

Chapter 20

Generative Relational Economic Order

Economic-Order Synthesis and Chapter Scope

Chapter 20 develops the book's economic-order synthesis. The preceding chapters established Generative Relational Economics as a historically situated and revisable research programme, developed its ontological and epistemological discipline, clarified research and application praxis, and progressively constructed an economic architecture of allocation, heterogeneous value, generative spacetime, power, knowledge, artificial intelligence, and domain-specific inquiry. Chapter 19 then tested those constructions across eleven domains and returned a set of comparative implications for economic order. The present chapter takes that accumulated architecture as its object. Its task is to ask what becomes visible when economic order is analyzed as a history-bearing configuration of relations, institutions, infrastructures, capabilities, values, dependencies, and future possibilities rather than only as a distribution of resources or a choice among familiar institutional labels.

The chapter does not propose a closed institutional blueprint. A market economy, welfare state, cooperative system, public infrastructure regime, commons arrangement, platform ecology, or mixed economy can contain substantially different relational architectures even where the same formal category is used. Conversely, distinct institutional forms can sometimes perform overlapping functions. GRE therefore treats economic order as a design and research problem whose relevant questions concern the organization of access, conversion, participation, power, learning, maintenance, value return, and revision across heterogeneous subjects and temporal scales. The chapter seeks to identify conditions, diagnostics, and open design questions rather than a uniquely optimal constitutional form.

This orientation preserves the methodological result of Chapter 19: recurrence across domains does not establish theoretical identity, and comparative synthesis does not authorize unrestricted generalization. The present chapter therefore works with the recurrent structures that survived domain translation while preserving the domain-specific remainders that qualify them. Access remains a conversion pathway rather than a binary entitlement; capability remains typed and potentially collective; dependency remains relational and heterogeneous; infrastructure includes material,

institutional, informational, interpretive, and ecological supports; maintenance can be generative; standing and participation remain multidimensional; and value remains plural, historically mediated, and incompletely commensurable. These constraints shape the economic-order analysis that follows.

The chapter has four connected objectives. The first is synthetic. Section 20.1 reconstructs the GRE programme across historical conditions, relational architecture, allocation, value, spacetime, power, knowledge, artificial intelligence, and praxis. The objective is to show how these components constrain one another when brought into one economic-order frame. The second objective is evaluative and institutional. Subsequent sections develop generative economic evaluation, policy, institutions, relational infrastructure, participation, and value recirculation. These sections ask how present arrangements alter downstream relations, capacities, constraints, and option structures, and how institutions can learn while remaining contestable.

The third objective concerns conditions that complicate conventional economic-order reasoning. The chapter examines plural and incommensurable values, productive and symbolic abundance accompanied by new scarcities, and persistent capability asymmetry under advanced artificial intelligence. It then develops adaptive governance and open economic futures as problems of monitoring, feedback, reversibility, institutional learning, path creation, intergenerational possibility, and radical uncertainty. These topics extend the analyses of Chapters 14–18 into the economic-order level without presuming that their local concepts can be aggregated into one scalar objective.

The fourth objective is reflexive. A framework that analyzes revisability should expose its own limits. The closing sections therefore state the domain, ontological, epistemic, methodological, normative, formal, historical, and generalization limits of GRE; define a future research programme; clarify the relation between GRE and possible future development of Generative Relational Theory; and close provisionally rather than constitutionally. The book's final synthesis is consequently designed to remain open to empirical correction, comparative domain work, formal refinement, historical re-epistemization, and institutional experimentation.

The internal sequence of the chapter is thus *programme synthesis, evaluation, policy, institutions, infrastructure, participation, recirculation, plural value, abundance and scarcity, capability asymmetry, adaptive governance, futures, limits, research, general-theory interface, provisional closure*. The sequence moves from analytical integration toward increasingly direct questions of economic order and then returns to reflexive limits. It is intentionally non-linear in one important sense: later sections can revise the interpretation of earlier ones. Economic-order synthesis is therefore treated as an iterative construction rather than the terminal deduction of a finished theory.

The term *generative relational economic order* will be defined formally enough for analytical use in Section 20.1. At the chapter level, it refers provisionally to an economic order examined through the relations and infrastructures that generate, distribute, maintain, constrain, regenerate, and revise capabilities and value-bearing possibilities through time. The adjective *generative* does not imply maximal novelty, perpetual growth, or unrestricted expansion. Maintenance, care, preservation, ecological regeneration, institutional continuity, and reduction of destructive depen-

dence can all be generatively significant where they preserve or reopen consequential future possibilities. The adjective *relational* likewise does not deny entities or individual agency. It indicates that economically consequential capacities and values often depend on relations whose effects cannot be inferred from isolated actors alone.

Chapter 20 therefore provides economic synthesis while preserving the open-programme character established at the beginning of the book. Its standards are demanding in two directions. The analysis should be sufficiently integrated to say something substantive about economic order, yet sufficiently restrained to keep heterogeneity, uncertainty, contestation, and future revision visible. The chapter proceeds within that tension.

20.1 GRE Programme Synthesis

The role of this section is to assemble the principal components of Generative Relational Economics into a single economic-order architecture before the chapter develops more specific approaches to evaluation, policy, institutions, infrastructure, participation, and governance. Its objective is synthesis rather than summary. The earlier chapters introduced concepts in response to distinct analytical problems; the present section asks how those concepts constrain one another when an economic order is treated as a history-bearing configuration. The discussion therefore proceeds through ten dimensions: historical formation, relational architecture, allocation and conversion, heterogeneous value, generative spacetime, power and justice, knowledge, artificial intelligence, research and application praxis, and the conditions of an open synthesis.

The method is reconstructive. Each dimension is restated only to the extent necessary for its economic-order role, and previously stabilized distinctions are preserved rather than redefined. The result is not a master variable or one composite welfare function. It is an architecture in which several kinds of relation must remain jointly visible because changes that appear beneficial in one dimension can alter capacities, dependencies, institutions, or future possibilities in another. Table 20.1 provides a compact map of these dimensions and their principal economic-order questions.

Definition 20.1 (Generative relational economic order). A *generative relational economic order* is a history-bearing configuration of economic subjects, relations, institutions, infrastructures, allocation and conversion pathways, value processes, dependencies, epistemic arrangements, and governance mechanisms considered with respect to how they generate, maintain, constrain, regenerate, and revise capabilities and future possibilities across heterogeneous subjects and temporal scales.

The definition is intentionally analytical rather than constitutional. It does not identify a specific property regime, market structure, welfare architecture, technology policy, or governance form as generative by definition. The same institutional label can support different relational configurations, and the same generative function can sometimes be realized through different institutional forms. The definition therefore establishes an object of inquiry whose adequacy must be evaluated through mechanisms, histories, evidence, and domain-specific conditions.

Table 20.1: GRE programme dimensions and their economic-order roles.

Dimension	Principal analytical object	Economic-order question
Historical formation	Pathways, inherited institutions, classifications, infrastructures, and conditions of possibility	Which inherited relations make the present order possible, and which remain revisable?
Relational architecture	Subjects, positions, relations, configurations, constraints, and standing	Which relations constitute practical access, participation, dependence, and capability?
Allocation and conversion	Resources, rights, services, infrastructures, and conversion pathways	How do allocated objects become usable capabilities and downstream effects?
Heterogeneous value	Generation, realization, conversion, circulation, capture, return, and remainder	Which values are produced or displaced, and how are conflicts mediated under incomplete commensurability?
Generative spacetime	Sequence, delay, reachability, path dependence, irreversibility, and option structures	How do present arrangements reshape later possibilities and transition capacities?
Power and justice	Typed asymmetry, dependence, conversion mechanisms, standing, and governance	Which asymmetries become durable power, and through which mechanisms can they be contested or revised?
Knowledge	Epistemic infrastructure, attention, verification, preservation, and orientation	Which knowledge capacities and interpretive conditions does the order reproduce or erode?
Artificial intelligence	Capability stacks, infrastructure, ownership, access, delegation, and participation	How do artificial capabilities alter dependency, judgment, participation, and human or collective capability reproduction?
Praxis	Research, application, evidence, intervention, learning, and revision	How can inquiry and intervention remain mutually corrective under uncertainty?
Open synthesis	Coupled dimensions, domain remainders, uncertainty, and revision pathways	Which conclusions are warranted now, and which structures must remain open to correction?

20.1.1 Historical Formation and Problem Conditions

GRE begins historically because an economic order is never encountered as an institutionally empty present. Categories such as labor, property, firm, household, market, public service, currency, welfare, platform, profession, migration status, and infrastructure are historically constituted positions whose meanings and practical consequences depend on prior institutional development. Chapter 1 therefore treated the emergence of GRE itself as historically conditioned, while later chapters repeatedly showed that inherited classifications and infrastructures shape which relations can be perceived, measured, governed, or transformed.

At the economic-order level, historical analysis performs at least four functions. First, it identifies *conditions of possibility*: legal forms, technical systems, administrative capacities, knowledge infrastructures, cultural conventions, ecological inheritances, and political settlements without which present arrangements would operate differently. Second, it identifies *path dependence*: past investments and institutional choices can alter the cost, intelligibility, legitimacy, and feasibility of later alternatives. Third, it makes visible *historical burden*: present actors can inherit maintenance obligations, ecological damage, debt structures, exclusionary classifications, or depleted capabilities that are absent from contemporaneous flow measures. Fourth, it reveals *historical remainder*: some effects of earlier arrangements persist even after formal rules change.

These functions matter because economic-order evaluation can be distorted by treating present distributions as if they arose from contemporaneous choice alone.

A platform ecosystem may depend on accumulated user networks and data; a public institution on generations of professional knowledge and administrative memory; a research system on inherited laboratories, journals, languages, and disciplinary standards; a neighborhood on past infrastructure and land-use decisions; an ecological economy on soil, water, biodiversity, and prior extraction. The present order is therefore partly an inheritance relation.

History also places limits on institutional design. A proposed rule can be normatively attractive in abstraction yet weakly implementable where administrative capacity, trust, infrastructure, or professional competence is missing. Conversely, inherited institutions can make some reforms feasible precisely because prior generations invested in capacities that no current actor could reproduce quickly. GRE thus treats institutional feasibility as historically conditioned rather than as a static constraint set.

Proposition 20.2 (Historical-formation condition). *Economic-order analysis is historically adequate only where present institutions, distributions, capabilities, and dependencies are interpreted together with the inherited pathways and infrastructures that materially condition their reproduction and revision.*

The proposition does not require every economic inquiry to reconstruct a complete history. It requires historical depth proportional to the mechanism under study. Where inherited classification, infrastructure, ecological burden, institutional memory, or path dependence materially affects present options, those histories belong inside the economic object rather than outside it as background narrative.

20.1.2 Relational Economic Architecture

Chapter 12 developed economic architecture around subjects, relations, configurations, institutions, access, dependencies, and constraints. At the order level, this architecture prevents the economy from being represented solely as a collection of agents exchanging objects. Economic subjects occupy differentiated positions within households, firms, public institutions, platforms, communities, knowledge systems, ecological relations, and transnational structures. Their practical capacities depend partly on the relations through which resources, information, recognition, authority, care, mobility, and institutional standing are mediated.

A relational architecture does not dissolve individuals into structure. It asks which relations are constitutive of what individuals and collectives can practically do. A formal right can require administrative documentation; an educational opportunity can require time, language, support, and institutional access; a nominally open market can depend on visibility, reputation, interoperability, transport, or payment infrastructure; a scientific capability can depend on laboratories, peer communities, archives, and verification practices. The relevant unit is therefore frequently a configuration in which individual and collective capabilities are jointly produced.

This architecture also supports heterogeneous subjecthood. Persons, households, firms, communities, public institutions, artificial systems, ecological entities, and transnational networks occupy different kinds of economic position. Their agency, affectedness, representation, legal standing, moral standing, responsibility, and capacity for participation should not be collapsed into one subject variable. Chapter 18

made this especially explicit under human–AI coexistence, while Chapter 19 showed that the same distinction matters in welfare, commons, ecology, migration, culture, and public institutions.

The economic-order implication is that institutional design changes relational positions even when measured resource stocks remain constant. A rule can change voice, visibility, bargaining position, dependency, exit capacity, institutional membership, or recognition without transferring money. Conversely, a monetary transfer can leave the surrounding relation unchanged. GRE therefore requires order analysis to track the relational architecture through which distribution becomes capability and participation.

Proposition 20.3 (Relational-adequacy condition). *An economic-order description is relationally adequate only where it identifies the economically consequential relations through which subjects acquire or lose practical access, capability, standing, dependency, participation, and influence over subsequent institutional states.*

The condition is diagnostic rather than maximalist. Not every relation matters for every question. The analytical requirement is to include those relations whose omission would materially alter explanation, evaluation, or feasible intervention.

20.1.3 Allocation and Conversion

Allocation remains central to economics, but GRE broadens its analytical unit. Chapter 13 treated allocation as the distribution or assignment of resources, rights, services, opportunities, burdens, infrastructures, and access positions within a relational configuration. Chapter 19 then repeatedly showed that allocation and realized capability can diverge because allocated objects pass through conversion pathways.

Conversion depends on context. Income can become nutrition, mobility, housing security, learning, or care only through prices, infrastructure, household relations, time, knowledge, bodily condition, legal status, local institutions, and other mediating structures. A public service can exist formally while remaining inaccessible because of documentation, distance, language, interface design, waiting time, or administrative discretion. A digital platform can be formally open while ranking architecture limits visibility. A research grant can purchase equipment while failing to generate durable research capability if training, maintenance, institutional memory, or community remain weak.

Allocation also has downstream structural effects. Public investment in transport changes mobility relations and spatial accessibility; research funding shapes agendas and institutional capacity; welfare design alters risk-bearing and bargaining positions; infrastructure standards shape interoperability; platform rules alter market visibility; ecological allocation can shift burdens across places and generations. Allocation therefore acts on relations and future pathways as well as on current holdings.

This motivates a distinction among at least four analytical moments: *allocation*, concerning what is assigned; *access*, concerning whether the assigned object can be reached or claimed; *conversion*, concerning whether it can become a relevant capability or value realization; and *trajectory effect*, concerning how the resulting configuration alters later possibilities. These moments can be separated empirically even

when they occur rapidly in practice.

Proposition 20.4 (Allocation–conversion condition). *Economic-order evaluation of an allocation should examine the pathways through which allocated resources, rights, services, infrastructures, or opportunities become practically accessible capabilities and should include material downstream changes in relations, constraints, and future options.*

The proposition does not displace distributional analysis. It extends it. Distribution remains ethically and economically important, while conversion analysis helps explain why formally similar allocations can produce different realized possibilities and why some inequalities persist despite nominally equal provision.

20.1.4 Heterogeneous Value Processes

Chapter 14 developed value as a heterogeneous process of generation, realization, conversion, circulation, capture, return, dissipation, regeneration, and transformation. At the economic-order level, this architecture prevents monetary valuation or aggregate utility from silently becoming the complete description of what an order produces and destroys. Monetary value remains indispensable for many economic questions, yet economic arrangements also affect capability, care, ecological functioning, knowledge, trust, cultural meaning, institutional capacity, time, security, and participation.

Value heterogeneity creates two distinct problems. The first is representational. Different values can be measured with different levels of precision and through different evidential practices. Some can be priced or monetized for specific purposes; others are better represented through multidimensional indicators, qualitative judgment, procedural safeguards, or domain-specific criteria. Representation should therefore remain purpose-indexed. A price, score, index, or utility representation can be useful without becoming an ontological claim that the represented values share one underlying substance.

The second problem is institutional mediation. Economic order must act despite incomplete commensurability. Budgets are finite, infrastructures occupy space, rules privilege some activities over others, and public decisions frequently require closure. GRE does not resolve this problem by refusing aggregation altogether. It asks which values are being translated, which remainders are lost, who has standing in the translation, how uncertainty is represented, and which decisions remain revisable. Procedural architecture becomes especially important where substantive values cannot be fully reduced to a common metric.

Value analysis also concerns circulation and return. Many activities depend on shared substrates that are only partially represented in transaction prices: educational systems, public institutions, ecological processes, scientific knowledge, cultural memory, community trust, care infrastructures, digital standards, and inherited technical systems. Chapter 19 introduced generative value return to ask whether value-generating activities help reproduce the capacities and relations on which their own continuation depends. At the order level, this becomes a problem of recurrent reinvestment and depletion.

Proposition 20.5 (Value-process visibility condition). *Economic-order analysis should keep visible the generation, realization, conversion, circulation, capture, return, and possible dissipation of materially relevant value forms, while preserving evaluative remainders where complete commensuration is unwarranted.*

The proposition leaves normative ranking open. Its purpose is to prevent institutional convenience, data availability, or market price from determining in advance which values count as economically consequential.

