conceptual plausibility as empirical support
Formal development	Typed derivation, interpretability, identifiable assumptions, and evidence linkage	Treating mathematical elaboration as substantive confirmation
Value conversion theory	Mechanism-specific accounts of conversion, remainder, agency, power, and regeneration	Collapsing heterogeneous values into unexamined commensuration
Justice under incommensurability	Defensible procedures and substantive constraints for conflict among partly incomparable values	Equating decision with demonstrated equivalence or full compensation
Multiscale economic history	Reconstructable relations among events, institutions, structures, and heterogeneous timescales	Projecting one scale's categories or mechanisms onto another
AI-era transformation	Versioned evidence on capability, dependence, institutions, labor, value, and governance	Freezing a rapidly changing sociotechnical configuration into a timeless model
Cross-domain comparison	Comparable research designs that preserve domain predicates, counterexamples, and translation remainder	Inferring shared mechanism from shared vocabulary or superficial resemblance
Future general theory	Cross-domain survival of candidate structures under translation, counterexample, and boundary testing	Promoting recurrent analogies into universal architecture before warrant exists

needed.” A future-work object should identify what remains unsettled and what kind of result could alter its status. Some future-work objects require additional data; others require conceptual clarification, formal derivation, historical reconstruction, normative argument, comparative inquiry, or a combination of these modes.

Definition 25.513 (Research maturation path). A *research maturation path* records, for a future-work object, its current epistemic status, principal unresolved dependencies, admissible methods of inquiry, relevant counterevidence, intermediate evidential or theoretical milestones, and the programme changes that would follow from success, persistent ambiguity, or failure.

Maturation need not mean movement toward confirmation. A research front matures when its status becomes better warranted and more discriminating, including when a proposed GRE construct is narrowed, replaced, divided into domain-specific variants, or rejected. Table 25.18 summarizes the eight fronts developed in this section and the principal risk of closing each one too early.

Proposition 25.514 (Future-work selectivity principle). A *GRE future research agenda* is epistemically useful when it prioritizes unresolved objects whose clarification would materially change the programme's explanatory, empirical, normative,

practical, or cross-domain warrant, while preserving the possibility that later evidence will generate research fronts not presently anticipated.

The eight fronts below should therefore be read as high-leverage unresolved areas within the present version of GRE. They organize work made visible by the current book; they do not define the outer boundary of future inquiry.

25.18.1 Empirical Validation

GRE contains constructs that range from interpretive distinctions to candidate empirical mechanisms. Their empirical maturation requires more than attaching measurements to existing terminology. Different GRE claims imply different evidential tasks. A claim about value circulation may require process and network evidence; a claim about historical path dependence may require longitudinal or archival evidence; a claim about power realization may require evidence connecting typed asymmetry to actual transformation capacity; and a claim about generative participation may require observation of whether participation changes later option formation. Empirical validation should therefore begin with the inferential target rather than with a generic demand for quantification.

Definition 25.515 (GRE empirical programme). A *GRE empirical-validation programme* is a coordinated set of studies that connects GRE constructs to observable or reconstructable evidence, specifies rival explanations, estimates scope conditions, preserves negative results, and evaluates whether the evidence supports, revises, localizes, or defeats the target claim.

Such a programme can include experiments, quasi-experiments, observational datasets, field studies, surveys, administrative records, archival reconstruction, ethnography, comparative case analysis, network analysis, process tracing, computational simulation linked to observed data, or mixed-method designs. Method selection follows the target relation and available evidence rather than a hierarchy in which one method automatically validates the framework.

Definition 25.516 (Evidential target map). An *evidential target map* identifies the GRE object being investigated, the observable consequences or historical traces expected under the proposed mechanism, plausible rival accounts, data-generation conditions, relevant units and timescales, and the inference that the evidence could or could not support.

The target map is especially important for broad concepts such as generativity, relational capacity, conversion, circulation, and power. Without a target map, multiple incompatible empirical patterns can be redescribed after the fact as evidence for the same concept.

Definition 25.517 (Operationalization bridge). An *operationalization bridge* is an explicit justification connecting a theoretical GRE construct to one or more indicators, observations, classifications, or reconstructed events while recording what dimensions of the construct remain unrepresented by those empirical proxies.

An operationalization can be useful without exhausting the construct. For example, a network measure can represent one aspect of relational position while omitting meaning, institutional authority, historical provenance, or latent capability. The

bridge should preserve that remainder instead of treating a measurable component as the whole theoretical object.

Definition 25.518 (Empirical scope envelope). An *empirical scope envelope* records the populations, institutions, periods, jurisdictions, technological conditions, relational configurations, and measurement regimes within which an empirical result has been established with the warrant presently available.

Scope envelopes allow GRE to accumulate empirical support without converting a local regularity into a universal proposition. Replication and comparative work can later widen, divide, or contract an envelope.

Proposition 25.519 (Empirical maturation principle). A GRE construct gains empirical maturity when multiple research designs can discriminate the target relation from plausible alternatives, when operationalization remainder and scope conditions remain explicit, and when negative or contradictory results can revise the construct rather than being absorbed through unrestricted reinterpretation.

A major future task is therefore to build cumulative evidence around selected constructs instead of attempting simultaneous empirical confirmation of GRE as a whole. The programme can become more empirically discriminating even if different components receive different outcomes: some may stabilize, some may remain heuristic, and others may be retired.

25.18.2 Formal Development

Formal development is a second major research front because the present book uses formal objects selectively and at several levels of abstraction. Some formalisms clarify conceptual relations; some propose dynamical representations; some indicate possible algebraic, geometric, network, or operator-based structures; and some remain programmatic. Future formal work should increase discriminating power, derivational transparency, and empirical or interpretive connection rather than simply increase symbolic density.

Definition 25.520 (Formal-development path). A *formal-development path* is a staged programme through which a GRE formal representation is given explicit primitive objects, typing rules, assumptions, derivations, admissible operations, interpretive mappings, empirical or historical interfaces, and criteria for comparison with alternative formalisms.

The path can terminate at different levels. A structural formalization may remain valuable without becoming an estimable model. A computational model may support counterfactual exploration without establishing ontology. An empirically parameterized model may be useful in one domain without becoming the canonical formal language of GRE.

Definition 25.521 (Formal adequacy profile). A *formal adequacy profile* records whether a GRE formalism possesses type consistency, derivational completeness for the claims it makes, interpretable primitives, explicit assumptions, identifiable scope, tractable or characterizable dynamics where relevant, and a stated relation to evidence or interpretation.

These dimensions prevent a formal object from gaining authority merely because

it is mathematically sophisticated. A formalism can be internally elegant yet poorly connected to the economic phenomenon it is intended to represent. Conversely, a deliberately simple formalism can be adequate if it isolates a mechanism and exposes testable consequences.