20.1.5 Generative Spacetime and Historical Trajectories

Chapter 15 added sequence, delay, accessibility, path dependence, reversibility, historical inheritance, and changing possibility spaces to GRE. These dimensions become decisive at the economic-order level because institutions rarely affect only contemporaneous outcomes. Infrastructure can last for decades; ecological change can be partly irreversible; education changes later capability; welfare institutions stabilize or destabilize life trajectories; platform networks accumulate; legal categories persist; research capacity requires long formation; cultural and institutional memory can disappear faster than it can later be rebuilt.

A static comparison can therefore miss the difference between two orders that produce similar present outputs while generating different future transition capacities. One order can achieve performance through concentrated infrastructure, brittle dependencies, or erosion of local capability; another can achieve similar performance while maintaining redundancy, learning, portable knowledge, and reversible institutional commitments. Their present-state descriptions may look similar while their future option structures differ materially.

The spacetime perspective also complicates efficiency. A faster process can impose downstream maintenance burdens; a cheaper institutional arrangement can externalize future rebuilding costs; a high-return investment can narrow technological pathways; protective regulation can preserve option space while slowing present deployment; redundancy can look inefficient under normal conditions while becoming valuable under disruption. These are not arguments against efficiency analysis. They indicate that the temporal boundary of the analysis matters.

GRE therefore treats economic order as a trajectory-generating configuration. Present institutions define neither one predetermined future nor an unconstrained option set. They alter probabilities, costs, dependencies, interpretive frames, infrastructures, and available transition pathways. Future possibilities are partly produced through the current order.

Proposition 20.6 (Spatiotemporal-adequacy condition). *Economic-order evaluation is spatiotemporally adequate only where materially relevant delay, path dependence, reversibility, inherited burden, transition capacity, and future-option effects are included at scales appropriate to the mechanism under study.*

This condition is deliberately scale-sensitive. Long-horizon analysis does not mean that every decision must be evaluated over the same temporal horizon. Acute humanitarian action, monetary operations, education, infrastructure, ecology, and institutional reform operate on different clocks. The requirement is to choose a horizon

capable of representing the consequential effects of the mechanism rather than defaulting to one conventional period.

20.1.6 Power, Justice, and Governance

Chapter 16 distinguished asymmetry, dependence, control, power, injustice, and governance. This distinction remains essential for economic-order synthesis. Unequal capability, resources, information, institutional access, or technical expertise do not automatically constitute power in the same form. Power emerges where an asymmetry is relationally converted into effective influence over another subject's feasible actions, standing, access, dependencies, or future possibilities, and where the conversion acquires sufficient persistence or efficacy.

The order-level question is therefore mechanistic. Property rights, labor contracts, platform interfaces, professional credentials, administrative procedures, standards, control of infrastructure, data access, financial structures, legal status, and epistemic authority can all mediate power. The same formal asymmetry can have different consequences depending on substitutability, exit, voice, counter-power, transparency, portability, institutional review, and the availability of alternative relations.

Justice enters because economic order distributes more than resources. It distributes exposure to dependency, capacity to convert resources into action, access to institutional correction, recognition, voice, responsibility, and influence over collective futures. Heterogeneous values make justice analysis especially difficult: a procedure can improve aggregate output while narrowing participation, preserve income while eroding standing, or expand formal access while increasing dependency on opaque infrastructure. GRE therefore treats justice as requiring plural evaluative dimensions and explicit mediation rather than automatic derivation from one outcome metric.

Governance is the institutional response to these asymmetries and conflicts, but governance itself can generate power. Monitoring, classification, eligibility rules, standards, algorithms, professional judgments, and emergency procedures can alter practical action spaces. Governance should therefore be analyzed through both its substantive objective and its relational mode of operation.

Proposition 20.7 (Power–governance visibility condition). *Economic-order analysis should identify the mechanisms through which asymmetries become effective power and should evaluate governance arrangements partly through their effects on standing, dependency, contestability, correction, and the capacity to revise consequential relations.*

The proposition does not imply that every asymmetry should be eliminated. Expertise, specialization, care, infrastructure, and institutional division of labor can create beneficial asymmetries. The economic-order problem is to distinguish productive differentiation from dependencies that become opaque, non-substitutable, non-contestable, or systematically depleting of others' generative capacities.

20.1.7 Knowledge and Epistemic Economy

Chapter 17 established knowledge as an economic and generative field rather than a frictionless informational input. Economic order depends on institutions that produce questions, evidence, methods, expertise, archives, standards, verification practices, interpretive communities, and orientation. These epistemic capacities shape both production and governance. An economy unable to identify emerging problems, preserve records, verify claims, or revise classifications can lose adaptive capacity even where current output remains high.

Knowledge also has distinctive economic properties. It can be copied while remaining costly to generate, abundant in symbolic form while scarce in verified or contextually usable form, and publicly accessible while practically inaccessible without language, training, tools, or institutional standing. Attention and orientation become especially consequential under abundance. The order-level question is therefore not merely how much information exists but which epistemic pathways remain capable of producing credible judgment.

Epistemic infrastructure includes universities, schools, libraries, laboratories, archives, professional communities, statistical systems, standards bodies, public records, software, data systems, and informal practices of interpretation and verification. Their capacities depend on funding and material infrastructure, but also on norms of criticism, preservation, provenance, access, succession, and institutional memory. An economic order that consumes these capacities without reproducing them can experience epistemic depletion analogous to the depletion of physical or ecological infrastructure.

Knowledge also intersects with power. Control over classification, expertise, metrics, ranking, data, or verification can shape what becomes institutionally visible and which claims can enter decision processes. Epistemic inclusion therefore does not mean that every claim receives equal evidential weight. It means that the procedures by which knowledge is produced, challenged, corrected, and incorporated remain intelligible and appropriately contestable.

Proposition 20.8 (Epistemic-capacity condition). *A generative economic-order analysis should examine whether its institutions reproduce the capacities required for problem formation, evidence generation, verification, interpretation, preservation, criticism, and revision across the domains on which collective decisions depend.*

The proposition connects epistemic economy to economic resilience without reducing knowledge to instrumental productivity. Cultural, scientific, historical, civic, and practical knowledge can matter because they sustain the interpretive and institutional conditions through which a society recognizes and revises its own problems.

20.1.8 Artificial Intelligence and Capability Asymmetry

Chapter 18 examined economic order under potentially radical and persistent differences in artificial and human capability. At the synthetic level, artificial intelligence matters because it can enter many of the preceding dimensions simultaneously. AI systems can alter production, research, education, administration, cultural generation, coordination, classification, search, monitoring, prediction, and rule execution.

Their economic-order significance therefore cannot be inferred from one task benchmark, labor-substitution rate, or productivity statistic.

The relevant object is a configuration of models, compute, data, energy, software, platforms, organizations, human operators, institutional rules, ownership, access, verification, and dependency. This configuration determines how artificial capability becomes practically available, who can redirect it, who bears error, which capabilities are regenerated, and which forms of participation remain consequential. Concentrated technical capability can become economic power where it is converted through infrastructure control, access restrictions, epistemic authority, institutional delegation, or dependency.

AI also intensifies the distinction between performance and capability. A person or organization can perform more effectively with AI while losing the independent capacity to verify, reconstruct, adapt, or continue when the system changes. Conversely, assistance can accelerate learning and widen capability where institutions deliberately support understanding, judgment, transfer, and participation. The economic-order question concerns the trajectory of the coupled human–AI–institution configuration rather than assistance intensity alone.

Abundance similarly changes location. Generative systems can make symbolic production, search, drafting, simulation, or coding cheaper while attention, trust, provenance, verification, orientation, institutional access, or meaningful participation remain scarce. An economy can therefore become abundant in generated outputs while remaining constrained in the relations through which outputs acquire credibility, meaning, or public consequence.

Proposition 20.9 (AI-order capability condition). *Where artificial systems become recurrent components of consequential economic and institutional processes, economic-order evaluation should include the distribution of AI infrastructure and access together with dependency, verification, human and collective capability reproduction, participation, and institutional revisability.*

The proposition preserves design plurality. It does not predetermine ownership, regulatory, or labor arrangements. It identifies dimensions that become difficult to ignore when artificial capability is embedded in the infrastructure through which economic subjects act and institutions govern.

20.1.9 Research and Application Praxis

GRE is also a theory of inquiry and intervention. Chapters 6–11 developed research-dominant and application-dominant praxis under incomplete knowledge, heterogeneous values, uncertainty, and changing systems. At the order level, this matters because institutional design cannot be separated cleanly from the practices through which institutions are studied, evaluated, implemented, monitored, and revised.

Research-dominant praxis seeks explanation while remaining aware that research categories, measurements, and interventions can alter the systems they describe. Application-dominant praxis seeks responsible action while recognizing that evidence is incomplete, causal mechanisms can be heterogeneous, and interventions can change future conditions. The distinction is one of principal orientation rather

than isolation. Policy experiments generate knowledge; research infrastructures affect domains; administrative systems produce data; institutional interventions can reveal mechanisms that were previously invisible.

This reciprocal relation supports an iterative economic-order method. A provisional design is evaluated against evidence and domain knowledge; implementation reveals conversion failures, power relations, unanticipated effects, and historical constraints; those findings revise both the intervention and the framework used to understand it. Reversibility, monitoring, and learning become analytically important because they preserve opportunities for correction when uncertainty is material.

Praxis also places responsibility on evidence architecture. What is measured, whose experience is represented, which time horizons are monitored, which failures become visible, and which domains are absent from evaluation can shape subsequent policy. A generative order therefore depends partly on institutions capable of learning about their own consequences without treating metrics as complete substitutes for judgment.

Proposition 20.10 (Praxis-feedback condition). *Economic-order inquiry should organize research, intervention, monitoring, and revision as mutually corrective processes where consequential uncertainty, domain remainder, or institutional learning makes one-pass optimization analytically inadequate.*

This condition does not imply perpetual experimentation with basic protections or rights. Some commitments can appropriately be durable. The relevant question is which aspects of an order require continuity and which require revisable operational forms, evidential standards, or implementation pathways.

20.1.10 Open Programme Synthesis

The preceding dimensions form a synthesis because they constrain one another, yet they do not collapse into one master criterion. Historical formation affects relational architecture; relational positions shape conversion; conversion affects value realization; value conflicts interact with power; power influences knowledge; knowledge conditions governance; artificial intelligence changes capability and epistemic dependence; and praxis feeds new evidence back into the programme. Economic order is therefore a coupled configuration whose evaluation is necessarily multidimensional.

This coupling also explains why isolated improvements can be misleading. Higher output can coincide with capability depletion; wider formal access with weaker practical conversion; greater informational abundance with lower verification capacity; stronger short-run resilience with long-run lock-in; efficient platform coordination with concentrated dependency; ecological preservation with exclusionary governance; stable income with declining institutional participation. GRE does not infer that such trade-offs are inevitable. It makes them visible so that their existence, magnitude, and distribution can be investigated rather than assumed away.

An open synthesis should also preserve distinctions among analytical, empirical, formal, and normative claims. A relational model can identify a dependency without establishing that it is unjust. A historical account can explain an institution without legitimating it. A formal representation can clarify dynamics without establishing on-

tology. A domain remainder can motivate theoretical revision without immediately becoming a universal concept. A normative proposal can be argued for without being presented as a deductive consequence of GRE's descriptive architecture.

The synthesis is open in a second sense: future domains and future historical conditions can revise the framework. Chapter 19 demonstrated that welfare, commons, platforms, migration, ecology, and culture each exposed distinctions that were less visible in the earlier general framework. Chapter 20 should therefore avoid turning the book's final economic synthesis into a closure that would contradict the research programme it develops.

Proposition 20.11 (Open-synthesis condition). *GRE programme synthesis should integrate historically and comparatively warranted structures while preserving explicit scope conditions, unresolved value conflict, domain-specific remainder, empirical uncertainty, and pathways for theoretical and institutional revision.*

This proposition establishes the working discipline for the rest of Chapter 20. The following sections can ask more direct questions about evaluation, policy, institutions, infrastructure, participation, recirculation, abundance, artificial intelligence, governance, and futures because the present section has defined the object they act upon: a relational economic order whose consequences unfold through conversion, history, capability, value, power, knowledge, and changing possibility spaces. The task is now to develop evaluative and institutional tools adequate to that object without transforming the framework into a closed blueprint.

20.2 Generative Economic Evaluation

The role of this section is to develop an economic-order evaluation architecture adequate to the generative relational object defined in Section 20.1. Its objective is to specify how an arrangement, intervention, institution, infrastructure, or economic-order trajectory can be evaluated when consequential effects extend beyond immediate outputs into relations, capabilities, constraints, recursive returns, and future possibility structures. The section therefore moves through ten evaluative dimensions: immediate outcomes, relational incidence, downstream propagation, delayed and cumulative effects, capability formation and regeneration, constraint transformation, option-space and reachability effects, generative return, history-space and transition-potential effects, and historically situated evaluation. The method is layered and claim-indexed. Each evaluative statement is tied to a specified object, affected position, temporal horizon, scale, comparison basis, evidential standing, attribution status, and normative criterion where judgment extends beyond description.

Chapter 13 developed a layered evaluation architecture for allocation. The present section extends that architecture to economic order as a whole. The difference in scope is consequential. Allocation evaluation begins from a focal allocative event or process and traces its effects. Economic-order evaluation can begin from a more distributed configuration in which many institutions, infrastructures, rules, dependencies, and value processes interact over time. The focal object can therefore be a policy regime, welfare architecture, platform ecosystem, labor-market arrangement, research system, public infrastructure configuration, ecological economy, or another

historically extended order whose effects cannot be attributed to one allocation event alone.

Economic-order evaluation also requires discipline about aggregation. Some consequences can be represented through prices, quantities, rates, indices, or other scalar measures. Others concern standing, dependency, repair capacity, institutional memory, ecological regeneration, epistemic reliability, interpretive continuity, or practical reachability. These objects can sometimes support partial ordering or domain-specific metrics without supporting one common scale. GRE therefore treats evaluation as a structured profile rather than presuming that adequacy requires a single composite score.

Definition 20.12 (Generative economic evaluation profile). *A generative economic evaluation profile is a structured, claim-indexed reconstruction of materially relevant effects of an economic arrangement or trajectory across specified subjects or relational positions, spatial and institutional scales, temporal horizons, and evaluative dimensions, together with the comparison basis, evidential support, attribution status, uncertainty, and normative criterion associated with each claim.*

Definition 20.12 makes two forms of plurality explicit. The first is plurality of effects: one arrangement can improve an immediate outcome while weakening a capability, increase output while intensifying dependency, or stabilize a service while narrowing future revision paths. The second is plurality of warrants: a measured outcome difference, a reconstructed mechanism, a qualitative account of institutional dependence, a formal scenario, and a normative judgment do not possess the same evidential status merely because they appear within one evaluation. A profile keeps these claims jointly visible without erasing their differences.

Table 20.2 summarizes the ten dimensions developed below. The dimensions form an analytical sequence rather than a mandatory checklist. A narrow decision can warrant a narrow profile. Broader profiling becomes important where the arrangement materially alters relations, capacities, constraints, institutions, or future option structures.

Proposition 20.13 (Profile-adequacy condition). *Generative economic evaluation is more adequate when materially relevant effects are represented at the level of differentiation required by their mechanisms, affected positions, horizons, and evidential standing, while aggregation is limited to dimensions for which a defensible translation or common metric has been established.*

Proposition 20.13 is a scope discipline rather than a demand for maximal complexity. It permits conventional outcome measures where they are sufficient for the claim. It requires additional dimensions where economically consequential effects would otherwise remain invisible.

20.2.1 Immediate Outcome Profiles

Immediate-outcome evaluation identifies near-term manifestations that are sufficiently close to the focal arrangement or change to serve as an initial account of what occurred. The relevant clock depends on the process. A payment can have an immediate outcome within days; an education programme can have an immediate

Table 20.2: Dimensions of generative economic evaluation.