Definition 25.522 (Formalism comparison dossier). A *formalism comparison dossier* is a record comparing two or more candidate representations with respect to their primitives, preserved distinctions, assumptions, expressive capacity, inferential outputs, empirical interfaces, computational demands, and known failure cases.

GRE's commitment to plural formulations makes such comparison preferable to premature canonization. Network, dynamical-system, category-theoretic, field-theoretic, agent-based, game-theoretic, operator-algebraic, and other representations can illuminate different questions. Their coexistence becomes productive when the programme can state which relations each representation preserves and where translation among them fails.

Definition 25.523 (Formal-to-evidential interface). A *formal-to-evidential interface* specifies how formal states, parameters, operators, relations, or invariants correspond to observable, reconstructable, or interpretively warranted features of an economic case, including uncertainty and non-identifiability in that correspondence.

The interface is particularly important for highly abstract representations. Without it, a model can organize thought while remaining insulated from empirical correction. That status can be legitimate when explicitly stated; the problem arises when heuristic or representational usefulness is silently converted into empirical confirmation.

Proposition 25.524 (Formal maturation principle). *Future GRE formalization is most informative when increasing mathematical structure also increases at least one of the following: conceptual precision, derivational constraint, discriminability among mechanisms, empirical testability, computational exploration, or transparent comparison with alternative representations.*

Formal development therefore remains open at both foundational and domain-specific levels. Some future work may simplify existing constructions; some may derive previously introduced objects from more primitive ones; some may prove incompatibility among formulations; and some may reveal that an apparently general structure is only locally adequate.

25.18.3 Value Conversion Theory

Value conversion remains one of the most consequential unresolved GRE research fronts. The book distinguishes generation, transfer, conversion, circulation, realization, capture, dissipation, return, recirculation, and regeneration, yet a general theory of how heterogeneous value forms become convertible, partially convertible, or non-convertible remains preliminary. Future work should investigate conversion as a relational and institutional process rather than assuming that observed prices, scores, rankings, or exchange ratios transparently reveal equivalence among values.

Definition 25.525 (Value-conversion research object). A *value-conversion research object* is a historically and institutionally situated process in which one recognized

value form is translated, exchanged, represented, transformed, or made actionable in terms of another value form through a conversion interface with identifiable rules, actors, authority, frictions, and remainder.

This object can include monetary pricing, credential conversion, reputation metrics, legal compensation, ecological valuation, labor evaluation, algorithmic scoring, social recognition, or other mechanisms through which heterogeneous values acquire actionable relations. The relevant research question concerns how the conversion becomes possible, who controls its terms, what is preserved, what is altered, and what remains outside the conversion.

Definition 25.526 (Conversion mechanism profile). A *conversion mechanism profile* records the source and destination value forms, the conversion interface, rule-setting authority, participating and excluded subjects, information requirements, temporal structure, conversion costs, uncertainty, reversibility, and residual value that the conversion does not represent.

The profile creates a common research architecture without presuming that different conversions share one mechanism. Market exchange, administrative scoring, legal damages, educational credentials, and cultural recognition can all involve conversion while remaining institutionally and normatively distinct.

Definition 25.527 (Conversion remainder). A *conversion remainder* is the dimension of a source value relation that is not preserved in the destination representation or actionable value form under the conversion rules used in a specific case.

Remainder can be epistemic, normative, relational, temporal, or distributional. A monetary compensation can leave relational loss unresolved; an index can omit local meaning; a credential can compress heterogeneous capability; an algorithmic score can reduce context into a standardized ranking. Remainder is therefore an object of inquiry rather than merely measurement error.

Definition 25.528 (Conversion-power relation). A *conversion-power relation* is a relation in which an actor or institution possesses materially consequential capacity to set, modify, enforce, contest, or selectively access the rules through which one value form is converted into another.

This capacity can shape which values become legible and which losses are recognized. Future value-conversion theory should therefore connect conversion with power, participation, institutional design, and justice rather than studying ratios or equivalences in isolation.

Definition 25.529 (Conversion-chain study). A *conversion-chain study* reconstructs a sequence in which value passes through multiple representations or interfaces and evaluates how value form, agency, distribution, meaning, uncertainty, and remainder change at each conversion stage.

Many economic processes contain chained conversion: knowledge can become a credential, the credential can influence employment, employment can generate income and status, and those outputs can alter future educational access. Studying a single interface may therefore miss cumulative loss, amplification, capture, or regeneration across the chain.

Proposition 25.530 (Value-conversion maturation principle). A *mature GRE theory of value conversion* should explain the conditions under which conversion occurs, pre-

serve distinctions among conversion and adjacent value processes, identify institutional and power-mediated mechanisms, represent conversion remainder, and permit empirical comparison across cases without presuming universal commensurability.

This research front is likely to require sustained collaboration among economic theory, institutional analysis, history, law, sociology, anthropology, ecology, and measurement studies. Cross-domain contribution should preserve the predicates of those domains rather than converting the entire problem into an economic metric.

25.18.4 Justice under Incommensurability

GRE's recognition of heterogeneous value creates a corresponding normative problem. Decisions still have to be made when relevant values are only partly comparable, when compensation is incomplete, or when one affected subject does not accept the conversion rule used by another institution. Future work on justice therefore concerns both substantive distribution and the legitimacy of the procedures through which partially incommensurable claims are represented, negotiated, protected, or left unresolved.

Definition 25.531 (Value-plural justice problem). An *incommensurability-sensitive justice problem* is a distributive, procedural, corrective, recognitional, or intergenerational problem in which materially relevant claims are expressed through value forms that cannot be fully reduced to a common measure without normative or informational remainder.

The definition does not imply absolute incomparability. Values may be comparable in some respects, rankable under specific thresholds, or actionable through institutions despite lacking a complete common metric. The theoretical task is to represent the remaining plurality rather than infer equivalence from the fact that a decision was reached.

Definition 25.532 (Justice remainder). A *justice remainder* is a materially relevant claim, loss, obligation, status, capability, relation, or value that remains insufficiently addressed after a practical allocation, compensation, balancing procedure, or institutional settlement has been completed.

A remainder can persist even when a decision is lawful, efficient, or procedurally valid. Recording it does not by itself establish that the decision was unjust. It preserves an object for later evaluation, remedy, reinterpretation, or institutional learning.

Definition 25.533 (Commensuration authority profile). A *commensuration authority profile* identifies the actors and institutions authorized to determine which values are compared, which metrics or thresholds are used, whose testimony or evidence is admissible, how disagreement is treated, and what routes exist for appeal, revision, or refusal.

This profile connects justice to power. A conversion rule can be procedurally transparent while the authority to define relevant values remains highly concentrated. Future work should therefore study the justice of commensuration institutions alongside the outputs they generate.

Definition 25.534 (Non-compensation constraint). A *non-compensation constraint* is

a normative or institutional rule specifying that improvement in one value dimension cannot, within the relevant decision context, fully offset loss beyond a stated threshold in another dimension.

Rights, safety floors, ecological limits, anti-discrimination protections, or minimum capability requirements can function in this way. Such constraints provide one family of responses to incommensurability without requiring a complete cardinal ordering of all values.

Definition 25.535 (Plural-justice comparison). A *plural-justice comparison* evaluates an economic arrangement through multiple explicitly distinguished justice lenses and records agreements, conflicts, domain dependencies, and unresolved remainder among the resulting judgments.

Future GRE work need not synthesize every justice theory into one meta-theory. Comparison can instead reveal which conclusions depend on particular normative commitments and where distinct theories converge on practical constraints despite different foundations.

Proposition 25.536 (Justice maturation principle). *GRE's future normative development is strengthened when decisions among heterogeneous values remain traceable to their commensuration rules, authority structures, non-compensation constraints, affected subjects, and unresolved justice remainder, while rival normative interpretations remain available for contestation where the underlying theory does not uniquely determine a settlement.*

Justice under incommensurability is therefore not a residual issue to be solved after positive economics. It is partly constitutive of how conversion, allocation, power, participation, and future option structures become institutionally organized.

25.18.5 Multiscale Economic History

GRE treats economic relations as historically formed and often distributed across heterogeneous timescales. Future work should develop this historical dimension more systematically. The challenge is to connect events, actor trajectories, institutional sequences, infrastructural change, long-run structural transformation, and inherited relational conditions without reducing one scale to another or assuming that mechanisms remain stable across periods.

Definition 25.537 (Multiscale economic-history programme). A *multiscale economic-history programme* is a research programme that reconstructs economically relevant relations across two or more temporal, spatial, institutional, or organizational scales and investigates how processes at those scales condition, amplify, constrain, or transform one another.

The relevant scales depend on the question. They can include transactions, projects, organizations, careers, generations, policy regimes, technological systems, states, international orders, or longer ecological and infrastructural trajectories.

Definition 25.538 (Historical scale profile). A *historical scale profile* records the temporal and organizational resolutions at which a historical claim is formulated, the evidence available at each resolution, and the mechanisms proposed to connect changes across scales.

This profile helps distinguish a genuine multiscale explanation from a narrative that merely juxtaposes short-run events and long-run trends. The connection mechanism can involve institutional inheritance, learning, capital accumulation, technological lock-in, demographic change, legal continuity, ecological feedback, or other historically warranted processes.

Definition 25.539 (Scale-translation record). A *scale-translation record* specifies which categories, actors, relations, and causal claims remain meaningful when analysis moves between historical scales, which require reinterpretation, and which fail to transfer.

An individual transaction cannot automatically be treated as a miniature institutional order, and a century-scale structural tendency cannot automatically explain a local event. Scale translation requires an explicit account of aggregation, mediation, selection, and historical transformation.

Definition 25.540 (Historical mechanism drift). *Historical mechanism drift* is a change through time in the operation, strength, meaning, institutional embedding, or boundary conditions of a mechanism that retains a similar analytical label.

Drift matters because terms such as market, labor, capital, household, education, information, platform, or state can refer to institutionally different relations across periods. A model can appear historically stable while the mechanism represented by its variables has changed.

Definition 25.541 (Event-structure coupling study). An *event-structure coupling study* investigates how historically situated events modify relatively persistent relational structures and how those structures condition the probability, interpretation, or consequence of later events.

This research object offers one route for connecting event history with GRE's generative-spacetime vocabulary without requiring a single universal formalism. Historical evidence can determine whether a proposed coupling is credible in a particular domain.

Proposition 25.542 (Multiscale historical maturation principle). *GRE's historical claims become more robust when scale selection, category continuity, mechanism drift, evidential resolution, and cross-scale coupling are made explicit enough that alternative periodizations or historical interpretations can alter the resulting explanation.*

A mature multiscale programme would also improve empirical validation elsewhere in GRE. It can reveal when apparently contradictory studies examine different historical regimes, when causal effects depend on inherited structures, and when present categories are poor representations of earlier economic worlds.

25.18.6 AI-Era Transformation

Artificial intelligence is a continuing research front because AI-mediated economic relations are changing more rapidly than a static theoretical description can reliably capture. GRE has developed concepts for epistemic economy, capability asymmetry, dependence, value generation, institutional mediation, and domain implications, yet the empirical form and social significance of these relations remain historically contingent. Future work should therefore study AI-era transformation through ver-

sioned, revisable observations rather than project one technological moment indefinitely into the future.

Definition 25.543 (AI-era transformation programme). An *AI-era transformation programme* is a versioned research programme that tracks how changing AI capabilities, deployment architectures, ownership structures, institutional rules, labor processes, epistemic practices, and public responses alter economic relations, generative capacities, dependencies, and distributions over time.

The programme should distinguish technical capability change from adoption, organizational integration, legal authorization, cultural acceptance, and economic realization. A capability can exist without transforming a domain, while modest technical change can produce large economic effects when institutions reorganize around it.

Definition 25.544 (Capability redistribution record). A *capability redistribution record* traces how an AI-mediated change expands, substitutes, complements, concentrates, degrades, or renders dependent the capabilities of different subjects, organizations, professions, communities, and public institutions.

Such records can distinguish aggregate productivity change from the distribution of practical agency. The same system can lower the cost of one task while concentrating model access, evaluation authority, infrastructure ownership, or epistemic dependence elsewhere.

Definition 25.545 (AI institutionalization pathway). An *AI institutionalization pathway* records how an AI capability becomes embedded in rules, workflows, standards, professional expectations, markets, education, public administration, or infrastructure and how that embedding changes the cost and feasibility of later exit or revision.

Institutionalization creates path dependence. Once assessment, hiring, research, public services, or communication infrastructures are reorganized around AI-mediated processes, the relevant economic object is no longer the model alone but the coupled sociotechnical arrangement.

Definition 25.546 (AI version horizon). An *AI version horizon* is the period and technological-institutional configuration for which an empirical or theoretical claim about AI-mediated economic relations remains sufficiently specified to be evaluated without assuming that later systems preserve the same capabilities, interfaces, costs, or governance conditions.

Version horizons should become standard in fast-changing AI research. They permit strong local claims while making temporal expiry visible. Later re-epistemization can then determine which findings persist across technological generations.