Dimension	Primary evaluative object	Characteristic question	Principal caution
Immediate outcome	Near-term manifested condition	What changed close to the focal process under the relevant practical clock?	Early observability can underrepresent wider incidence
Relational incidence	Positions, roles, dependencies, standing, and coordination	Which economically consequential relations changed, and for whom?	Recipient-level measures can miss relational redistribution
Downstream propagation	Effects traveling through linked systems or positions	Through which pathways did effects extend beyond the focal boundary?	Tracing requires a materiality-based stopping rule
Delayed and cumulative effects	Latent, compounding, threshold, or maintenance-dependent consequences	Which effects emerged only after time, repetition, or intermediate processes?	Temporal sequence alone does not establish attribution
Capability formation	Individual, collective, institutional, epistemic, or regenerative capability	Which capacities to act, learn, coordinate, maintain, verify, repair, or adapt changed?	Temporary substitution can resemble durable capability
Constraint transformation	Material, institutional, relational, epistemic, normative, or biophysical constraints	Which constraints were relaxed, intensified, redistributed, or converted?	Constraint removal can create new dependencies elsewhere
Option-space effects	Practically reachable actions, exits, revisions, and alternatives	Which possibilities became accessible, fragile, restored, or foreclosed?	Nominal option counts can misstate practical reachability
Generative return	Value-bearing effects re-entering later activity	What generated conditions returned to support later generation, maintenance, or adaptation?	Return requires provenance and does not imply overall desirability
History-space and transition potential	Support for future paths, transition structure, and admissible histories	Did the arrangement reweight paths, alter transitions, or transform the represented possibility structure?	Represented support differs from practical structural change
Historical evaluation	Warrants and consequences across changing knowledge states	How should the arrangement be evaluated at different historical positions?	Ex post knowledge should not silently replace ex ante information

outcome at the end of a term; an infrastructure investment can have an immediate outcome when service becomes operational. GRE therefore indexes immediacy to the mechanism and implementation architecture rather than assigning one universal duration.

Immediate outcomes can concern delivery, access, uptake, continuity, production, safety, income, service quality, participation, utilization, environmental load, administrative processing, or another manifested condition. The object should follow from the stated purpose and mechanism. A welfare reform can be evaluated initially through realized access and income stabilization; a platform rule through participation, visibility, transaction completion, or exclusion; a public-infrastructure change through service availability and reliability; an ecological intervention through specified material or biological indicators.

A comparison basis is required even at this first layer. Depending on the inquiry, evaluation can use a pre-change baseline, an explicit target, a contemporaneous comparator, an estimated counterfactual, a legal or institutional standard, or a plausible historical trajectory. These baselines answer different questions. Improvement relative to the previous period can coexist with deterioration relative to an appropriate comparison group or a failure to meet an institutional obligation.

Distribution should remain visible. Aggregate improvement can coexist with de-

terioration for particular groups, regions, organizational positions, or subject types. Immediate-outcome profiling should therefore identify whose outcome is being measured, which aggregation rule is being used, and whether the average conceals materially relevant heterogeneity. This requirement is especially important where an order contains differentiated standing or conversion capacity.

Immediate outcomes are often attractive because they are comparatively observable. That observability should not enlarge their interpretive scope. A rise in employment, service uptake, output, or test performance can establish a near-term change under an adequate design without establishing durable capability formation, relational improvement, long-horizon welfare, or generative return. Immediate-outcome evaluation is therefore the entry layer of a broader profile.

Proposition 20.14 (Immediate-outcome specification). *An immediate-outcome claim is adequately specified when the focal manifestation, affected population or position, comparison basis, process-relative horizon, and evidential basis are explicit, and when broader relational or long-horizon significance is treated as a further claim requiring additional support.*

The proposition protects conventional evaluation from two opposite errors. Near-term outcomes should neither be dismissed because they are incomplete nor treated as sufficient merely because they are measurable. Their role is to establish one well-bounded layer of the evaluative profile.

20.2.2 Relational Incidence and Position Effects

Relational evaluation asks how an economic arrangement changes positions and relations through which subjects gain or lose access, authority, recognition, coordination, dependency, bargaining capacity, care, information, or institutional standing. This layer is required because identical recipient-level outcomes can rest on different relational architectures. A household can receive the same income under secure entitlement or discretionary patronage; a worker can receive the same wage under different exit conditions; a creator can receive the same revenue under different platform dependencies; a community can receive the same service under participatory or externally controlled governance.

The relevant incidence boundary therefore extends beyond the nominal recipient where relational effects are material. A subsidy can alter supplier dependence, household bargaining, regional infrastructure, or administrative standing. A platform rule can change the relation among sellers, customers, complementors, and ranking systems. A research funding regime can change relations among institutions, disciplines, infrastructures, and early-career researchers. An ecological policy can redistribute stewardship obligations and exposure across communities or generations.

Relational incidence can also concern who becomes legible to an institution. Classification, documentation, ranking, verification, eligibility, and recognition systems can create or modify positions even before resource quantities change. Being classified as eligible, high-risk, verified, unemployed, resident, contributor, dependent, or authorized can alter the relations through which later opportunities are mediated. Evaluation should therefore include classification effects where they are economically consequential.

The relational layer also makes distribution more precise. Distribution is not only a distribution of objects. It can be a distribution of discretion, waiting time, verification burden, exposure to monitoring, ability to appeal, access to decision processes, or control over conversion interfaces. These relational distributions can partly determine how formal resources become effective capabilities.

Proposition 20.15 (Relational-incidence condition). *Economic evaluation should extend beyond nominal recipients when an arrangement materially changes relations of access, authority, recognition, coordination, dependency, standing, or conversion among positions that affect realized capability or later economic participation.*

This condition does not require tracing every social relation. It requires a bounded incidence analysis guided by the mechanism and the claim. The relevant boundary expands where omitted relational changes would materially alter the evaluation.

20.2.3 Downstream Propagation Across Configurations

Downstream evaluation concerns consequences that propagate beyond the focal intervention, institution, or administrative boundary through economically relevant connections. Propagation can occur through prices, supply chains, labor markets, migration, information, standards, infrastructure, organizational imitation, financial relations, ecological flows, care networks, or institutional precedent. The resulting effects can appear in positions that were never designated as direct recipients.

The evaluation problem is therefore one of pathway reconstruction. A public investment can alter local demand, mobility, land values, institutional capacity, and later private investment. A platform change can alter seller strategy, consumer search, advertising markets, third-party software, and competitor behavior. A migration regime can affect households, employers, remittance systems, care relations, sending-region institutions, and destination public services. A research infrastructure investment can propagate through training, data reuse, collaboration, standards, and downstream technological development.

Propagation analysis needs a stopping rule because every economic process is connected to wider systems. GRE uses materiality, mechanism, horizon, scale, and decision relevance to bound tracing. An effect belongs inside the evaluation where excluding it would materially change the claim being made or the affected-position profile relevant to the decision. Distant or speculative consequences can remain documented as uncertainty without being assigned the same status as well-supported downstream effects.

Propagation also raises attribution problems. The further an effect travels through independent decisions and changing conditions, the more alternative explanations and interacting causes become relevant. Attribution can therefore weaken with relational or temporal distance even when the original process remains a contributory condition. Distributed causation should be represented where appropriate rather than converted into exclusive causal ownership.

Proposition 20.16 (Downstream-tracing condition). *Downstream evaluation is analytically adequate when materially relevant propagation pathways are traced across the positions and systems through which effects travel, while the stopping rule, attribu-*

tion strength, intervening conditions, and uncertainty remain explicit.

This formulation preserves both reach and restraint. Economic-order evaluation can examine propagation without implying that one focal arrangement explains every later event connected to it.

20.2.4 Delayed and Cumulative Effects

Delayed effects emerge after an interval because the relevant mechanism requires maturation, accumulation, learning, institutional reproduction, ecological response, demographic change, network formation, maintenance failure, or another temporally extended process. Cumulative effects arise through repeated episodes whose combined consequence becomes materially different from any one episode considered alone. These structures require an evaluative horizon matched to the mechanism.

Delay can conceal benefit. Education, preventive health, research, infrastructure, institutional capacity, ecological restoration, and cultural preservation can produce important effects only after years of use, maintenance, or transmission. Delay can also conceal harm. Skill erosion, environmental depletion, maintenance debt, institutional dependence, data concentration, loss of interpretive capacity, or weakened local capability can accumulate while short-run outputs remain favorable.

Cumulative effects can be approximately additive in some settings, but many important cases involve thresholds, feedback, path dependence, or changing conversion conditions. Repeated under-maintenance can eventually cause system failure. Small exclusions can accumulate into durable standing differences. Repeated algorithmic ranking can reshape market visibility. Persistent extraction can reduce ecological regenerative capacity. Recurrent emergency substitution can weaken local institutional reproduction. The evaluative object is therefore sometimes a trajectory or process regime rather than a sum of isolated events.

Temporal comparison also requires attention to maintenance. A benefit can appear durable only because continuing resources, labor, care, software updates, administrative capacity, or ecological stewardship remain available. Evaluation should distinguish an effect that persists autonomously from one that persists through continuing maintenance. The latter can still be highly valuable, but its maintenance dependence belongs in the profile because it affects cost, vulnerability, and transition planning.

Proposition 20.17 (Delayed-and-cumulative condition). *Where material consequences depend on maturation, repetition, accumulation, threshold behavior, maintenance, or institutional reproduction, economic evaluation should use a horizon and process representation capable of distinguishing delayed emergence, cumulative change, and persistence conditions from immediate manifestation alone.*

The condition guards against temporal truncation. It also guards against indefinite extrapolation: later effects remain claims that require mechanism evidence rather than presumed continuation of early trends.

20.2.5 Capability Formation and Regeneration

Capability evaluation asks how an economic arrangement changes practical capacities to act, learn, coordinate, maintain, verify, repair, adapt, participate, or reorganize. The carrier of capability can be an individual, household, organization, institution, community, epistemic network, or another collective configuration. Chapter 19 repeatedly showed that collective and institutional capabilities can be irreducible to a sum of individual skills because they depend on relations, procedures, infrastructures, memory, and coordination.

A central distinction concerns service substitution and capability formation. An external provider can solve a problem without increasing the recipient's ability to solve related future problems. Artificial intelligence can raise current task performance while reducing practice in verification or judgment. Centralized humanitarian logistics can protect life while temporarily substituting for disrupted local systems. Outsourcing can improve short-run service delivery while weakening in-house maintenance knowledge. None of these patterns is intrinsically undesirable. Evaluation should identify which function is being optimized and whether future capability reproduction matters to the arrangement's purpose.

Capability formation also differs from capability regeneration. Formation concerns the creation or strengthening of a capacity. Regeneration concerns the ability to reproduce, renew, repair, transmit, or adapt that capacity after turnover, disruption, technological change, or environmental pressure. A research institution with one exceptional expert can possess high current capability and low regenerative capacity. A public service can function well while succession systems erode. A community can coordinate effectively while losing the practices through which new members acquire stewardship competence.

Capability evaluation should therefore examine carriers, enabling conditions, conversion pathways, maintenance requirements, transmission, and substitutability. It should also preserve distinctions among productive, epistemic, institutional, relational, ecological, and judgment capacities where their mechanisms differ.

Proposition 20.18 (Capability-regeneration condition). *Economic evaluation of capability is more adequate when it distinguishes current performance, formed capability, and regenerative capability, and identifies the subjects or configurations that carry the relevant knowledge, relations, infrastructures, routines, and maintenance conditions.*

This proposition is particularly important for long-horizon economic order because high current output can coexist with low capacity to reproduce the conditions on which that output depends.

20.2.6 Constraint Transformation and Burden Redistribution

Constraint evaluation asks how an arrangement changes the conditions that limit, channel, protect, stabilize, or structure economic action. GRE treats constraints as typed. Material scarcity, legal rules, administrative procedures, infrastructure limits, social obligations, epistemic uncertainty, platform standards, ecological thresholds, and institutional mandates constrain activity through different mechanisms. Their evaluative meaning depends on the focal process and affected positions.

Constraint relaxation can expand capability. Removing an exclusionary rule, reducing transport barriers, improving interoperability, releasing time, providing translation, or increasing information can open participation. Constraint relaxation can also redistribute burdens. A rule that simplifies participation for one group can shift verification labor to another. A platform that removes seller entry barriers can intensify attention competition. Faster permitting can reduce delay while weakening a protective review process. Increased mobility can expand labor opportunities while increasing dependence on transport, documentation, or digital systems.

Some constraints are generative because they coordinate, protect, or preserve enabling conditions. Safety standards, ecological limits, professional obligations, due-process requirements, data-governance rules, and maintenance protocols can restrict immediate action while sustaining trust, resilience, fairness, or future capability. Evaluation should therefore distinguish the existence of a constraint from its mechanism, incidence, revisability, and relation to the protected object.

Constraint transformation can also occur through conversion. A financial constraint can become a time burden; a legal right can become practically inaccessible through administrative friction; a technological bottleneck can become organizational dependence; an ecological limit can become a distributional burden through pricing or rationing. Evaluating the removed constraint alone can miss the new constraint generated elsewhere in the configuration.

Proposition 20.19 (Constraint-transformation condition). *Generative economic evaluation should identify materially relevant constraints by type and examine whether an arrangement relaxes, intensifies, relocates, converts, or creates them across affected positions, while preserving the distinction between protective coordination and restrictive burden.*

The proposition provides a symmetric discipline: neither more constraint nor less constraint is an evaluative conclusion by itself. The object is the changed constraint architecture and its consequences.

20.2.7 Option-Space and Reachability Effects

Option-space evaluation concerns changes in the practically reachable actions, relations, exits, revisions, and future pathways available to specified positions. The emphasis on reachability is essential. A formally available alternative can have little practical value when cost, standing, information, infrastructure, documentation, skill, location, dependency, or coordination requirements make it inaccessible. Conversely, a modest institutional change can create a consequential option when it removes one binding conversion barrier.

Option-space effects can involve creation, preservation, restoration, diversification, fragilization, or foreclosure. Interoperability can preserve switching options. Savings or social protection can preserve the option to refuse unsafe work. Legal recognition can create a new route to institutional participation. Redundant infrastructure can preserve service alternatives under disruption. Exclusive standards or accumulated platform dependence can narrow exit. Ecological degradation can foreclose histories dependent on damaged systems. Long contracts can support investment while narrowing near-term revision.

More options do not automatically imply a better economic order. Some options can be harmful, exploitative, unsafe, or inconsistent with legitimate commitments. Durable cooperation can require actors to relinquish some unilateral options. Environmental protection can intentionally close destructive pathways. Evaluation should therefore identify which option is being preserved or foreclosed, for whom, why it matters, and which normative or institutional criteria justify the change.

Option-space analysis also makes uncertainty more tractable where precise forecasting is unavailable. An arrangement can be assessed partly by whether it preserves diversified pathways, modularity, liquidity, portability, repairability, reversible commitments, or institutional revision even when the probability of each future state is unclear. These indicators are useful only where the mechanism connecting them to practical reachability is specified.

Proposition 20.20 (Reachability-sensitive option condition). *An option-space claim is economically meaningful when it identifies the relevant option or pathway, the position for which it is reachable, the conversion conditions required for exercise, and the mechanism through which the arrangement creates, preserves, restores, weakens, or forecloses that reachability.*

This condition prevents nominal possibility from standing in for effective freedom while leaving room for justified commitment and protective closure.

20.2.8 Generative Return and Recursive Effects

Chapter 14 defined generative return as a value-bearing effect attributable, with stated scope and evidential standing, to an earlier generative process and re-entering later activity as a condition of further generation, maintenance, coordination, adaptation, participation, or transformation. Economic-order evaluation uses that concept to ask whether an arrangement reproduces the conditions on which later value generation depends.

Recursive effects can take many forms. Education can return capability into later learning and work. Research can return knowledge, methods, infrastructure, or trained researchers. Public infrastructure can return mobility, reliability, or coordination capacity. Care can return health, time, participation, and relational continuity. Commons stewardship can return ecological or institutional viability. Cultural preservation can return interpretive capacity. Platform ecosystems can return complementary innovation while also capturing data or attention in ways that reshape later participation.

Generative return is therefore distinct from financial return, although financial return can be one component. It is also distinct from persistence. A condition can persist without re-entering a later generative process, and a return can occur after transformation into another value form. The evaluative questions concern provenance, re-entry pathway, carrier, incidence, horizon, maintenance conditions, and uncertainty.

Recursive effects can be adverse. Debt, technical lock-in, depleted reserves, institutional burden, surveillance infrastructure, ecological damage, or capability erosion can also re-enter later processes and shape what becomes possible. The language of

return is most useful for value-bearing re-entry; burdensome recursive effects should be named directly where calling them returns would obscure their evaluative status.

Attribution should remain distributed where the underlying generation is distributed. A later innovation can depend on public education, prior research, infrastructure, organizational routines, open knowledge, and many contributors. A provenance-sensitive account can identify material contribution without turning visibility at the final step into exclusive ownership of the return.

Proposition 20.21 (Generative-return evaluation condition). *Economic-order claims about generative return should identify the originating process or configuration, the value-bearing condition that later re-enters activity, the affected positions, the re-entry pathway, the relevant horizon, and material attribution uncertainty, while preserving heterogeneous value forms where no warranted common metric exists.*

Generative-return evaluation thus connects current economic performance to the reproduction of future productive, institutional, epistemic, ecological, cultural, and relational conditions without requiring those conditions to be valued in one unit.