Definition 25.547 (AI reflexive transformation). *AI reflexive transformation* is a process in which representations, predictions, classifications, or recommendations produced by AI systems alter the behavior, institutions, data-generating processes, or categories that future AI systems subsequently observe and model.

Reflexivity can change both the economic field and the evidence used to describe it. Future work should investigate these feedbacks in domains where AI-mediated classifications influence access, reputation, prices, labor allocation, knowledge production, or policy.

Proposition 25.548 (AI-era maturation principle). *GRE research on AI becomes more*

durable when claims are versioned by technological and institutional conditions, capability change is separated from realized economic transformation, distributional and dependency effects are traced alongside aggregate gains, and reflexive feedback is treated as a possible source of mechanism change rather than as residual noise.

This agenda should remain empirically responsive. AI may generate transformations that the current GRE vocabulary does not anticipate. Those cases should be allowed to revise the framework rather than being redescribed until they fit existing categories.

25.18.7 Cross-Domain Comparison

The book has established interfaces with history, governance, law, education, ecology, artificial-intelligence studies, political theory, social theory, aesthetics, and other neighboring domains. The next research step is comparative rather than merely translational. Future work should test whether candidate relational or generative structures recur across domains under sufficiently different conditions, where their mechanisms diverge, and which apparent similarities disappear when domain-specific predicates are restored.

Definition 25.549 (Cross-domain comparative programme). A *cross-domain comparative programme* is a coordinated inquiry in which two or more domains investigate a shared question or candidate structure using domain-appropriate evidence and concepts while preserving a common record of correspondences, divergences, counterexamples, translation operations, and non-transferable remainder.

This programme differs from applying one GRE model everywhere. Its value lies partly in discovering failed transfer. A structure that appears general in economics may depend on institutional predicates absent in law or ecology; a mechanism identified in governance may require agency conditions unavailable in another domain.

Definition 25.550 (Comparative invariance candidate). A *comparative invariance candidate* is a relation, constraint, transformation pattern, or structural property that appears to persist across multiple domain-specific representations after relevant vocabulary, scale, agency, and evidential differences have been explicitly considered.

The term *candidate* is essential. Recurrent language alone does not establish invariance. Comparative studies should test whether the relation survives alternative operationalizations and whether domain experts agree that the translated structure retains its relevant meaning.

Definition 25.551 (Negative-transfer result). A *negative-transfer result* is a documented case in which a GRE construct, mechanism, formalism, or normative inference that is useful in one domain fails, distorts the target object, or loses essential predicates when transferred to another domain.

Negative transfer is a substantive result. It can identify domain boundaries, improve translation rules, or show that a proposed general structure should remain domain-specific. Preserving such results is necessary if cross-domain research is to constrain generalization rather than merely supply analogies.

Definition 25.552 (Comparative depth ladder). A *comparative depth ladder* distin-

guishes progressively stronger cross-domain findings, including shared question, terminological correspondence, structural correspondence, mechanism correspondence, recurrent constraint, and candidate invariance, with each level requiring additional warrant beyond the preceding one.

The ladder prevents movement from a common question directly to a general theory. Two domains can share a question without sharing mechanisms. They can share a structural pattern generated through different mechanisms. Even mechanism correspondence can remain limited by domain-specific boundary conditions.

Definition 25.553 (Cross-domain correction loop). A *cross-domain correction loop* is a process through which a translated GRE object is tested in another domain, the receiving domain identifies fit, remainder, or failure, and those results return to revise the source-domain formulation or its claimed scope.

The correction loop makes cross-domain work bidirectional. Neighboring fields are not merely sources of examples or applications; they can expose hidden assumptions in GRE and force economic concepts to become narrower or more precise.

Proposition 25.554 (Cross-domain maturation principle). *Cross-domain learning supports stronger generalization only when comparative findings survive domain-appropriate evidence, preserve relevant semantic and institutional predicates, incorporate negative-transfer results, and remain open to source-framework revision through correction loops.*

This research front can therefore advance GRE even when it produces less generality. More accurate boundaries, differentiated mechanisms, and explicit non-translation can constitute theoretical progress within an open programme.

25.18.8 Future General Theory

The possibility of a future Generative Relational Theory (GRT) remains the most ambitious research front and the one requiring the greatest restraint. GRE is currently an economic-domain development informed by preliminary GR foundations. Repeated structures across economics and neighboring domains may eventually support a more general theoretical architecture, yet the existence, scope, and form of such a theory cannot be inferred from the present book alone. Future generalization should be treated as a promotion problem: candidate structures acquire broader status only after surviving demanding cross-domain and epistemic tests.

Definition 25.555 (General-theory candidate). A *general-theory candidate* is a relation, primitive, transformation rule, constraint, equivalence structure, generative mechanism, or formal architecture proposed to possess explanatory or representational relevance across multiple domains beyond its original GRE context.

A candidate can arise from recurrent empirical findings, formal reconstruction, comparative history, philosophical analysis, or successful cross-domain translation. Its origin does not determine its eventual status.

Definition 25.556 (Generalization promotion dossier). A *generalization promotion dossier* records the domains in which a general-theory candidate has been studied, the domain-specific formulations used, positive and negative evidence, translation remainder, counterexamples, alternative explanations, formal representations, nor-

mative dependencies, and the scope proposed for any broader claim.

The dossier makes generalization cumulative and contestable. It also allows a candidate to remain useful at an intermediate level without forcing a binary choice between domain specificity and universal theory.

Definition 25.557 (Domain-survival test). A *domain-survival test* evaluates whether a general-theory candidate retains a stable and non-trivial analytical role across multiple domains after domain-specific predicates, scales, agency conditions, evidential practices, and counterexamples are restored.

Survival does not require identical manifestation. A genuinely general relation may appear differently across domains. The requirement is that the proposed abstraction preserve enough structure to constrain inquiry rather than become so permissive that every outcome can be redescribed as compatible with it.

Definition 25.558 (Generality threshold). A *generality threshold* is a stated evidential and theoretical standard that a candidate must satisfy before its status is widened from a domain-specific or cross-domain hypothesis to a more general component of GR or a future GRT.

Different candidates can require different thresholds. A formal identity, a historical mechanism, a normative principle, and a relational ontology claim should not be promoted through the same evidence. The threshold must match the epistemic type of the candidate.

Definition 25.559 (General-theory remainder). A *general-theory remainder* is the set of domain-specific meanings, mechanisms, evidential conditions, normative predicates, or historical features that remain necessary for explanation after a candidate general structure has been abstracted.

Remainder protects a future general theory from becoming explanatorily imperial. A general relation can organize comparison while domain theories retain indispensable explanatory work.

Proposition 25.560 (General-theory promotion principle). A *candidate should acquire broader GR or GRT status only to the extent that its promotion dossier demonstrates cross-domain survival, discriminating content, reconstructable translation, resilience to relevant counterexamples, and an explicit account of the domain-specific remainder that the general structure does not explain.*

Proposition 25.561 (General-theory deferral principle). *When available cross-domain evidence supports shared questions or partial structural correspondence but remains insufficient for a stable general mechanism or architecture, maintaining the candidate at an intermediate or domain-specific status is a positive theoretical result rather than a programme failure.*

Future GRT work may therefore emerge through a long sequence of comparisons, failed translations, revised primitives, competing formalisms, and domain corrections. GRE can contribute to that process while retaining economic specificity. The possibility of a broader theory does not reduce the value of domain-level explanation.

Definition 25.562 (GRE open-work portfolio). A *GRE open-work portfolio* is a versioned programme record connecting future-work objects to their research maturation paths, responsible or relevant research communities, evidential and theoretic-

cal dependencies, negative results, intermediate outputs, unresolved remainder, and consequences for GRE if the target object is supported, revised, localized, divided, or abandoned.

The portfolio provides continuity between the present book and later versions of the programme. It can also prevent future work from being judged only by whether it confirms current formulations. A failed empirical hypothesis, a superior alternative formalism, a historically bounded mechanism, a non-convertible value relation, or a negative cross-domain transfer can each improve the programme by reducing unwarranted generality.

Proposition 25.563 (Open-work integration principle). *GRE remains an open research programme when consequential unresolved objects are preserved as explicit research obligations with identifiable maturation paths, while future investigators retain authority to generate new questions, alter the agenda, and revise the framework in response to evidence, argument, historical change, and domain-specific correction.*

The unresolved agenda therefore provides a bridge to provisional closure rather than a substitute for closure. Empirical validation, formal development, value conversion, justice under incommensurability, multiscale history, AI-era transformation, cross-domain comparison, and possible general-theory formation identify major continuations of the present work. Their unresolved status is part of the programme's epistemic architecture. The final section can consequently close the book at the level of a versioned framework while leaving its research objects, counterexamples, collaborations, and possible successors open to continuation.

25.19 Provisional Closure

The role of this final section is to close the present book without converting the framework it develops into a final system. The preceding sections have reconstructed the architecture of Generative Relational Economics (GRE), distinguished its epistemic statuses and programme commitments, specified its non-commitments, developed conditions of contestability and provenance, opened the framework to re-epistemization and domain evidence, disciplined cross-domain learning, described theoretical evolution, treated economic futures as historically open, and stated attentional disciplines for research and practice. Section 586 then identified major unresolved research fronts. The remaining task is therefore neither to add another substantive layer nor to summarize every concept introduced in the book. It is to state what kind of closure is warranted by the present version of the programme and what responsibilities remain attached to any continuation of it.

The argument proceeds through eight dimensions: bounded framework completion, research-programme identity, dialogical use, counterexample admission, revision architecture, collaborative development, open economic futures, and programme continuation. The method is synthetic and dependency-sensitive. Each dimension states what can presently be treated as complete enough for use while preserving the distinctions, uncertainties, domain limits, and defeat conditions on which that use depends. The resulting closure is versioned: it identifies a coherent research object that can be criticized, extended, or replaced without implying that

later work must preserve every present formulation.

Definition 25.564 (Provisional closure). *Provisional closure* is a programme state in which a framework is sufficiently specified for identification, use, criticism, comparison, and continuation, while its substantive claims, representations, methods, normative commitments, domain boundaries, and future architecture remain open to revision under stated evidential and argumentative conditions.

Provisional closure therefore has two requirements. The framework must be determinate enough that disagreements can have identifiable targets, and it must remain corrigible enough that evidence or argument can change those targets or their status. Closure without determinacy produces an indeterminate label. Closure without corrigibility produces a protected doctrine.

Definition 25.565 (Book-level closure state). A *book-level closure state* records which conceptual structures, programme commitments, methodological disciplines, formal representations, substantive propositions, open problems, limitations, and research interfaces have been developed to a level sufficient for the present book, together with the elements intentionally left provisional or unresolved.

The present book-level closure state includes a historical and disciplinary account of GRE, ontological and epistemological foundations, research and applied praxis, substantive economic concepts, analyses of power and epistemic economy, AI-era capability asymmetry, domain studies, theoretical dialogues, cross-domain interfaces, limitations, and an open research-programme architecture. Completion at this level means that these components can be related within a coherent manuscript. It does not imply empirical completion, formal completion, normative convergence, or final theoretical adequacy.

Proposition 25.566 (Closure discipline). *A provisional GRE closure is warranted when the framework is identifiable enough to support cumulative inquiry and contestation, its unresolved objects and limitations remain explicit, and later revision can alter the framework without requiring that every change be redescribed as either confirmation or external rejection.*

Table 25.19 summarizes the eight dimensions through which the present section states this closure.

Proposition 25.567 (Completion principle). *Completion of the present manuscript changes the status of GRE from a dispersed set of developing arguments into a more reconstructable programme formulation; it does not by itself strengthen the empirical, formal, historical, or normative warrant of claims beyond the support established within their respective chapters.*

This distinction governs the remainder of the section. A completed book can provide a stable object for criticism precisely because it no longer needs to remain fluid at every sentence. Stability of the object of criticism is compatible with revisability of the programme that the object represents.

25.19.1 Bounded Framework Completion

The present GRE formulation is best understood as a framework with bounded completeness. It has enough internal structure to guide research questions, organize dis-

Table 25.19: Dimensions of provisional GRE closure and their principal continuity requirements

Closure dimension	Present programme status	Principal continuity requirement
Bounded framework completion	A coherent, usable architecture with explicit scope and unresolved objects	Preserve distinctions between completion of the book and completion of the research programme
Research-programme identity	A reconstructable commitment structure rather than fixed doctrinal content	Keep identity contestable through versioning, lineage, and successor recognition
Dialogical use	A language for comparison, translation, reconstruction, and disagreement	Preserve domain predicates, translation remainder, and alternative vocabularies
Counterexample admission	Negative and contrary evidence can target identifiable GRE claims	Maintain defeat paths and protect counterexamples from retrospective absorption
Revision architecture	Claims and representations can change status, scope, or form	Preserve reasons, dependencies, superseded states, and revision consequences
Collaborative development	Programme work can be distributed across disciplines, communities, and publics	Preserve correction authority, provenance, authorship, and responsibility across collaboration
Open economic futures	Economic orders remain contingent objects of inquiry and praxis	Evaluate generative consequences without deriving one terminal economic arrangement
Programme continuation	Later work inherits a versioned framework rather than a finished canon	Carry forward questions, evidence obligations, limitations, and permission to transform the programme

tinctions, support formal and empirical programmes, and expose its dependencies. At the same time, many of its concepts remain preliminary, several formalizations are intentionally non-exclusive, and the empirical range of numerous propositions has not been established across the domains in which they might eventually be used. Bounded completeness recognizes both facts at once.