20.2.9 History-Space and Transition-Potential Effects

History-space evaluation asks whether an arrangement changes the represented family of possible economic histories, the transition relations among configurations, or the practical accessibility of different continuations. The representation can be qualitative or formal. Chapter 15 introduced typed history weights and transition potentials precisely to distinguish several meanings that numerical or comparative support can carry. Economic evaluation should preserve that typing.

Three kinds of change are especially important. *Path reweighting* changes the relative evidential support, decision support, attractiveness, cost, or practical plausibility assigned to paths already represented. *Transition change* alters how one configuration can lead to another by modifying resources, capacities, constraints, rules, or coordination. *History-space transformation* changes which actions, states, institutions, or histories need to be represented at all because the underlying possibility architecture has changed.

These distinctions matter for evaluation. New evidence can reweight a policy path without changing the economic configuration. A transport investment can change practical transitions by connecting previously separated activities. A new legal institution can create a class of recognized actions that was previously unavailable. A technical standard can close some transition routes while creating others. Artificial intelligence can change both the cost of tasks and the set of feasible organizational forms. Ecological threshold crossing can remove histories that depended on a prior biophysical regime.

Transition-potential analysis should remain typed. A transition can be technically feasible and normatively undesirable, politically difficult, financially expensive, or weakly supported by evidence. A numerical representation of one dimension should not silently become a probability or welfare ranking. Where the inquiry uses scenario graphs, simulations, partial orders, or dynamical models, the meaning of each weight or transition quantity must therefore remain explicit.

History-space analysis is especially valuable under structural uncertainty. Evaluation can ask whether an arrangement creates robust transition routes, preserves repair or exit pathways, increases dependence on one narrow branch, or makes later institutional revision prohibitively costly even when the likelihood of particular future states is unknown. Such claims can often be supported through mechanism and scenario analysis without assigning precise probabilities to every branch.

Proposition 20.22 (History-space evaluation condition). *Where an economic arrangement materially changes future-path support, practical transition structure, or the set of admissible or represented histories, evaluation should distinguish path reweighting, transition change, and history-space transformation, and should state the type and evidential meaning of any transition-potential or history-weight representation used.*

This condition links evaluation to the book's generative-spacetime architecture while preserving ontological restraint. History spaces are analytical representations of possible economic continuation, not claims that futures exist as a unique pre-given mathematical object.

20.2.10 Historically Situated Evaluation

Historically situated evaluation reconstructs an economic arrangement across changing states of knowledge, institutional capacity, available alternatives, value recognition, and realized consequence. Its role is to prevent later information from silently replacing what decision-makers and affected participants could reasonably know or contest at an earlier historical position. The distinction is central to accountability, learning, and re-epistemization.

At least three evaluative positions are often useful. An *ex ante position* reconstructs the evidence, expectations, alternatives, institutional obligations, capabilities, and uncertainty present before or at the time of decision. An *implementation position* examines how the arrangement was enacted, including deviations, adaptations, participation, failures, and emerging effects. An *later reconstruction position* incorporates delayed outcomes, new evidence, revised concepts, changed values, and historical comparison. These positions can support different judgments because they answer different questions.

A favorable later outcome does not establish that an earlier decision was well warranted. Good fortune, unanticipated complementarity, later repair, or external support can improve an initially weak arrangement. An adverse later outcome likewise does not establish that the earlier decision was unreasonable if material information was unavailable or a low-probability event occurred. Evaluation should therefore distinguish *ex ante* warrant, implementation quality, realized consequence, and later reinterpretation.

Historical evaluation also permits normative learning. Later societies can recognize harms, affected subjects, ecological consequences, data rights, care burdens, or forms of exclusion that earlier institutions did not adequately represent. Present evaluation can legitimately use those criteria while making clear that they are part of a later evaluative standpoint. This distinction supports critique without constructing a fictional history in which earlier actors possessed later concepts and evidence.

The evaluative apparatus itself can be endogenous to economic order. Institutions shape which data are collected, which groups are represented, which indicators become authoritative, which time horizons receive attention, and which failures become legible. A platform can generate the data used to evaluate platform effects; a welfare administration can define the categories through which unmet need is observed; a research system can reward the outputs by which its productivity is later measured. Historically situated evaluation should therefore record the provenance and institutional production of evidence where those conditions materially affect interpretation.

Re-epistemization completes this section's logic. Later evidence can revise judgments about earlier events, but revision should preserve the evidential history through which the judgment changed. A programme can move from plausible to weakly supported, or from apparently harmful to beneficial, as information accumulates. A concept can also change: what counted as access, capability, harm, or value can be refined through domain inquiry. Evaluation is consequently a history of warranted claims as well as a history of economic effects.

Proposition 20.23 (Historical-evaluation condition). *Generative economic evaluation should distinguish the evidence, alternatives, criteria, and institutional capacities available at materially different historical positions, preserve the provenance of later revisions, and separate ex ante warrant, implementation, realized consequence, and retrospective re-epistemization where those judgments can diverge.*

The ten-dimensional architecture developed in this section gives Chapter 20 an evaluation layer suited to the economic-order object defined in Section 20.1. Immediate outcomes remain necessary, yet they are situated within a wider profile of relational incidence, downstream propagation, delayed effects, capability regeneration, constraint transformation, option-space change, generative return, history-space transformation, and historical warrant. This architecture does not predetermine which dimensions should dominate a particular decision. It identifies the kinds of economically consequential effects that require explicit treatment when they are material to the inquiry.

The next section can therefore move from evaluation to policy. Section 20.3 asks how resources, relational infrastructure, capability formation, generative investment, option preservation, adaptation, learning, and exit can be organized when policy is informed by a multidimensional and historically situated evaluation profile rather than by one immediate outcome alone.

20.3 Generative Economic Policy

The role of this section is to translate the economic-order evaluation architecture developed in Section 20.2 into a policy architecture. Its objective is to specify how economic policy can organize resources, rules, infrastructures, capacities, learning, and revision when policy effects are evaluated across immediate outcomes, relational incidence, capability regeneration, constraint transformation, future reachability, and historical change. The section develops eight policy dimensions: allocation-conversion architecture, relational infrastructure provision, capability regeneration,

generative investment, option-space preservation, adaptive policy, policy learning, and exit-sensitive closure. The method is design-oriented but non-prescriptive. GRE identifies policy objects, tracing requirements, revision conditions, and recurrent failure modes without deriving one universally preferred policy instrument, scale, or institutional form.

Economic policy is used here in a broad but bounded sense. It includes public and publicly authorized arrangements that shape economic resources, access, incentives, rules, infrastructures, protections, capacities, and transition conditions over time. Taxation, transfers, public investment, procurement, regulation, standards, service provision, credit architecture, labor-market institutions, research funding, social protection, infrastructure governance, and transition programmes can therefore enter the analysis where they have materially economic effects. The term does not imply that economic order is produced by the state alone. Chapter 19 showed that firms, platforms, communities, research institutions, transnational arrangements, and ecological governance also organize economically consequential relations. Policy operates within and upon these wider configurations.

The distinction between policy and isolated intervention is also important. Chapters 10 and 11 developed general methodologies for application-dominant praxis, decision, intervention, monitoring, reversibility, and practical closure. The present section specializes those resources to economic policy, where commitments are often recurrent, institutionally layered, population-wide, and entangled with infrastructures and expectations that accumulate over time. A policy can therefore generate effects through repeated eligibility rules, financing arrangements, administrative pathways, technical standards, or investment priorities even where no single intervention event captures the whole causal structure.

Definition 20.24 (Generative economic policy configuration). A *generative economic policy configuration* is a historically situated arrangement of policy objectives, instruments, resources, institutional responsibilities, implementation pathways, affected positions, monitoring practices, revision conditions, and transition provisions, evaluated through the immediate and generated economic relations, capabilities, constraints, value processes, and future possibilities that the arrangement materially shapes.

Definition 20.24 gives policy a configuration-level object. A tax rate, subsidy, entitlement, procurement rule, investment programme, or technical standard can remain an analytically useful instrument, yet its effects depend on the institutional and relational configuration through which it operates. Eligibility, information, administrative capacity, market structure, complementary infrastructure, bargaining position, legal standing, timing, and implementation can materially change the realized policy relation.

A generative orientation also changes the temporal scope of policy reasoning. Immediate relief, stabilization, or output can be fully legitimate objectives. The additional question is what conditions the policy creates for later action. A policy can secure present consumption while weakening administrative capacity, or impose a present cost while building infrastructure that lowers future dependency. It can widen present access while creating technical lock-in, or restrict one activity while preserving ecological or institutional capacities on which later activity depends.

Table 20.3: Dimensions of generative economic policy.

Policy dimension	Primary object	Generative question	Characteristic policy risk
Allocation–conversion	Resources, rights, access pathways, incidence	Can nominal provision be converted into usable capability across affected positions?	Formal allocation with weak practical conversion
Relational infrastructure	Physical, administrative, legal, digital, epistemic, care, and coordination systems	Which relations require durable provision, maintenance, and interoperability?	Asset provision without maintenance or usable access
Capability regeneration	Human, collective, institutional, epistemic, and maintenance capability	Does policy reproduce capacities needed for later action and adaptation?	Service substitution accompanied by capability erosion
Generative investment	Resource commitment to future productive or enabling conditions	What future capacities, infrastructures, relations, or option structures are being built?	Narrow return measures that omit substrate depletion
Option-space preservation	Reachable alternatives, transition routes, repair and reversal pathways	Which future actions remain practically attainable after commitment?	Present optimization that creates costly lock-in
Adaptive policy	Monitoring, thresholds, modularity, revision, staged commitment	Can policy change as evidence and conditions change?	Flexibility without accountability or revision capacity
Policy learning	Evidence, institutional memory, comparison, re-epistemization	Can implementation generate usable knowledge for later policy revision?	Data accumulation without organizational learning
Exit-sensitive closure	Exit, reversal, transition, residual obligations, burden on remaining positions	Can a policy be ended or transformed without unmanaged relational damage?	Formal sunset or withdrawal with stranded dependencies

Policy analysis therefore benefits from a record that connects immediate objectives to generated conditions rather than treating long-horizon effects as a separate afterthought.

Proposition 20.25 (Policy–evaluation alignment condition). *Where an economic policy materially alters relations, capabilities, constraints, infrastructures, dependencies, or future reachability, its design and review should connect the operative policy mechanism to the corresponding dimensions of the generative economic evaluation profile in Section 20.2, with scope proportionate to consequence, uncertainty, duration, and reversibility.*

Table 20.3 summarizes the eight policy dimensions developed below. The table is an analytical map rather than a mandatory instrument sequence. A narrowly scoped policy can require only a subset of the dimensions, while broad or durable policy regimes can require explicit treatment of most of them.

20.3.1 Allocation–Conversion Policy Architecture

Allocation remains a central operation of economic policy, yet Chapter 13 showed that allocation becomes economically meaningful through conversion. A policy can distribute money, rights, licenses, quotas, service entitlements, credit, land access, infrastructure access, or time while producing highly unequal realized capability because affected positions face different conversion conditions. Generative policy therefore treats allocation and conversion as one connected design problem.

The first policy task is to specify the allocative object. A monetary transfer differs from a service entitlement, a legal right, a public option, a technical standard, or guaranteed access to infrastructure. The second task is to identify the pathway through which the object becomes usable. Information, documentation, transport, language,

digital access, time, care responsibilities, legal status, complementary assets, and administrative capacity can each mediate conversion. The third task is to reconstruct incidence beyond the nominal recipient. A childcare subsidy can alter household time, provider markets, labor participation, public budgets, and care-sector wages. A research grant can affect laboratories, trainees, suppliers, publication infrastructures, and future research capacity.

Policy can therefore fail even when formal allocation is accurately executed. A benefit can be delivered yet remain inaccessible to people unable to navigate administrative requirements. Infrastructure funding can be allocated while maintenance capability remains absent. Credit can be expanded where market concentration or weak bargaining position prevents productive conversion. Conversely, a modest resource allocation can have large generative effects where complementary capacities and institutions are already present.

Definition 20.26 (Policy conversion pathway). A *policy conversion pathway* is the sequence of institutional, material, informational, legal, relational, and capability conditions through which a policy-provided resource, right, service, or opportunity becomes practically usable by a specified affected position.

The pathway can contain multiple failure points and can differ across positions. Its analysis therefore complements distributive incidence. Equality of nominal allocation can coexist with substantial inequality in realized access, while unequal nominal allocations can sometimes be designed to address unequal conversion conditions. The evaluative justification for such differences remains a normative question that should be stated explicitly rather than embedded silently in administrative design.

Allocation policy should also track burden conversion. Taxes, compliance requirements, waiting periods, reporting obligations, contribution rules, and eligibility tests can translate into different burdens depending on time, expertise, organizational scale, or access to professional assistance. A policy architecture that traces benefits but ignores burden conversion can misidentify its relational incidence.

Proposition 20.27 (Allocation–conversion policy condition). *Where a policy distributes resources, rights, services, opportunities, or obligations, policy design should identify materially relevant conversion pathways for affected positions and distinguish nominal allocation, practical access, realized capability, and redistributed burden where these can diverge.*

This condition does not require exhaustive tracing of every indirect effect. Proportionality remains important. The tracing burden should increase where affected positions face heterogeneous conversion conditions, where access is administratively complex, where policy consequences are durable, or where failure can produce substantial dependency or exclusion.

20.3.2 Relational Infrastructure Provision

Economic policy frequently operates through infrastructures whose contribution is partly invisible when analysis focuses only on transactions or final outputs. Chapter 19 showed that education, research, welfare, communities, platforms, public institutions, migration, ecology, and culture all depend on infrastructures that organize

practical relations. These infrastructures can be physical, legal, administrative, digital, epistemic, care-based, ecological, or coordinative. Policy can therefore shape economic possibility by creating, maintaining, connecting, or degrading relational infrastructure.

Relational infrastructure provision differs from project delivery alone. A transport link requires maintenance, operational capacity, standards, institutions, and integration with the activities it is meant to support. A public data system requires governance, provenance, interoperability, security, correction, and practical access. A legal right depends on procedures, records, representation, enforcement, and institutional capacity. Care infrastructure depends on trained people, time, facilities, continuity, financing, and social recognition. Knowledge infrastructure can depend on archives, standards, software, repositories, libraries, educational institutions, and communities able to interpret and reproduce knowledge.

The policy object is therefore partly the relation that infrastructure makes possible. A bridge supports mobility relations; a registry supports administrative recognition; broadband supports communication and access; an archive supports intergenerational epistemic continuity. This relational view can reveal why capital expenditure without maintenance, institutional capacity, or accessibility can produce a nominal asset with weak generative effect.

Infrastructure also creates dependencies. Centralized technical systems can improve coordination while increasing exposure to one operator, standard, provider, or failure mode. Public procurement can create proprietary lock-in. A national registry can improve access while concentrating informational power. Infrastructure policy should therefore consider interoperability, redundancy, fallback capacity, portability, and governance alongside efficiency and scale.

Proposition 20.28 (Relational-infrastructure policy condition). *Where policy relies on infrastructure to sustain economically material relations, provision should evaluate the infrastructure's practical accessibility, maintenance and renewal capacity, interoperability, dependency profile, governance, and contribution to later collective action in addition to initial asset delivery.*

Section 20.5 will examine relational infrastructure as a broader object of economic order. The present subsection establishes the policy implication: infrastructure spending is generative only through the relations and capacities that the infrastructure can sustain over time.

20.3.3 Capability Regeneration Policy

Policy can provide a service directly, enable subjects to develop relevant capabilities, or support institutions that regenerate capability across time. These operations can overlap, yet they have different long-horizon consequences. Section 20.2.5 distinguished current performance from capability formation and regenerative capability. Generative policy uses that distinction to ask when substitution is appropriate and when policy should also reproduce the capacities that make future action possible.

Direct substitution can be necessary. Emergency income support can substitute for lost earnings. Public healthcare can provide capabilities that individuals cannot rea-

sonably reproduce independently. Infrastructure operators can perform technical functions more effectively than dispersed users. A generative orientation therefore does not require that every service recipient become self-sufficient. The policy question concerns the relevant level and distribution of regenerative capability for the domain.

In education, regeneration can concern the learner's capacity to continue learning. In research, it can concern institutional ability to form researchers and maintain methods. In welfare, it can concern administrative capacity, care capacity, and household resilience. In industrial policy, it can concern technical capability, supply-chain learning, standards competence, and organizational routines. In public administration, it can concern professional judgment, institutional memory, and succession. In ecological policy, it can concern stewardship capability and the renewal of ecological functions.

Capability policy therefore requires a typed account. Human skill, collective coordination, institutional memory, repair capacity, epistemic competence, and technological capability are different objects. A policy that improves one can weaken another. Automation can increase immediate service capacity while eroding human verification or maintenance capability. Outsourcing can obtain specialized performance while reducing institutional memory. Training can increase individual skill while organizational rules prevent its use.