Definition 25.568 (Bounded framework completeness). *Bounded framework completeness* is the condition in which the principal objects, relations, distinctions, inferential pathways, scope limits, and open problems required for a stated programme version are specified well enough to support use and criticism within that version's declared domain.

This notion of completeness is relative to purpose. A framework can be complete enough to formulate a research programme while incomplete as a predictive theory. It can be complete enough to organize normative questions while leaving major normative disagreements unresolved. It can be complete enough to define a formal research direction while lacking a unique or empirically calibrated mathematical representation.

Definition 25.569 (Closure boundary). A *closure boundary* identifies which tasks, claims, derivations, validations, comparisons, or domain extensions are treated as

completed for the current version and which remain outside that completion state.

The closure boundary protects the book from two opposite readings. One would treat every open problem as evidence that the framework has not been formulated at all. The other would treat manuscript completion as evidence that the programme's substantive questions have been settled. The present work supports neither reading. Its completion lies chiefly in the construction of a coherent architecture and a set of contestable research objects.

Proposition 25.570 (Bounded-completion condition). *A GRE component can be treated as complete for the present framework when its analytical role, dependencies, scope, epistemic status, and principal unresolved remainder are sufficiently explicit for later researchers to use or contest it without reconstructing the component from unstated assumptions.*

This condition also limits retrospective repair. Later investigators may improve definitions, correct arguments, introduce better evidence, or replace formal structures. Such changes should be recorded as revisions to an identifiable prior state rather than projected backward as if the earlier formulation had always contained them.

Definition 25.571 (Framework remainder). *A framework remainder is an unresolved conceptual, evidential, formal, normative, historical, or domain-specific issue whose existence is compatible with present framework use but whose resolution could materially alter the programme's later form.*

Framework remainder is therefore expected rather than anomalous. Section 586 records several high-leverage examples. Additional remainders will become visible only after the framework is used in domains and problems not considered in the present book.

Proposition 25.572 (Framework-use principle). *The present GRE framework should be used as a structured source of questions, distinctions, representations, and revisable claims rather than as an inference that economic phenomena are already exhaustively represented by the vocabulary developed here.*

Bounded framework completion thus provides closure at the level appropriate to a first integrated research programme. The resulting object is substantial enough to be judged and limited enough to be changed.

25.19.2 Research Programme Identity

A research programme requires continuity across change, but continuity does not require preservation of every present proposition. Sections 571, 575, 576, and 582 developed the relevant architecture: GRE has current commitments, plural formulations, historical versions, and possible transformation paths. Provisional closure now states how those elements relate at the point where the book ends.

Definition 25.573 (Programme identity profile). *A programme identity profile is a versioned record of the commitments, characteristic questions, analytical distinctions, domain orientation, methodological permissions, revision norms, and historical lineage through which a GRE formulation is presently recognized as belonging to the programme.*

The profile is more stable than any one model and less permissive than a name alone. Relational attention, generative attention, historical situatedness, value plurality, revisability, methodological pluralism, praxis orientation, domain specificity, and openness to counterevidence presently form a central identity kernel. Their future interpretation can change, and sufficiently deep changes can eventually justify recognition of a successor programme.

Definition 25.574 (Canonicalization pressure). *Canonicalization pressure* is the tendency for historically contingent formulations, examples, diagrams, formalisms, or terminological choices to acquire authority because they appear in an early or influential programme text rather than because later inquiry continues to support their privileged status.

Canonicalization pressure is likely in any programme that accumulates a literature. It can be useful when shared reference points reduce coordination costs, yet it becomes epistemically problematic when citation or repetition substitutes for renewed warrant. The appropriate response is not to prohibit canonical texts. It is to distinguish historical importance from current evidential or theoretical authority.

Definition 25.575 (Programme continuity test). *A programme continuity test* evaluates whether a later formulation remains reconstructably connected to GRE through its questions, commitments, lineage, correction relations, and domain orientation, or whether accumulated changes are better described as producing a transformed branch or successor programme.

The test is interpretive rather than algorithmic. Different researchers can reasonably disagree about the threshold of continuity. The important requirement is that the reasons for retaining or changing the programme label remain open to scholarly examination.

Proposition 25.576 (Identity-through-revisability principle). *GRE programme identity is strengthened when continuity can be reconstructed across explicit revisions, disagreements, negative results, and branch formation, because identifiable change provides a more discriminating continuity relation than preservation of terminology alone.*

This principle gives the present book a limited constitutional role. It records a current programme state against which later states can be compared. It does not legislate the vocabulary or formalism that later GRE research must retain.

25.19.3 Dialogical Use of GRE

GRE has repeatedly been presented as a language of inquiry. The closing implication is that the framework should remain usable in dialogue with theories and disciplines that do not share its vocabulary. Dialogue is analytically productive when it clarifies correspondence, disagreement, remainder, and domain boundaries. It becomes unproductive when translation is used to assimilate every external claim into GRE terminology.

Definition 25.577 (Dialogical GRE use). *Dialogical GRE use* employs GRE concepts to formulate questions, reconstruct relations, compare accounts, or translate selected structures while preserving the independent predicates, evidential standards, and unresolved disagreements of the interlocutor theory or domain.

This use can occur within economics, across neighboring generative-relational domains, or in engagement with theories that reject major GRE assumptions. A dialogue does not require convergence. A clarified disagreement can be an adequate outcome when the underlying objects or warrants differ.

Definition 25.578 (Dialogue remainder). A *dialogue remainder* is a concept, predicate, explanatory commitment, evidential requirement, normative claim, or practical concern that remains materially significant after attempted comparison or translation and cannot be carried into the receiving framework without distortion or loss.

Dialogue remainder should remain visible. It can identify the boundary of a translation, expose an omitted domain predicate, or reveal that two apparently similar terms perform different theoretical roles.

Definition 25.579 (Reciprocal clarification). *Reciprocal clarification* occurs when comparison with another theory, method, discipline, or public vocabulary makes the commitments, limits, ambiguities, or evidential burdens of both sides more explicit, irrespective of whether substantive agreement increases.

This notion matters because GRE should not evaluate dialogue only by how much external material can be translated into its own architecture. External resistance can improve GRE by revealing where its categories are too broad, too narrow, historically local, normatively loaded, or empirically underspecified.

Proposition 25.580 (Dialogical non-absorption principle). *GRE dialogue is epistemically productive when translation and comparison generate reciprocal clarification while preserving domain-specific or theory-specific remainder that remains necessary for understanding the original object.*

A language for dialogue therefore gains value from disciplined limits on its reach. GRE can offer relational and generative questions without requiring those questions to become the sole grammar through which economic inquiry is conducted.

25.19.4 Counterexample Admission

A framework becomes meaningfully contestable only when contrary cases can alter the status of its claims. Sections 577, 578, and 586 developed criticism, negative-result preservation, and research maturation. The closing requirement is to treat counterexamples as programme evidence rather than as external interruptions that must be translated away.

Definition 25.581 (Admissible GRE counterexample). An *admissible GRE counterexample* is a well-specified empirical case, historical reconstruction, formal result, conceptual argument, normative challenge, or domain-specific finding that conflicts with a sufficiently identifiable GRE claim, proposed mechanism, scope statement, or representation under conditions relevant to that object's intended warrant.

Admissibility does not imply decisive defeat. A counterexample can reveal a measurement problem, hidden scope condition, missing variable, alternative mechanism, category error, or genuine failure. Its value lies in forcing the target claim to respond through a reconstructable inferential path.

Definition 25.582 (Counterexample response path). A *counterexample response path* records the challenged GRE object, the contrary evidence or argument, the relevance

assessment, competing interpretations, resulting scope or status changes, and any unresolved disagreement after review.

Such a path makes post hoc accommodation visible. If every contrary case can be absorbed by expanding the meaning of a concept after observation, the concept loses discriminating force. A response path should therefore state whether the original formulation survives, narrows, branches, is replaced, or remains under dispute.

Definition 25.583 (Counterexample preservation duty). The *counterexample preservation duty* is the programme-level requirement to retain consequential negative or contrary results, including their original target and conditions, when later revisions would otherwise make the earlier failure difficult to reconstruct.

Preservation is especially important when a revised theory successfully handles a case that defeated an earlier version. The improvement is intelligible only if the earlier failure remains part of the theoretical history.

Proposition 25.584 (Counterexample productivity principle). A *counterexample improves GRE* when it reduces unwarranted generality, reveals an omitted mechanism or domain condition, distinguishes competing formulations, or defeats a current claim in a manner that later researchers can reconstruct.

The invitation to counterexample is therefore substantive. It requires stable targets, preservation of contrary results, and the possibility that the appropriate programme response is abandonment rather than repair.

25.19.5 Revision Architecture

Revision is the practical counterpart of contestability. A framework that accepts criticism in principle but lacks a way to alter its claims, dependencies, or programme records remains only rhetorically open. GRE therefore requires revisions to be attributable, scope-sensitive, and historically reconstructable.

Definition 25.585 (Revision obligation). A *revision obligation* arises when evidence, argument, domain correction, failed translation, normative reconsideration, or historical change materially weakens the warrant of a GRE object relative to the claim strength, scope, or programme role presently assigned to it.

The obligation does not determine a unique revision. Reasonable alternatives can include narrowing a claim, changing its epistemic status, modifying definitions, separating domain variants, introducing an unresolved branch, or abandoning the object. What matters is that the weakening of warrant produces an explicit response rather than silent persistence.

Definition 25.586 (Revision adequacy). *Revision adequacy* is the degree to which a programme change addresses the evidence or argument that motivated it, propagates consequential changes through relevant dependencies, preserves the prior state and rationale, and avoids claiming more repair than the revision establishes.

A local wording change can be inadequate when a counterexample reaches a foundational dependency. Conversely, a major architectural revision may be unnecessary when the problem concerns a narrow empirical scope. Dependency-sensitive revision helps preserve proportionality.

Definition 25.587 (Revision remainder). A *revision remainder* is the portion of a mo-

tivating problem, disagreement, or uncertainty that remains unresolved after a revision and continues to constrain the warrant of the revised object.

Revision remainder protects against declaring a problem solved merely because a new formulation has been introduced. Later research should be able to see both what the revision repaired and what it left open.

Proposition 25.588 (Revision traceability principle). *Consequential GRE revisions should remain traceable from motivating evidence or argument through changed objects and dependencies to their resulting epistemic and programme statuses, including any unresolved revision remainder.*

This architecture supports intellectual continuity without enforcing doctrinal continuity. The programme can change substantially while retaining a transparent account of why it changed.

25.19.6 Collaborative Programme Development

GRE's unresolved questions exceed the competencies of any one researcher or discipline. Empirical validation, legal and institutional interpretation, historical reconstruction, formal development, ecological analysis, AI studies, normative inquiry, and public contestation each require forms of expertise that cannot be responsibly collapsed into one programme voice. Collaboration therefore belongs to the epistemic architecture of GRE rather than functioning merely as a strategy for increasing research volume.

Definition 25.589 (Collaborative GRE development). *Collaborative GRE development* is programme work in which multiple researchers, disciplines, communities, institutions, or affected publics contribute differentiated knowledge, criticism, evidence, interpretation, or revision while preserving the provenance and authority conditions of those contributions.

Differentiation is important. Collaboration does not require every participant to become a GRE theorist. A legal scholar can correct a legal-economic inference without accepting the entire GRE framework. A community can provide situated knowledge relevant to an intervention without assuming responsibility for the resulting theory. A formal researcher can expose inconsistency without deciding the normative implications of the repair.

Definition 25.590 (Collaborative authority map). A *collaborative authority map* records which participants possess evidential, interpretive, methodological, normative, procedural, or decision authority over specified parts of a collaborative inquiry and where those forms of authority conflict or remain distributed.

The map helps prevent expertise in one domain from becoming presumed authority in another. It also makes visible when affected subjects possess experiential or practical knowledge while lacking institutional authority to alter the interpretation or use of that knowledge.

Definition 25.591 (Collaborative provenance). *Collaborative provenance* records the origin, transformation, attribution, contestation, and authorized use of contributions that enter a shared GRE research object or programme revision.

This requirement concerns more than authorship. It includes the conditions under

which data were obtained, interpretations were negotiated, translations were made, objections were preserved, and local knowledge was abstracted into broader claims.

Proposition 25.592 (Collaborative correction principle). *GRE collaboration is epistemically valuable when differentiated contributors can correct the programme within domains where they possess relevant warrant, while the resulting synthesis preserves disagreement, provenance, responsibility, and limits on transfer beyond those domains.*

The invitation to collaboration is thus also an invitation to distributed correction authority. A programme that seeks cross-domain reach should expect some of its most important improvements to originate outside the communities that currently identify most closely with GRE.

25.19.7 Open Economic Futures

The programme's theoretical openness has an economic counterpart. Section 583 argued that GRE should not infer one terminal economic order from relational or generative premises. Provisional closure retains that claim at the book level. The framework can evaluate institutions, allocations, value conversions, power relations, ecological constraints, participation structures, and future option effects without treating one historically specific arrangement as the necessary destination of economic development.