Proposition 20.29 (Capability-regeneration policy condition). *Where sustained policy performance materially depends on human, collective, institutional, epistemic, technical, or maintenance capability, policy design should identify which capabilities require preservation, formation, renewal, or external provision and should monitor whether implementation changes the capacity to reproduce those capabilities over time.*

The condition is intentionally plural. Different economic orders can legitimately allocate capability across individuals, communities, markets, public institutions, and technical systems in different ways. GRE asks whether the resulting dependency and regeneration architecture remains visible and revisable.

20.3.4 Generative Investment Architecture

Economic policy often uses investment language to justify present resource commitment by reference to later benefit. GRE broadens the analytical object while preserving the ordinary financial meaning where it is appropriate. Public capital, research, education, care systems, ecological restoration, administrative capacity, standards, cultural infrastructure, community institutions, and open knowledge can generate later value through pathways that are only partially represented by financial return.

Definition 20.30 (Generative policy investment). *A generative policy investment is a policy-supported commitment of resources, institutional attention, or protected time whose justification materially includes the formation, regeneration, or connection of capabilities, infrastructures, relations, knowledge, ecological functions, or option structures expected to support later value generation or collective action.*

The definition does not classify every socially beneficial expenditure as investment.

A generative investment claim should identify what is being formed, the plausible generation pathway, the relevant horizon, the affected positions, the maintenance requirements, and the uncertainty surrounding later return. The language becomes weak when future benefit is merely asserted.

Generative investment also requires attention to substrates. A productive activity can generate measured economic return while drawing down ecological functions, public infrastructure, care capacity, institutional trust, or knowledge commons on which later activity depends. Policy can therefore examine both investment and depletion within the same configuration. Section 20.2.8 introduced generative return as value-bearing conditions that re-enter later activity. Investment policy asks how such returns are produced, distributed, and maintained.

Portfolio reasoning is useful because generative returns can be heterogeneous and uncertain. Some investments yield predictable infrastructure capacity; others support exploratory research, institutional learning, community capability, or option creation whose specific future use is uncertain. An economic policy architecture can therefore distinguish reliable provision, strategic capability formation, exploratory investment, maintenance, and resilience without forcing all categories into one expected-return metric.

Investment also has incidence. Public support can create private asset appreciation, proprietary capability, regional concentration, or platform dependence even where the originating expenditure was broadly financed. Provenance-sensitive analysis can ask who contributes to the generative substrate, who captures realized returns, and whether sufficient value or capability returns to the institutions and relations required for continued generation.

Proposition 20.31 (Generative-investment policy condition). *A policy framed as generative investment should specify the capability, infrastructure, relation, knowledge, ecological function, or option structure being formed; the plausible pathway through which later value or action becomes possible; the maintenance conditions; the distribution of generated benefits and burdens; and the principal uncertainties and depletion risks relevant to the investment claim.*

This condition supplies a bridge to Section 20.7, which will examine value recirculation and social reinvestment more directly.

20.3.5 Option-Space Preservation

Policy often narrows possibilities deliberately. Safety rules prohibit some actions. Standards reduce technical variety to improve interoperability. Land-use decisions commit space to particular purposes. Infrastructure creates path dependence. Long-term contracts stabilize expectations. A generative policy orientation therefore cannot equate openness with maximum optionality. The relevant object is the preservation of economically and normatively material future alternatives under conditions where current commitment is necessary.

Section 20.2.7 distinguished nominal options from practically reachable options, while Chapter 15 developed reachability and transition potential across history spaces. Policy can use these distinctions to ask whether current decisions preserve

repair paths, alternative providers, institutional revision, technological substitution, fiscal room, ecological recovery, or practical exit where future uncertainty makes such alternatives valuable.

Option preservation has costs. Redundancy can be expensive. Interoperability requirements can slow optimization. Maintaining multiple technologies can reduce scale economies. Reversible infrastructure can be less efficient than a specialized irreversible system. Policy analysis should therefore treat option preservation as an evaluative tradeoff rather than a categorical priority. Its importance increases where uncertainty is high, consequences are durable, dependency is concentrated, or the costs of later reversal are strongly asymmetric.

Definition 20.32 (Option-preservation architecture). A *policy option-preservation architecture* is the set of institutional, technical, fiscal, legal, informational, and relational provisions that keep specified future alternatives practically reachable after a policy commitment, including where relevant modularity, interoperability, reserves, fallback capacity, review rights, alternative providers, repair pathways, and reversible stages.

The definition also permits explicit non-preservation. A policy can justifiably close harmful, unsafe, or institutionally unacceptable options. The important requirement is to identify which options are being closed, which are being preserved, and how the judgment is warranted under the available evidence and values.

Proposition 20.33 (Option-preservation policy condition). *Where a policy creates durable path dependence under substantial uncertainty, design should identify materially valuable future alternatives and assess whether their practical reachability warrants protection through modularity, interoperability, reserves, staged commitment, review, fallback, or other locally appropriate mechanisms.*

Option preservation thereby connects economic policy to intergenerational possibility without assuming that future preferences, technologies, or institutions can be fully specified in advance.

20.3.6 Adaptive Policy Architecture

Adaptive policy concerns the organized capacity to revise a policy when evidence, conditions, technologies, institutions, or value judgments change. Adaptation is more demanding than discretionary flexibility. A policy can be formally adjustable while lacking monitoring, decision rights, technical modularity, administrative capacity, or political procedures needed for actual revision. Conversely, frequent discretionary change can reduce predictability, weaken rights, or expose affected positions to arbitrary authority.

Chapter 10 developed provisional closure, monitoring, reversibility, revision, and reopening as practical governance resources. Economic policy adds several scale-specific issues. Policies can shape expectations and investment, create reliance interests, redistribute property values, alter organizational capability, and become embedded in infrastructure or administrative systems. Revision therefore has both benefits and transition costs.

Adaptive design begins by identifying the variables that matter for reconsideration.

These can include outcome thresholds, access failures, fiscal stress, distributional burden, ecological indicators, technological change, dependency concentration, capability erosion, or new evidence about causal mechanisms. A review schedule without a substantive reconsideration rule can become ceremonial. A substantive rule without data, institutional capacity, or authority can remain inoperative.

Modularity can support adaptation. Pilot regions, phased implementation, separable programme components, interoperable standards, bounded experimental authority, and staged investment can permit learning while limiting irreversible exposure. Yet modularity is not universally feasible. Network infrastructures, macroeconomic stabilization, legal rights, and emergency response can require coordinated commitment at scale. The design question is therefore how much modularity and reversibility the policy object permits.

Definition 20.34 (Adaptive policy architecture). *An adaptive policy architecture is a policy arrangement in which materially relevant monitoring, review authority, revision procedures, implementation modularity where feasible, transition protections, and institutional capacity are organized so that policy commitments can be recalibrated in response to specified changes in evidence or conditions without dissolving accountability or basic continuity.*

Proposition 20.35 (Adaptive-policy condition). *Where material uncertainty, technological change, ecological dynamics, institutional learning, or evolving dependency can alter the warrant for an economic policy, policy design should connect monitoring to a practicable revision architecture and should specify how continuity, affected-party protections, and accountability are maintained during adaptation.*

Adaptation therefore concerns governed responsiveness. It does not mean that every policy should remain permanently unsettled. Durable rights and predictable rules can themselves be generative infrastructure, while the procedures through which they are interpreted or amended remain contestable and revisable.

20.3.7 Policy Learning Architecture

Policy learning concerns the capacity of implementation to generate knowledge that can inform later judgment. Monitoring produces observations; learning requires a relation among evidence, interpretation, institutional memory, comparison, and revision. The distinction is important because policy systems can accumulate extensive data while repeating the same interpretive or organizational failures.

A learning architecture should preserve the history of policy assumptions. The original problem formulation, causal expectations, target population, value judgments, uncertainty, and implementation constraints provide the baseline against which later evidence can be interpreted. If these assumptions disappear from institutional memory, outcome data can be detached from the claims they were meant to test.

Learning should also preserve heterogeneity of evidence. Administrative data can reveal utilization and distribution. Qualitative inquiry can reveal barriers, unintended effects, or changes in meaning. Comparative designs can identify differential effects. Historical reconstruction can explain path dependence. Formal or computa-

tional models can explore mechanisms and scenarios. The appropriate combination depends on the policy question; methodological plurality from Chapters 6–9 remains active.

Policy learning can be asymmetric across positions. A programme can learn efficiently about fiscal cost while remaining weakly informed about administrative burden, local institutional effects, care responsibilities, trust, or excluded groups. Evidence architecture therefore has distributive consequences: what the policy can learn depends partly on what it records and whose experience becomes legible.

Definition 20.36 (Policy learning record). A *policy learning record* is a versioned reconstruction of a policy’s problem formulation, assumptions, expected mechanisms, evidence, implementation changes, observed effects, interpretive revisions, unresolved uncertainty, and resulting changes in policy warrant across materially distinct historical positions.

A learning record supports re-epistemization. Later evidence can revise earlier judgments without erasing what was reasonably knowable at the time. It can also reveal that the original categories were inadequate: an indicator may have obscured a conversion barrier, an eligibility category may have excluded a relevant subject, or a success metric may have omitted capability erosion. Learning can therefore modify the policy’s conceptual architecture as well as its parameter values.

Proposition 20.37 (Policy-learning condition). *A policy that is materially expected to learn from implementation should preserve traceable links among its initial assumptions, evidence architecture, implementation history, observed effects, interpretive revisions, and subsequent policy changes, while keeping unresolved uncertainty and materially excluded evidence visible.*

Policy learning thus gives adaptive policy an epistemic substrate. Adaptation without learning can become reactive change; learning without revision can become archival accumulation without practical consequence.

20.3.8 Exit-Sensitive Policy Closure

Economic policies eventually face continuation, renewal, transformation, replacement, or termination. Policy exit is therefore part of design even where no near-term termination is intended. Chapter 10 distinguished revision, reversal, and exit within practical closure. Economic policy adds a configuration-level concern: withdrawal can affect subjects whose livelihoods, rights, investments, organizations, technical systems, or expectations have adapted to the policy.

A formal sunset clause does not by itself provide an adequate exit architecture. Ending a subsidy can strand assets. Closing a public programme can disrupt care relations or administrative records. Withdrawing infrastructure support can undermine complementary services. Ending a regulatory exemption can impose abrupt transition costs. Terminating a platform-dependent public service can create portability and continuity problems. Policy exit therefore has both a decision condition and a transition condition.

Exit design can include advance notice, grandfathering, portability, record preservation, replacement services, compensation, retraining, debt restructuring, technical

migration, staged reduction, ecological restoration, or institutional handoff depending on the policy object. These mechanisms are not automatically required. Their relevance depends on legitimate reliance, dependency, reversibility, distributional burden, public obligation, and the extent to which the policy itself generated the dependence that makes exit costly.

Exit should also remain distinct from policy failure. A successful temporary programme can end because its objective has been met. A programme can be replaced because a better instrument becomes available. A long-lived institution can require transformation rather than termination. Conversely, continuing a policy merely because exit has become costly can entrench lock-in. An explicit exit architecture makes these possibilities easier to distinguish.

Definition 20.38 (Policy exit architecture). *A policy exit architecture is the set of criteria, authorities, transition provisions, continuity protections, record-preservation practices, residual obligations, and burden-allocation rules through which a policy can be ended, replaced, substantially transformed, or allowed to expire.*

The architecture should account for exit remainders. Some effects persist after formal termination: sunk infrastructure, damaged ecosystems, disclosed data, changed expectations, institutional capability loss, accumulated debt, legal precedents, or dependencies among remaining actors. A policy can therefore require post-exit monitoring or repair even when the principal instrument has ceased.

Proposition 20.39 (Exit-sensitive policy condition). *Where an economic policy can generate material reliance, dependency, irreversible effects, or transition burdens, its closure architecture should specify conditions for continuation, revision, replacement, or termination and should identify practicable transition protections, residual obligations, and post-exit remainders proportionate to the policy's consequences.*

The eight dimensions developed in this section connect generative evaluation to policy design without converting GRE into a universal policy formula. Allocation is linked to conversion; infrastructure to maintenance and dependency; service provision to capability regeneration; investment to future generative conditions; commitment to option-space preservation; uncertainty to governed adaptation; implementation to learning; and closure to exit-sensitive transition. Their relative importance depends on the policy object, affected positions, institutional scale, available evidence, values, urgency, and reversibility.

Generative economic policy is therefore best understood as a discipline of policy construction and revision rather than a catalogue of preferred instruments. The framework asks what a policy generates in addition to what it immediately delivers, which capacities and dependencies it reorganizes, which future pathways it opens or closes, how it can learn, and how commitments can be transformed responsibly when their warrant changes. Section 20.4 turns next to the institutional architecture required to sustain such policy capacities over time.

20.4 Generative Economic Institutions

The role of this section is to specify the institutional architecture through which the evaluation and policy principles developed in Sections 20.2 and 20.3 can persist

beyond isolated decisions or temporary programmes. Its objective is to identify the properties of economic institutions that can hold relational mandates, reproduce capabilities, learn from experience, recirculate value, organize participation, remain contestable, and evolve without losing the continuity required for collective action. The section develops eight institutional dimensions: relational mandates, institutional learning, value recirculation, capacity formation, participation and standing, contestability and correction, institutional generativity, and institutional evolution. The method is architectural rather than constitutional. GRE does not derive one preferred ownership form, organizational scale, legal personality, or public–private boundary; it asks what institutional functions and relations must be visible when an institution is evaluated through its generated economic consequences.

The term *economic institution* is used broadly enough to include organizations and durable rule-bearing arrangements whose operation materially structures access, allocation, production, exchange, knowledge, care, infrastructure, finance, ecological stewardship, social protection, or economic participation. A ministry, cooperative, university, pension system, platform, standards body, public bank, professional association, commons institution, foundation, insurer, labor organization, infrastructure operator, or community-governance arrangement can therefore enter the analysis where it stabilizes expectations and allocates rights, obligations, capabilities, resources, or decision authority. The category does not imply organizational homogeneity. Some institutions are formally incorporated organizations; others are distributed rule systems embedded across several organizations and practices.

Institutional analysis also differs from policy analysis. A policy can specify an entitlement, standard, investment, tax, or transition rule, yet its practical effects depend on institutions able to interpret, administer, maintain, learn, correct, and eventually revise that rule. Conversely, institutions can outlive particular policies and preserve capabilities, records, routines, authority, and dependencies that shape later policy possibilities. Section 20.3 therefore supplies one immediate input to the present analysis, while Chapter 19 supplies domain evidence showing that institutional capacity, memory, standing, and maintenance recur across education, research, work, welfare, commons, platforms, public infrastructure, migration, ecology, and culture.

Definition 20.40 (Generative economic institution configuration). A *generative economic institution configuration* is a history-bearing arrangement of mandates, rules, authority, resources, capabilities, infrastructures, membership or affected positions, learning practices, accountability mechanisms, value flows, and revision pathways through which an institution organizes present economic relations while reproducing or transforming the conditions for later collective action.

Definition 20.40 makes institutional generativity a configuration-level property rather than a label attached to organizational form. Public ownership, cooperative membership, private ownership, nonprofit status, decentralization, hierarchy, or network governance can each support or weaken generative conditions depending on the relations through which authority, capability, dependency, participation, and value are organized. The relevant institutional question is therefore not whether one form is inherently generative, but what the form enables, reproduces, concentrates, depletes, or makes revisable under specified historical conditions.

Institutional continuity is equally important. Economic life relies on arrangements

Table 20.4: Dimensions of generative economic institutions.

Institutional dimension	Primary object	Generative question	Characteristic institutional risk
Relational mandate	Authorized purpose, affected relations, obligations, scope	Which relations and positions does the institution have warrant to organize, protect, or transform?	Mission language detached from operative authority and incidence
Institutional learning	Evidence, memory, interpretation, revision	Can experience change institutional understanding and practice?	Data accumulation without retained learning or conceptual revision
Value recirculation	Revenue, surplus, capability, knowledge, maintenance return	Which generated value returns to the substrates required for continued operation?	Extraction or capture accompanied by substrate depletion
Capacity formation	Human, collective, professional, technical, administrative capability	Does the institution reproduce the capabilities required for future performance and adaptation?	Output maintained through capability erosion or concentrated dependence
Participation and standing	Membership, voice, representation, affectedness, contribution	Which positions can influence, contest, or participate in consequential institutional processes?	Formal inclusion with weak practical standing
Contestability and correction	Review, appeal, audit, explanation, remedy, counter-power	Can consequential institutional decisions be challenged and corrected?	Durable authority without practicable correction pathways
Institutional generativity	Reproduction of relations, capability, infrastructure, learning, option space	Does institutional operation renew the conditions for later collective action?	Current performance purchased through long-horizon generative depletion
Institutional evolution	Succession, redesign, boundary change, transformation, dissolution	Can the institution change form while preserving warranted continuity and managing inherited obligations?	Persistence through inertia or abrupt transformation with lost institutional memory

that persist sufficiently for rights, expectations, knowledge, infrastructure, and cooperation to remain usable. Yet continuity can become lock-in where mandate, authority, or capability cannot be revised as conditions change. A generative institutional architecture therefore combines enough stability to support coordinated action with enough learning, contestability, succession, and redesign capacity to remain historically revisable.

Proposition 20.41 (Institutional generativity condition). *Where an economic institution materially organizes access, capability, value, dependency, infrastructure, or participation across time, evaluation should examine both its present functional performance and its capacity to reproduce, repair, contest, learn from, and revise the relations on which later collective action depends.*

Table 20.4 summarizes the eight institutional dimensions developed below. The dimensions are analytical rather than a universal checklist. Their relevance depends on institutional function, scale, duration, consequence, and the degree to which affected positions depend on the institution's continued operation.

20.4.1 Relational Institutional Mandates

Institutions act through mandates. A mandate can be legal, contractual, fiduciary, professional, constitutional, customary, community-based, or organizational. It specifies what an institution is authorized or expected to do, but its practical significance depends on the relations through which the mandate is realized. A public agency

charged with service access, a university charged with research and education, a co-operative charged with member benefit, or a platform charged by contract with mediating transactions can each exercise authority beyond the literal wording of a formal purpose because infrastructure, information, standards, and dependency shape practical choice.

A relational mandate therefore includes more than a statement of mission. It identifies the subjects and positions whose relations the institution can materially alter; the resources, rules, infrastructures, or capabilities within institutional reach; the obligations generated by reliance on institutional services; and the boundaries beyond which additional authorization is required. Chapter 16 showed that power can arise through conversion mechanisms, access control, dependency, and institutional mediation. Institutional mandate analysis makes these mechanisms visible before authority is treated as self-justifying simply because it is organizationally established.

Mandates can also conflict internally. A public bank can be expected to preserve financial soundness while expanding access to credit. A research university can pursue frontier knowledge, education, public contribution, and organizational survival. A welfare institution can protect continuity while preventing administrative lock-in. These tensions need not be resolved by one permanent hierarchy. Institutions can use differentiated decision rules, procedural safeguards, protected minima, or issue-specific balancing where relevant values and obligations cannot be reduced to one metric.

Definition 20.42 (Relational institutional mandate). *A relational institutional mandate is the historically situated set of authorized purposes, obligations, affected positions, protected relations, scope boundaries, and revision conditions through which an institution's authority to organize economically consequential relations is specified and interpreted.*

A relational mandate should also expose mandate drift. Institutions can acquire new technical capabilities, data, infrastructure, market position, or public reliance that expand their practical influence without corresponding revision of formal authorization. Conversely, old mandates can remain formally broad while institutional capacity has narrowed to the point that promised obligations are no longer practically realizable. Mandate adequacy therefore requires correspondence among authorized purpose, practical power, institutional capacity, and affected positions.

Proposition 20.43 (Mandate–power alignment condition). *Where an institution's practical control over access, infrastructure, information, resources, or dependency materially exceeds or falls short of the relations contemplated by its formal mandate, institutional review should examine whether authority, obligation, capacity, and accountability remain aligned with the institution's actual economic position.*

Relational mandates provide the normative and functional boundary within which the remaining dimensions operate. Learning can revise interpretation of the mandate; participation can reveal affected positions omitted from it; contestability can correct abuses within it; and institutional evolution can eventually require its formal redesign.

20.4.2 Institutional Learning Architecture

Institutions require more than information to learn. Learning occurs when evidence changes institutional interpretation, routines, categories, resource allocation, or mandate implementation in ways that can be retained and later reassessed. Chapter 17 treated knowledge as an economic field with infrastructures, dependencies, and preservation problems. Section 20.3.7 specialized that concern to policy learning. The institutional problem is broader because an organization or rule system must preserve learning across personnel turnover, political cycles, leadership changes, technological replacement, and shifts in the problems it confronts.

Institutional learning therefore has at least four components. First, observations must be generated and retained. Second, those observations must remain connected to the assumptions, categories, and decisions they bear upon. Third, interpretation must be able to change rather than merely confirm existing routines. Fourth, revised understanding must enter operational practice, training, governance, or mandate review. Failure at any stage can produce an institution rich in records yet poor in learning.

Tacit knowledge complicates the architecture. Some institutional competence resides in professional judgment, informal coordination, maintenance practices, local relationships, and accumulated experience that cannot be fully encoded in manuals or databases. Succession planning, apprenticeship, team continuity, communities of practice, and reflective review can therefore be as important as formal record keeping. Automation can preserve some procedures while simultaneously weakening the human capabilities needed to diagnose exceptions or reconstruct why the procedure exists.

Definition 20.44 (Institutional learning architecture). *An institutional learning architecture is the arrangement of evidence generation, record preservation, interpretive review, tacit-knowledge transmission, decision revision, and organizational memory through which an institution can update both its operational practices and its understanding of the problems those practices address.*

Learning should remain historically indexed. A later institution can reasonably reject an earlier decision while preserving the fact that the earlier decision was made under different evidence, constraints, or values. Re-epistemization is stronger than retroactive condemnation because it reconstructs why judgment changed. This historical record also improves accountability by making institutional evolution traceable rather than presenting each new rule as though it emerged without a predecessor.

Proposition 20.45 (Institutional-learning continuity condition). *An institution expected to operate across changing conditions should maintain practicable links among evidence, historical assumptions, tacit knowledge, interpretive revision, operational change, and succession so that organizational learning can survive turnover and remain open to later re-epistemization.*

Institutional learning becomes especially consequential when policy or technology changes rapidly. An adaptive rule system without memory can oscillate; a stable rule system without learning can become obsolete. Generative institutional design requires both continuity and the capacity to revise the reasons for continuity.

20.4.3 Value Recirculation Architecture

Institutions consume and generate heterogeneous forms of value. They use financial resources, professional capability, public legitimacy, knowledge, ecological functions, care, attention, infrastructure, data, and relational trust. Their operation can then generate revenue, surplus, expertise, reputation, data, social capability, technological assets, public value, or new dependencies. Chapter 14 developed generation, conversion, circulation, accumulation, capture, and generative return as distinct value processes. Institutional analysis asks how these processes are organized within durable structures.

Recirculation is one mechanism through which an institution reproduces its substrate. A university can return value through training, open knowledge, research infrastructure, and professional communities. A cooperative can return surplus or capability to members. A platform can reinvest in interoperability, participant safety, developer ecosystems, or portability. A public service can return value through maintained infrastructure and institutional capacity. An ecological commons institution can return resources to stewardship and regeneration. These pathways differ in value form and cannot be evaluated through financial retention alone.

Value recirculation should also remain distinct from internal accumulation. An institution can retain a large surplus while underinvesting in maintenance, employee capability, public infrastructure, ecological repair, community relations, or knowledge preservation. Conversely, an institution can distribute resources outward while weakening its own capacity to discharge future obligations. The relevant question is how value returns are distributed among institutional continuity, contributors, affected positions, shared infrastructures, and the wider relational substrates on which continued generation depends.

Definition 20.46 (Institutional value-recirculation architecture). An *institutional value-recirculation architecture* is the set of rules, practices, and pathways through which value generated, captured, or accumulated through institutional activity is returned, retained, converted, or redistributed among the institution, contributors, affected positions, shared infrastructures, and other substrates required for continued generative activity.

The definition does not imply that every institution owes every generated value form back to every contributing relation. It creates an object for tracing. A research institution can legitimately retain resources for future research; a pension institution must preserve long-horizon obligations; a public utility may require reserves; a cultural institution may devote resources to preservation. The analytical task is to identify which substrates are being replenished, which are being depleted, and how the chosen return architecture relates to institutional mandate and justice.

Proposition 20.47 (Institutional value-return condition). *Where institutional activity materially depends on shared, public, relational, epistemic, ecological, or participant-supplied substrates, evaluation should trace whether generated value returns in forms and pathways sufficient to support the continued viability of the substrates on which later institutional activity depends.*

Section 20.7 develops value recirculation and social reinvestment in greater depth. The present subsection establishes the narrower institutional requirement: an insti-

tution's value architecture should make its own reproduction and its dependence on wider substrates jointly visible.

20.4.4 Institutional Capacity Formation

Institutions can perform while degrading the capacities that make performance possible. Short-term output can be preserved by overloading experienced staff, outsourcing critical functions, relying on one technical vendor, postponing maintenance, or automating tasks without reproducing diagnostic knowledge. The resulting institution can appear efficient while becoming more brittle. A generative institutional perspective therefore treats capacity formation and regeneration as part of institutional performance rather than as a separate human-resources or investment concern.

Institutional capacity is typed. Professional expertise, administrative competence, legal capability, technical maintenance, data stewardship, financial management, coordination, public communication, research capability, conflict resolution, and leadership succession are not freely substitutable. Collective capacity can also exceed the sum of individual skill because routines, role differentiation, trust, infrastructure, and shared memory make coordinated performance possible. Chapter 19 repeatedly encountered such configuration-level capability in research institutions, organizations, commons, public institutions, and ecological stewardship.

Capacity formation therefore includes recruitment and training but extends further. Institutions need pathways through which novices become capable contributors, expertise is distributed rather than trapped in one position, critical functions have succession or redundancy, and changes in technology are accompanied by corresponding changes in verification and judgment capacity. Outsourcing can be appropriate, yet the institution should understand which capabilities it is relinquishing, which it retains for oversight, and whether re-entry remains possible if the external dependency changes.

Definition 20.48 (Institutional capability reproduction). *Institutional capability reproduction* is the process through which an institution forms, maintains, transmits, distributes, and renews the human, collective, technical, administrative, epistemic, and maintenance capabilities required to discharge its mandate and adapt to materially changing conditions.

Capability reproduction has temporal incidence. Training can reduce immediate throughput while strengthening later resilience. Redundancy can look inefficient under ordinary conditions while preserving continuity during disruption. Apprenticeship can require expert time while preventing future knowledge loss. Evaluation should therefore connect capacity costs to the horizon over which institutional obligations are expected to persist.

Proposition 20.49 (Institutional-capability condition). *Where institutional obligations are durable or difficult to substitute, institutional design should identify the capabilities whose loss would materially impair continuity, oversight, learning, maintenance, or adaptation and should organize practicable pathways for their reproduction, distribution, and succession.*

Institutional capability formation creates one bridge to Section 20.5, where rela-

tional infrastructure will be examined more directly. Capabilities depend on infrastructures, while infrastructures remain usable only where institutional capacities for maintenance, interpretation, and coordination persist.

20.4.5 Participation and Institutional Standing

Institutions contain multiple positions whose relations to authority differ. Formal members, employees, users, beneficiaries, contractors, contributors, residents, citizens, suppliers, regulated parties, funders, and indirectly affected communities can all have economically consequential relations to one institution. Chapter 19 showed that membership, contribution, affectedness, representation, and participation often diverge. Institutional design therefore benefits from a multidimensional account of standing rather than a single inside–outside boundary.

Standing can concern information, voice, representation, decision rights, appeal, contribution, access, protection, or entitlement to explanation. These dimensions can legitimately differ. A technical user may require reliable access and appeal without voting rights over every strategic decision. Workers can require voice concerning workplace conditions while customers hold different protections. Future generations, ecosystems, or dispersed affected populations may require representation because direct participation is unavailable or conceptually inappropriate. The design problem is therefore to match forms of standing to the institution’s mandate, power, dependency relations, and affected positions.

Participation also has conversion conditions. A formal consultation mechanism can remain inaccessible because of time, language, information asymmetry, technical complexity, social risk, or lack of consequence. Practical participation requires pathways through which input becomes institutionally legible and can affect decisions or review. Participation without any plausible connection to institutional action can become ceremonial and may weaken rather than strengthen trust.

Definition 20.50 (Institutional standing profile). *An institutional standing profile specifies the forms of access, information, voice, representation, contribution, protection, appeal, and decision influence available to a position in relation to an institution, together with the practical conversion conditions through which those forms become usable.*

Institutional standing should remain proportional to the relation rather than mechanically equalized. Some decisions require specialist authority; some obligations are fiduciary; some data are confidential; some emergency decisions require speed. A generative architecture asks where differentiated authority is warranted and which complementary protections, explanations, review rights, or representative mechanisms are needed because other positions remain materially affected.

Proposition 20.51 (Standing–incidence condition). *Where an institution materially affects a position’s access, livelihood, capability, rights, dependency, or future options, institutional design should identify the forms of standing appropriate to that relation and assess whether formal standing can be practically exercised under the relevant conversion conditions.*

Section 20.6 will examine economic participation across production, knowledge,

care, institutions, communities, and activity beyond employment. The present subsection establishes the institutional component: participation requires specified standing within the structures that organize consequential decisions.

20.4.6 Institutional Contestability and Correction

Institutions make classifications, allocate access, enforce rules, distribute resources, interpret mandates, and sometimes exercise authority that affected positions cannot readily avoid. Contestability provides one mechanism through which errors, exclusions, abuse, outdated categories, and unexpected consequences can be surfaced and corrected. Chapter 16 connected power analysis to counter-power, procedural safeguards, and governance. Institutional contestability specifies the operational architecture through which those protections become usable.

Contestability contains several distinct operations. A person can request explanation, challenge factual error, appeal a decision, seek independent review, present new evidence, contest the rule itself, or seek remedy for harm. Audit and transparency can support these processes but do not substitute for them. Information about a decision is valuable, yet correction also requires authority, procedure, timing, and a practical remedy. Some institutional systems therefore benefit from layered pathways: frontline correction, internal review, independent appeal, judicial review, ombuds functions, member governance, or external regulatory oversight depending on the institutional form.

Correction should also feed learning. Repeated appeals can reveal a category problem rather than isolated mistakes. Disparate error patterns can expose data or model failures. Complaints can reveal conversion barriers invisible in administrative metrics. An institution that resolves individual cases while failing to aggregate what those cases teach can remain operationally responsive yet structurally unlearning.

Definition 20.52 (Institutional contestability architecture). An *institutional contestability architecture* is the arrangement of explanation, challenge, evidence submission, review, counter-authority, correction, remedy, and learning pathways through which materially consequential institutional decisions or rules can be questioned and, where warranted, revised.

Contestability has costs and boundaries. Endless appeal can paralyze administration; disclosure can violate privacy; technical systems can require specialized review; emergency decisions can precede full process. The relevant design question is proportionality: consequences, reversibility, dependency, error cost, and power asymmetry can justify different levels of explanation and review.

Proposition 20.53 (Contestability–correction condition). *Where institutional decisions materially shape access, standing, resources, rights, or dependency, contestability should connect practicable challenge to an authority capable of explanation, correction, remedy, or rule revision, with procedural intensity proportionate to consequence and reversibility.*

Contestability thereby supports both justice and institutional intelligence. It creates a channel through which excluded evidence and affected experience can modify institutional understanding rather than remaining external criticism with no route

into practice.

20.4.7 Institutional Generativity

The preceding dimensions can now be integrated. An institution can discharge its current mandate while consuming the capacities, trust, infrastructure, ecological conditions, knowledge, or participation on which later operation depends. It can also preserve itself indefinitely while ceasing to generate useful collective possibilities. Institutional generativity therefore concerns the relation between present function and the reproduction or transformation of future institutional capability.

Generativity is not synonymous with growth, innovation rate, organizational survival, or expansion of authority. A small institution can be highly generative if it maintains a critical commons, reproduces expertise, preserves records, or enables many actors to act independently. A growing organization can be generatively weak if expansion concentrates dependency, depletes contributors, erodes contestability, or destroys alternative pathways. Institutional generativity is therefore indexed to the relations and capacities generated, maintained, or foreclosed by institutional operation.

Maintenance belongs inside this concept. Reliable payroll, archival preservation, infrastructure repair, routine service continuity, professional succession, ecological stewardship, and procedural upkeep can all preserve the substrate of future action. Novelty can be generative where it expands capability or option space, but maintenance can be equally generative where deterioration would narrow those possibilities.

Definition 20.54 (Institutional generativity). *Institutional generativity* is the capacity of an institution, through its continuing operation and revision, to reproduce or strengthen the relations, capabilities, infrastructures, knowledge, value-return pathways, participatory standing, and option structures required for later collective action while keeping materially consequential dependencies and authority sufficiently visible and revisable.

The definition leaves room for differentiated institutional purposes. A court, central bank, school, cooperative, research institute, hospital, platform, utility, and commons organization need not generate the same capabilities or values. Generativity concerns adequacy relative to mandate, affected positions, historical conditions, and the wider economic order in which the institution operates.