Definition 25.593 (Open-future economic stance). *An open-future economic stance evaluates economic arrangements through their situated consequences, values, constraints, generative conditions, participation structures, power relations, irreversibilities, and future revision capacities while withholding a presumption that one institutional endpoint is already entailed by GRE.*

Openness does not suspend judgment. Some arrangements can be criticized under explicit empirical, legal, ecological, ethical, or political criteria. Rights and safety constraints can justify closure of particular options. Ecological limits can make some trajectories infeasible. The stance concerns the absence of a single theory-derived endpoint, not the absence of practical constraints or normative commitments.

Definition 25.594 (Future-generative evaluation). *A future-generative evaluation examines how a present economic arrangement changes the capacities of later subjects to form relations, generate and convert value, participate in institutions, preserve or recover options, contest inherited structures, and revise the conditions under which subsequent economic life is organized.*

This evaluation extends analysis beyond immediate welfare or output without replacing those measures. It asks an additional question: what kinds of future action and relation become more or less reachable because of the present arrangement?

Definition 25.595 (Future foreclosure record). *A future foreclosure record identifies materially relevant future options, relations, capabilities, institutional alternatives, ecological states, or value forms made substantially less reachable by a present economic decision, together with the affected subjects, justification, uncertainty, and expected reversibility of that foreclosure.*

The record does not imply that foreclosure is always undesirable. Economic and institutional life requires commitments that close alternatives. The analytical require-

ment is to make consequential foreclosure visible when it bears on later generative capacity or justice.

Proposition 25.596 (Open-future responsibility principle). *GRE can support substantive evaluation of economic arrangements while preserving open economic futures when present decisions are assessed partly through the future capabilities, relations, value possibilities, revision capacities, and foreclosures they generate for affected subjects.*

The economic future therefore remains a domain of inquiry, judgment, institution building, and contestation. GRE contributes analytical attention to how present structures alter that future without claiming to pre-author it.

25.19.8 Programme Continuation

The final implication of provisional closure is continuation under explicit inheritance conditions. Later GRE work will encounter evidence, technologies, institutions, theoretical resources, political problems, ecological constraints, and social configurations that the present book does not anticipate. A continuation worthy of an open programme should therefore inherit more than terminology. It should inherit the obligations that make revision and correction possible.

Definition 25.597 (GRE continuation record). *A GRE continuation record is a versioned handoff that identifies the inherited programme state, current commitments and non-commitments, active evidence and formal dependencies, known limitations, unresolved research objects, preserved counterexamples, domain interfaces, and changes introduced by the continuing work.*

A continuation record can be implemented through publications, repositories, research notes, version histories, data documentation, formal specifications, or other durable scholarly media. Its conceptual purpose is to prevent continuity from depending only on memory or nominal affiliation.

Definition 25.598 (Responsible programme inheritance). *Responsible programme inheritance* occurs when later work uses, extends, or criticizes GRE while preserving enough of the inherited framework's provenance, scope, counterevidence, and unresolved remainder to distinguish faithful continuation, revision, branch formation, and successor development.

Responsible inheritance does not privilege fidelity over innovation. A later researcher may reject major parts of the present architecture. The requirement is reconstructability: readers should be able to determine what was inherited, what changed, why it changed, and what consequences followed for the programme's identity and warrant.

Definition 25.599 (Continuation permission). *Continuation permission* is the explicit programme-level recognition that later investigators may revise terminology, replace formalisms, narrow or abandon claims, introduce new domains, alter normative assumptions, reorganize the architecture, or develop successor frameworks when evidence and argument warrant those changes.

This permission is constrained by scholarly responsibility rather than by doctrinal loyalty. Revision should remain attributable; borrowed ideas should retain prove-

nance; counterevidence should remain visible; and claims should retain scope proportionate to warrant.

Proposition 25.600 (Continuation principle). *GRE continues as an open research programme when later work can inherit an identifiable framework, contest and revise its components, preserve the history and evidence needed to understand those changes, and recognize when accumulated transformation is better represented as a branch or successor rather than as unchanged programme continuity.*

Definition 25.601 (Provisional-closure handoff). *The provisional-closure handoff is the programme state established at the end of the present book: a bounded and identifiable GRE framework, a stated set of commitments and non-commitments, a record of formal and substantive constructions, explicit limitations and unresolved research fronts, mechanisms for counterexample and revision, interfaces for collaboration and cross-domain correction, and permission for later transformation under reconstructable scholarly lineage.*

Proposition 25.602 (Provisional-closure integration principle). *The present book is provisionally closed when its framework can be handed forward as a coherent but defeasible research object whose future value depends on continued inquiry, empirical and historical testing, normative argument, formal clarification, domain correction, criticism, and revision rather than on preservation of the present text as a final authority.*

This handoff states the endpoint appropriate to the book. GRE has been developed here as an economic research programme concerned with relations, generative conditions, heterogeneous value, conversion and circulation, historical formation, power, knowledge, capability, praxis, and the future consequences of economic organization. The programme has also been required to expose its own limits: its representations are not proofs of ultimate ontology; its formalisms remain plural and revisable; generativity does not by itself establish normative priority; domain translations can fail; historical categories can drift; counterexamples can narrow or defeat claims; and future evidence can reorder the architecture.

The resulting closure is therefore substantive without being terminal. Researchers can now ask whether GRE concepts discriminate useful economic structures, whether proposed mechanisms survive empirical and historical testing, whether its value and justice analyses clarify problems left obscure by existing approaches, whether its formal representations improve explanation without outrunning evidence, and whether its domain interfaces produce genuine correction rather than terminological expansion. Practitioners can ask whether GRE attention to uncertainty, relation, power, reversibility, participation, value conflict, and learning improves intervention design in particular settings. Other disciplines and publics can challenge the programme where its economic vocabulary fails to represent their objects or where its claims exceed their warrant.

The book closes by leaving these questions answerable. Its most durable contribution would therefore not be the preservation of every present proposition, symbol, or term. It would be the establishment of a sufficiently explicit research architecture in which later scholars can determine what was claimed, what was assumed, what evidence was available, what remained unresolved, where disagreement entered, how revisions propagated, and why later formulations differ. Such reconstructability per-

mits both continuity and departure.

Generative Relational Economics, in the version developed here, is consequently complete enough to enter sustained inquiry and incomplete enough to require it. The framework ends at a point from which criticism, empirical work, formal development, historical reconstruction, normative argument, practical experimentation, cross-domain comparison, and theoretical transformation can proceed without presuming their outcomes. That is the intended meaning of provisional closure.