Proposition 20.55 (Institutional-generativity evaluation condition). *Assessment of institutional generativity should distinguish current output from the reproduction of capability, infrastructure, learning, value return, participation, maintenance, and future option structures and should identify where present performance depends on depletion or concentration that weakens those later conditions.*

This proposition connects institutional analysis back to the generative economic evaluation profile in Section 20.2. Institutions become one important carrier of recursive economic effects because they preserve or transform the conditions through which future allocations, policies, and collective decisions become possible.

20.4.8 Institutional Evolution and Succession

Institutions change. Mandates expand or contract; technologies alter operational possibilities; professional fields evolve; populations and memberships change; crises create new responsibilities; organizations merge, split, decentralize, federate, privatize, publicize, automate, or dissolve. A generative framework therefore needs an account of institutional evolution that is neither simple preservation nor unrestricted adaptation.

Institutional evolution has at least three temporal layers. Incremental revision changes rules, routines, or capacities while organizational identity remains relatively continuous. Structural transformation changes authority, ownership, boundaries, or core operating architecture. Succession transfers functions, obligations, records, capabilities, or rights to a new institutional configuration. Each layer creates different continuity problems. A procedure can be revised without altering institutional identity, while dissolution of a pension fund, archive, public agency, or infrastructure operator can require explicit transfer of obligations that outlive the organization itself.

Institutional inheritance matters because organizations carry history. Records, contracts, legal precedents, professional communities, technical debt, public expectations, ecological liabilities, data, and tacit knowledge persist into later configurations. A successor institution can acquire formal assets while losing the relational and epistemic conditions required to use them. Institutional evolution therefore requires more than asset transfer; it can require preservation of provenance, capability, standing, maintenance obligations, and unresolved claims.

Definition 20.56 (Institutional evolution pathway). An *institutional evolution pathway* is a historically ordered sequence of revisions, capacity changes, boundary changes, authority transformations, and succession arrangements through which an institution changes form while carrying forward, reallocating, or terminating specified mandates, capabilities, records, dependencies, rights, and obligations.

Evolution should also permit institutional death. An institution can complete its purpose, become obsolete, lose legitimate warrant, or impose costs that exceed the value of continuity. Generativity therefore does not require permanent survival. What matters is whether transformation or closure manages inherited obligations and preserves those capabilities, records, relationships, or infrastructures that remain independently valuable.

Succession can be designed before crisis. Modular records, interoperable infrastructure, distributed expertise, clear ownership of data and obligations, portable entitlements, and documented maintenance practices can reduce the cost of institutional transformation. These provisions parallel the exit-sensitive policy architecture of Section 20.3.8, but the institutional horizon can be longer because organizations and rule systems can persist across multiple generations of policy.

Proposition 20.57 (Institutional-evolution condition). *Where an institution carries durable mandates, dependencies, records, infrastructures, or obligations, material transformation or succession should identify what requires continuity, what can be redesigned, what can legitimately terminate, and how capabilities, standing, provenance, and residual responsibilities are transferred or resolved across the institutional*

change.

The eight dimensions developed in this section specify an institutional architecture capable of carrying the policy and evaluation disciplines of the preceding sections across time. Relational mandates connect authority to affected relations; learning connects experience to revision; value recirculation connects generated value to institutional and wider substrates; capacity formation reproduces the means of future performance; participation gives differentiated positions practical standing; contestability connects authority to correction; institutional generativity integrates present function with future conditions; and institutional evolution makes continuity itself revisable.

Generative economic institutions are therefore not a distinct institutional sector or a fixed organizational type. They are institutions whose mandates, capabilities, value pathways, participation structures, correction mechanisms, and evolution can be analyzed in relation to what they make possible over time. Section 20.5 turns next to relational infrastructure, examining the physical, legal, digital, epistemic, care, mobility, communication, and access systems through which institutional and economic participation become practically possible.

20.5 Relational Infrastructure

The role of this section is to identify the infrastructures through which the evaluation, policy, and institutional architectures developed in Sections 20.2–20.4 become practically usable in economic life. Its objective is to treat infrastructure as a relational condition of access, coordination, capability, standing, and future participation rather than as a residual category of fixed capital. The section develops eight dimensions: public space and spatial access, mobility and reachability, communication and coordination, knowledge and epistemic access, care and relational reproduction, digital interoperability, legal standing, and integrated institutional access. The method is configurational. GRE examines how infrastructures connect subjects, institutions, resources, rights, information, and places across time and how those connections are maintained, repaired, governed, and revised.

Infrastructure in this sense includes physical assets, but its economic significance arises through the relations those assets support. A railway line is consequential through the destinations, schedules, prices, accessibility conditions, employment patterns, and institutional connections it makes reachable. A library is consequential through collections, staff, catalogues, opening rules, interpretive assistance, preservation, and the communities able to use them. A digital identity system is consequential through the services it unlocks, the records it connects, the errors it propagates, and the correction procedures available when identification fails. Similar reasoning applies to public space, communication systems, care arrangements, legal institutions, and knowledge repositories.

The category is therefore broader than public infrastructure and narrower than the totality of social relations. Relational infrastructure consists of durable or recurrent arrangements whose continued operation materially conditions repeated access, coordination, capability conversion, or institutional participation for multiple sub-

jects or positions. Such infrastructure can be publicly provided, privately owned, cooperatively governed, community maintained, professionally organized, digitally mediated, or assembled through hybrid arrangements. Ownership form remains analytically relevant, especially where it shapes dependency or access, yet it does not by itself determine infrastructural generativity.

Definition 20.58 (Relational infrastructure configuration). A *relational infrastructure configuration* is a history-bearing arrangement of physical, spatial, communicative, epistemic, care, digital, legal, and administrative systems whose repeated operation materially conditions access, coordination, capability conversion, institutional standing, and participation across subjects, places, and time.

Definition 20.58 makes maintenance and accessibility part of the analytical object. Construction alone does not establish infrastructural adequacy. Reliability, affordability, interoperability, repair, documentation, staffing, temporal availability, accessibility, governance, and correction can determine whether nominal provision becomes practical capability. The same asset can therefore have different relational effects for subjects with different locations, languages, legal status, disabilities, care responsibilities, digital access, or institutional standing.

Infrastructure also has temporal depth. Present systems inherit routes, standards, property arrangements, protocols, professional practices, technical debt, legal categories, and settlement patterns generated earlier. New infrastructure can alter future location choices, dependencies, institutional boundaries, and option structures for long periods. This temporal depth makes infrastructural evaluation closely related to the historical and option-space dimensions developed in Section 20.2.

Proposition 20.59 (Relational-infrastructure condition). *Where infrastructure materially conditions repeated economic access, coordination, capability conversion, or participation, evaluation should examine practical usability, maintenance, interoperability, dependency, correction, and long-horizon option effects in addition to nominal provision or installed capacity.*

Table 20.5 summarizes the eight infrastructure dimensions developed below. The table is diagnostic rather than exhaustive; particular economic configurations can require additional domain-specific infrastructures or can combine several dimensions within one institutional arrangement.

20.5.1 Public Space and Spatial Access

Economic participation takes place somewhere. Streets, plazas, markets, parks, libraries, transit nodes, schools, civic buildings, community facilities, waterfronts, sidewalks, and other shared spaces condition encounter, movement, visibility, informal exchange, rest, learning, care, and collective life. Their economic significance does not depend on every use being monetized. A public bench, shaded route, accessible toilet, safe crossing, library reading room, or community hall can alter whether a person can remain in an area long enough to work, learn, care, meet, or participate in institutional life.

Public space is relational because practical use depends on more than formal designation. Location, opening hours, safety, accessibility, climatic protection,

Table 20.5: Dimensions of relational infrastructure in generative economic order.

Infrastructure dimension	Primary relation	Generative question	Characteristic infrastructural risk
Public space and spatial access	Presence, encounter, proximity, common use	Which subjects can safely and practically occupy, encounter, and use shared economic space?	Nominal openness with exclusion through location, design, time, or policing
Mobility and reachability	Movement between activities, services, institutions, and relations	Which economically consequential destinations are practically reachable within relevant time and resource constraints?	Transport supply accompanied by weak practical reachability
Communication and coordination	Information exchange, addressing, language, signaling, coordination	Can participants communicate reliably enough to coordinate, contest, learn, and maintain relations?	Connectivity without intelligibility, trust, or effective coordination
Knowledge and epistemic access	Records, repositories, expertise, provenance, interpretive support	Can knowledge be found, understood, verified, preserved, and reused?	Information abundance with weak interpretation or provenance
Care and relational reproduction	Care availability, continuity, time, support, social reproduction	Does the configuration reproduce the bodily and relational conditions of continued participation?	Economic participation sustained through hidden care depletion
Digital interoperability	Networks, compute, identity, protocols, data, interfaces, fallback	Can digital participation remain portable, secure, intelligible, and recoverable across systems?	Concentrated technical dependency and non-portable access
Legal infrastructure and standing	Legal identity, rights, procedures, enforcement, remedy	Can formal rights and obligations be practically realized and corrected?	Formal entitlement without practicable standing or remedy
Institutional access integration	Cross-system eligibility, navigation, coordination, handoff	Can subjects move through coupled infrastructures without avoidable exclusion at their interfaces?	Fragmented access in which failure at one interface blocks otherwise available capabilities

surveillance, policing, commercial pressure, social norms, maintenance, crowding, and nearby transport can distribute use unevenly. The same formally public site can support one group while remaining practically difficult for another. Spatial access therefore has to be indexed to subjects, activities, times, and the surrounding infrastructural configuration.

Public space also provides low-threshold interfaces among domains that are otherwise institutionally separated. Libraries can combine knowledge access, digital connectivity, study space, civic information, and shelter from environmental conditions. Parks can support health, care, community relations, informal education, and ecological functions. Transit concourses can become sites of commerce, information, and public service access. Such multifunctionality can be generative where it increases practical combinations among activities without requiring every relation to pass through a commercial transaction.

Definition 20.60 (Public-space access profile). A *public-space access profile* specifies, for a subject or position and a relevant activity, the spatial, temporal, physical, social, legal, environmental, and institutional conditions that determine whether a formally shared space can be safely and practically used.

Spatial access also interacts with private and semi-public space. Shopping centers, workplaces, campuses, stations, platforms, and privately owned public spaces can perform public-facing functions while remaining governed by differentiated admission, conduct, surveillance, and exclusion rules. GRE therefore examines practical standing within the space rather than assuming that the public–private legal category

fully describes relational access.

Proposition 20.61 (Spatial-access condition). *Where shared space materially supports economic, civic, epistemic, care, or community participation, infrastructural evaluation should examine who can use the space, for which activities, at which times, under what conditions of safety and standing, and with what capacity for continued or alternative access.*

Public space provides the spatial substrate for the mobility relations considered next. A destination can be formally open yet economically remote where transport, time, cost, accessibility, or legal constraints make it difficult to reach.

20.5.2 Mobility and Reachability Infrastructure

Mobility infrastructure connects subjects to employment, education, care, markets, institutions, communities, public space, and other forms of participation. Roads, railways, buses, pedestrian systems, cycling networks, ports, mobility services, scheduling systems, ticketing, information, and accessibility arrangements together shape practical movement. The economic object is therefore broader than transport supply. What matters is the reachability of valued or necessary relations under actual constraints.

Reachability is relative to time, cost, reliability, safety, physical accessibility, documentation, operating hours, and the timing of linked institutions. A clinic can be geographically close while practically unreachable if transport ends before an appointment concludes. A job can be accessible by distance yet incompatible with care schedules. A low-cost route can become unusable where transfers are unreliable or physical design excludes particular bodies. Mobility infrastructure consequently converts spatial separation into differentiated practical possibility.

Mobility also structures bargaining and dependency. Access to multiple employers, suppliers, schools, hospitals, markets, or administrative offices can reduce dependence on a single local gatekeeper. Conversely, a region organized around one transport corridor or one costly mobility provider can concentrate dependency even when aggregate mobility appears high. Reachability therefore belongs inside analysis of power and option space as well as infrastructure performance.

Definition 20.62 (Practical reachability profile). *A practical reachability profile specifies the set of economically consequential destinations and relations that a subject or position can access within relevant constraints of time, cost, reliability, safety, physical accessibility, legal permission, information, and linked institutional schedules.*

The profile can change without new construction. Integrated fares, accessible information, schedule coordination, safer streets, portable mobility benefits, or revised operating hours can expand practical reachability using existing physical systems. Conversely, deterioration, congestion, service cuts, digital-only ticketing, or lost affordability can shrink reachability while installed infrastructure remains unchanged.

Proposition 20.63 (Mobility–conversion condition). *Where economic opportunities or entitlements depend on physical movement, policy and institutional evaluation should distinguish installed transport capacity from the practical reachability through which subjects can convert spatial mobility into access, participation, and alternative*

options.

Mobility makes physical relations reachable. Communication infrastructure performs a related function for information, coordination, and relational continuity across distance.

20.5.3 Communication and Coordination Infrastructure

Economic relations require communication. Prices, schedules, requests, warnings, contracts, care needs, research findings, institutional explanations, claims, appeals, and community coordination depend on channels through which information can move among participants. Communication infrastructure includes telecommunications and media systems, but it also includes addressing systems, language services, notification practices, standards, emergency channels, trusted directories, interpretation, and the routines through which messages become actionable.

Connectivity alone therefore provides an incomplete measure. A participant can have network access while lacking linguistic intelligibility, trusted addressing, reliable notification, accessible formats, or the institutional knowledge required to interpret what is received. Communication can also be asymmetric: one party can broadcast rules or demands while the other lacks a practical reply, correction, or appeal channel. Relational infrastructure analysis examines the direction, intelligibility, reliability, and consequence of communication rather than only its technical availability.

Communication infrastructure supports coordination when participants can align expectations and actions across time. Supply chains, public services, care networks, research collaborations, emergency response, workplaces, and communities all rely on coordination capacity. Redundancy can be generative here. Multiple communication channels, offline fallback, interoperable standards, and preserved contact records can sustain coordination when one channel fails or becomes inaccessible.

Definition 20.64 (Communicative infrastructure capacity). *Communicative infrastructure capacity* is the capability of a configuration to support sufficiently reliable, intelligible, accessible, bidirectional, and recoverable communication for the coordination, explanation, contestation, learning, and maintenance of economically consequential relations.

The definition includes institutional response as part of communication quality. A complaint channel that accepts messages without producing acknowledgment, review, or response has different relational significance from a channel embedded in a correction process. Similarly, public information gains practical value when subjects can identify its relevance, provenance, and consequences for action.

Proposition 20.65 (Communication–coordination condition). *Where economic relations depend on distributed coordination, communication infrastructure should be evaluated through intelligibility, directionality, reliability, accessibility, response capacity, and fallback arrangements as well as nominal connectivity or message volume.*

Communication provides channels through which knowledge can circulate, but epistemic infrastructure adds preservation, provenance, verification, interpretation, and reuse.

20.5.4 Knowledge Infrastructure and Epistemic Access

Chapter 17 developed knowledge as an economic field rather than a frictionless informational input. Relational infrastructure brings that argument into economic-order design. Libraries, archives, repositories, schools, universities, laboratories, standards systems, documentation, public data, professional communities, search systems, provenance records, and interpretive expertise can all function as knowledge infrastructure when they make reliable knowledge repeatedly available for learning, verification, coordination, innovation, and institutional memory.

Epistemic access involves more than possession of information. Subjects need to locate relevant material, understand its language and categories, assess provenance, connect evidence to decisions, and sometimes obtain expert assistance. Knowledge can therefore be formally open while remaining practically inaccessible because of paywalls, technical complexity, missing metadata, language, disability barriers, incompatible formats, absent documentation, or loss of the contextual knowledge required for interpretation.

Preservation is a further infrastructural function. Records, datasets, software, institutional decisions, scientific methods, cultural materials, and administrative histories can lose practical meaning even while files survive. Chapter 17 treated re-epistemization as reconstruction of the conditions under which knowledge claims were generated and interpreted. Economic-order infrastructure should therefore preserve provenance, version history, dependencies, and interpretive context where later verification or reuse is materially important.

Definition 20.66 (Epistemic infrastructure access). *Epistemic infrastructure access* is the practical capability to locate, retrieve, interpret, verify, preserve, and reuse knowledge relevant to economic participation, institutional action, or collective learning, including the provenance, expertise, documentation, and technical means required for those operations.

AI-mediated search and generation can expand apparent access while changing its dependency structure. If discovery, synthesis, translation, or verification becomes concentrated in systems whose provenance or continued availability is weak, immediate epistemic convenience can coexist with reduced regenerative capability. The infrastructure question therefore includes human expertise, alternative retrieval paths, durable records, and the capacity to reconstruct knowledge when a mediation layer changes.

Proposition 20.67 (Epistemic-infrastructure continuity condition). *Where economic coordination or institutional learning depends on durable knowledge access, infrastructure should preserve not only retrievable content but also sufficient provenance, interpretive capability, documentation, and alternative access pathways for later verification, reuse, and re-epistemization.*

Knowledge infrastructure helps participants understand and revise economic relations. Care infrastructure supports the bodily, temporal, and relational reproduction through which participation can continue at all.

20.5.5 Care Infrastructure and Relational Reproduction

Economic systems rely on care. Childcare, healthcare, disability support, elder care, mental and social support, household coordination, respite, community care, and other forms of relational maintenance shape whether people can work, learn, participate, recover, move, or sustain commitments over time. Chapter 19 showed that care cannot be reduced to one sector because it appears across welfare, organizations, communities, migration, education, and public institutions. In an economic-order synthesis, care therefore enters as infrastructure when its recurring availability materially conditions the continuity of multiple forms of participation.

Care infrastructure includes facilities and professional services, yet it also includes staffing, scheduling, transport, information, continuity, leave arrangements, coordination among providers, informal networks, payment systems, and recognition of care recipients and caregivers. Formal service capacity can therefore coexist with care gaps if operating hours, cost, eligibility, language, geography, or staffing make services unusable in practice.

Care infrastructure has a distinctive temporal structure. Care needs can be recurrent, unpredictable, intensive, or long-duration. A configuration that relies on unpaid or under-supported care may sustain measured production while transferring depletion into households, families, or particular social positions. Generative analysis therefore asks whether care relations reproduce the capacities of both recipients and caregivers and whether institutions retain enough redundancy and continuity to absorb shocks without cascading exclusion from work, education, or community participation.

Definition 20.68 (Care infrastructure configuration). *A care infrastructure configuration is the arrangement of services, facilities, labor, time, finance, mobility, information, coordination, informal relations, and institutional protections through which recurrent care needs are met and the bodily and relational conditions of continued participation are reproduced.*

Care also interacts with infrastructure design elsewhere. Accessible transport can reduce care burdens; public space can support caregivers and dependents; digital systems can ease coordination while creating new exclusion; legal rules can allocate leave, guardianship, entitlement, and responsibility. Treating care as infrastructure therefore reveals interfaces that disappear when care is analyzed only as private consumption or household labor.

Proposition 20.69 (Care-reproduction condition). *Where economic participation depends on recurrent care, evaluation should examine whether the care configuration reproduces the capabilities and continuity of care recipients, caregivers, and supporting institutions without relying on hidden depletion that narrows later participation or recovery capacity.*

Digital infrastructure increasingly mediates each of the preceding dimensions, making interoperability and recoverability central economic-order concerns.

20.5.6 Digital Infrastructure and Interoperability

Digital infrastructure now mediates payments, identity, communication, knowledge, employment, public services, logistics, education, health, research, platform participation, and institutional administration. Its components include networks, compute, storage, identity systems, authentication, data architectures, software, protocols, interfaces, cybersecurity, models, registries, cloud services, and technical standards. Because these layers are coupled, failure or exclusion at one layer can propagate into many economic domains.

Digital access has at least three levels. Connection provides technical reach to a system. Functional access provides the devices, credentials, interfaces, accessibility, skills, and permissions required to use it. Recoverable access provides the ability to restore participation after error, device loss, account compromise, provider failure, migration, or system change. A configuration can perform well at the first level while remaining fragile at the second or third.

Interoperability affects generative capacity because it shapes whether data, identity, reputation, records, workflows, and services can move across institutional boundaries. Interoperability can lower switching costs and reduce dependency, although it can also create security, privacy, and governance challenges. GRE therefore treats interoperability as a scoped design relation rather than an unconditional objective. The relevant question is which functions require portability or substitutability and under what protections.

Definition 20.70 (Digital infrastructural dependency profile). *A digital infrastructural dependency profile identifies the technical layers, providers, credentials, protocols, data stores, models, interfaces, and recovery pathways on which a subject, institution, or economic function depends, together with their substitutability, interoperability, failure modes, and control relations.*

The profile is especially important where digital infrastructure becomes invisible through convenience. A public service can appear simple at the user interface while depending on identity providers, cloud infrastructure, payment processors, proprietary formats, model APIs, or external cybersecurity services. Concentrated dependencies can be entirely appropriate under some conditions, yet their criticality, fallback arrangements, contractual governance, and exit pathways should remain visible.

Proposition 20.71 (Digital-interoperability condition). *Where digital systems mediate economically consequential access or institutional continuity, infrastructure design should identify critical dependencies and specify the interoperability, portability, security, fallback, and recovery arrangements required to keep participation and institutional obligations practicable under foreseeable system change or failure.*

Digital systems frequently encode legal status and institutional eligibility. Legal infrastructure therefore concerns the practical realization of rights, obligations, standing, and remedy across both digital and non-digital settings.

20.5.7 Legal Infrastructure and Practical Standing

Economic relations depend on legal infrastructure even where legal institutions are not continuously visible. Legal identity, property and use rights, contracts, labor protections, organizational forms, registries, licensing, family status, welfare entitlements, insolvency rules, dispute resolution, administrative law, courts, enforcement, and remedies structure who can act, claim, transfer, coordinate, and contest. These arrangements provide durable expectations that other infrastructures rely upon.

Formal rights nevertheless require realization pathways. A contractual entitlement has limited practical significance if enforcement is prohibitively costly or slow. A welfare right can remain unusable where identity documents, registration, language, digital access, or appeal procedures are inaccessible. A right to mobility can be constrained by documentation or jurisdiction. Legal infrastructure therefore connects normative status to administrative and material capability.

Practical standing has both enabling and protective dimensions. Legal infrastructure can authorize action, recognize relationships, protect assets, stabilize expectations, and create remedies. It can also impose obligations, exclusions, liabilities, or classifications that structure dependency. GRE does not reduce these effects to transaction-cost reduction. The relevant analysis asks how legal arrangements constitute and transform relations, which subjects and positions they recognize, and how correction operates when classifications or decisions are contested.

Definition 20.72 (Legal realization pathway). *A legal realization pathway is the sequence of recognition, documentation, procedure, representation, decision, enforcement, correction, and remedy through which a formal legal status, right, obligation, or claim becomes practically consequential for an affected subject or position.*

Legal infrastructure also has memory. Precedent, registries, contracts, administrative records, organizational histories, and rights accumulated over time can affect later claims. Digitalization can improve retrieval and coordination while creating new dependencies on data quality, system compatibility, and identity infrastructure. Preservation and correction therefore become legal-infrastructure concerns as well as technical ones.

Proposition 20.73 (Legal-infrastructure realization condition). *Where economic capability or protection depends on legal status, rights, or obligations, evaluation should trace the practical realization pathway through documentation, procedure, representation, enforcement, correction, and remedy rather than infer effective standing from formal recognition alone.*

The preceding infrastructures converge at institutional interfaces. The final subsection therefore examines whether people can actually traverse the coupled systems through which economic rights, services, and opportunities are delivered.

20.5.8 Institutional Access and Infrastructure Integration

Economic participation often requires movement through several infrastructures at once. Applying for a benefit can require legal identity, digital access, communication, mobility, knowledge of procedure, care-compatible time, and an administrative institution capable of processing the claim. Entering education can require transport,

housing, information, documentation, finance, digital systems, and care. Employment can depend on similar combinations. Failure at one interface can therefore block the conversion of otherwise available resources or rights.

Institutional access is accordingly an integration problem. Fragmented systems can shift coordination costs onto individuals, especially where eligibility criteria, records, schedules, digital identities, or administrative categories do not align. People with greater time, money, language capacity, professional advice, or social networks can often absorb these frictions more easily, so interface complexity can generate unequal effective access even when formal rules are uniform.

Integration does not require one centralized system. Federated institutions can preserve specialization, plural governance, and local knowledge while using interoperable records, referral pathways, common standards, portable credentials, human navigators, or explicit handoff protocols. The appropriate degree of integration depends on privacy, autonomy, security, institutional diversity, and the risks of concentrated failure. The analytical requirement is to make the interface visible.

Definition 20.74 (Integrated institutional access architecture). *An integrated institutional access architecture is the arrangement of eligibility, navigation, records, identity, communication, referral, handoff, correction, and fallback mechanisms through which subjects move across multiple infrastructures and institutions to realize economically consequential rights, services, opportunities, or forms of participation.*

An access architecture can be evaluated through the conversion profile developed in Section 20.3.1. Nominal availability provides one layer; practical access requires that subjects can traverse the relevant interfaces; realized capability requires that the resulting service or resource can be converted into meaningful action; and long-horizon generativity requires that continued use does not depend on hidden depletion or irreversible concentration that undermines future alternatives.

Integration also creates governance questions. Shared data can improve continuity while expanding surveillance risk. Common standards can improve portability while centralizing classification power. One-stop interfaces can reduce administrative burden while creating a single point of exclusion. Infrastructure integration should therefore preserve contestability, correction, proportional data use, and alternative pathways where the consequences of failure are high.

Proposition 20.75 (Infrastructure-integration condition). *Where economically consequential participation depends on several coupled infrastructures, institutional design should identify interface failures, coordination burdens, and single points of exclusion and should provide proportionate interoperability, navigation, correction, and fallback arrangements while preserving warranted institutional plurality and contestability.*

The eight dimensions developed in this section show that relational infrastructure is neither a secondary background condition nor a synonym for physical capital. Public space shapes encounter and presence; mobility shapes reachability; communication shapes coordination; knowledge infrastructure shapes epistemic access; care infrastructure reproduces participation; digital infrastructure mediates interoperability and dependency; legal infrastructure converts formal standing into practical consequence; and institutional access determines whether these systems can be traversed as a coherent configuration.

A generative relational economic order therefore has to evaluate infrastructure through the relations and capabilities it enables, the dependencies it creates, the maintenance it requires, and the future options it preserves or forecloses. Section 20.6 turns next to economic participation. Infrastructure provides conditions of possibility, while participation concerns the positions from which subjects actually contribute, learn, care, deliberate, organize, and shape the economic relations that infrastructure makes accessible.

20.6 Economic Participation

The role of this section is to specify the positions through which subjects and collectives enter, sustain, and reshape economic processes once the policy, institutional, and infrastructural architectures of Sections 20.3–20.5 are in place. Its objective is to treat participation as a differentiated economic relation rather than as a synonym for employment, market exchange, institutional membership, or formal voice. The section develops eight dimensions: productive participation, epistemic participation, care participation, institutional participation, community participation, participation beyond employment, participation inequality, and generative participation. The method is relational and configurational. GRE asks what practical pathways connect a participant to consequential activity, what standing the participant acquires, what capabilities are formed or depleted through participation, how contribution is recognized, and whether participation can influence the later configuration of economic life.

Chapter 12 introduced economic participation as a broad relation through which subjects can contribute to, be represented in, influence, depend on, or be affected by economic processes. Chapter 18 then showed why participation becomes especially important when productive necessity and employment no longer reliably determine who can contribute to knowledge, care, institutions, communities, culture, or future formation. The present section works at the level of economic order. It asks how an order distributes practical pathways of participation across these domains and how participation itself changes capability, standing, dependency, recognition, and future possibility.

Participation should therefore be separated from mere presence. A worker can be physically present in production while having little influence over process design, learning, recognition, or organizational decisions. A citizen can possess formal political rights while lacking practical access to the information, time, language, or institutional pathways required for consequential participation. A learner can receive knowledge without entering the processes through which questions are formed, claims are verified, or research agendas are revised. A family member can perform extensive care while remaining economically invisible. A community member can contribute to maintenance, culture, or stewardship without receiving formal organizational standing. In each case, a thin indicator of participation can coexist with a much narrower practical participation relation.

Nor is participation intrinsically desirable. Economic configurations can compel participation, expose participants to risk, extract unpaid contribution, distribute re-

sponsibility without authority, or make exit prohibitively costly. Participation can reproduce hierarchy as well as capability. GRE therefore evaluates participation through the relation between access, contribution, standing, recognition, capability formation, burden, dependency, contestability, and exit. Increasing the quantity of participation is not a sufficient objective.

Definition 20.76 (Economic participation configuration). *An economic participation configuration is a history-bearing arrangement of positions, access pathways, contribution relations, recognition practices, decision interfaces, capability effects, dependencies, protections, and exit conditions through which subjects or collectives enter and affect economically consequential processes.*

Definition 20.76 makes participation positional. Different participants in the same process can have substantially different participation profiles. A platform seller, platform employee, consumer, model developer, content moderator, shareholder, regulator, and affected non-user can all be connected to the same digital-economic configuration through different access, contribution, authority, dependency, and exit relations. The same applies to a school, hospital, research institution, cooperative, public agency, neighborhood commons, or care network.

Participation is also temporal. Entry can create learning, reputation, credentials, social relations, institutional memory, obligations, or dependencies that change later participation. Conversely, exclusion from one stage can remove access to later stages. Internship access can shape professional entry; participation in research can shape later epistemic authority; care interruption can constrain later employment; exclusion from public decision processes can alter infrastructures that subsequently determine access. Economic participation therefore has pathway effects that extend beyond the immediate activity.

Proposition 20.77 (Participation-architecture condition). *Evaluation of economic participation should distinguish formal admission from practical access, activity from consequential contribution, contribution from recognition, presence from decision standing, and current participation from the capability and dependency effects that shape later participation.*

Table 20.6 summarizes the eight participation dimensions developed below. The dimensions overlap in practice. Productive, epistemic, care, institutional, and community participation can occur within one activity, and an adequate analysis should preserve those overlaps where they are economically consequential.

20.6.1 Productive Participation Relations

Productive participation concerns the positions through which subjects contribute to production, maintenance, coordination, transformation, and organizational continuity. Employment is one important pathway, but productive participation also includes self-employment, cooperative work, informal activity, voluntary contribution, household production, maintenance, peer production, platform-mediated work, and contributions performed through mixed human-machine arrangements. The analytical unit is therefore the participation relation rather than the employment contract alone.

Table 20.6: Dimensions of economic participation in generative relational economic order.

Participation dimension	Primary relation	Generative question	Characteristic participation failure
Productive participation	Contribution to production, maintenance, coordination, and transformation	Can participants contribute, learn, and influence productive processes without contribution being reduced to measured output?	Output extraction with weak recognition, learning, or process standing
Epistemic participation	Question formation, interpretation, verification, knowledge production, and reuse	Who can enter the processes through which economically consequential knowledge is formed and revised?	Information access without practical epistemic standing
Care participation	Provision, receipt, coordination, and reproduction of care relations	Are care participants supported, recognized, and able to sustain the relations on which wider participation depends?	Participation elsewhere sustained through hidden care depletion
Institutional participation	Membership, representation, deliberation, challenge, and decision interfaces	Which affected positions have practical standing in consequential institutional processes?	Formal voice without information, response, correction, or influence
Community participation	Shared practice, stewardship, mutual provision, maintenance, and collective formation	Can communities reproduce collective capabilities and shared relations across time?	Reliance on uncompensated or non-renewed community capacity
Post-employment participation	Economically consequential activity beyond employment or labor scarcity	Which pathways remain available when employment ceases to organize income, contribution, and standing together?	Material support without consequential participatory pathways
Participation inequality	Unequal conversion of formal opportunity into practical participation	Which conditions distribute entry, standing, burden, recognition, and exit unequally?	Nominal equality with unequal conversion conditions
Generative participation	Participation that reproduces or enlarges later participation capacity	Does participation strengthen capabilities, relations, standing, and future-forming pathways?	Present activity accompanied by later deskilling, exclusion, or generative foreclosure

Production also contains more than execution. Participants can identify problems, interpret local conditions, coordinate interdependent tasks, maintain tools, prevent errors, transmit tacit knowledge, mentor others, reorganize workflows, and notice emerging risks. An economic order that recognizes only directly measurable output can understate these contributions and can weaken the very relations through which productive systems remain adaptable.

Productive participation can therefore be differentiated along several axes: access to productive resources; discretion over task execution; opportunity to learn; visibility of contribution; recognition and compensation; exposure to risk; ability to challenge process decisions; portability of acquired skills or records; and access to later roles. Two workers with the same job title can occupy very different productive participation positions if one has substantial learning, discretion, recognition, and mobility while the other performs tightly monitored tasks with little transferable capability.

Definition 20.78 (Productive participation profile). A *productive participation profile* specifies, for a participant or position, the practical access, contribution scope, discretion, learning opportunity, recognition, compensation, risk exposure, process influence, capability formation, and exit or transition conditions associated with participation in a productive configuration.

Automation can change this profile even where employment persists. A person may remain employed while moving from direct production into verification, exception handling, customer relations, maintenance, or system oversight. Such transitions can increase discretion in some settings and reduce understanding in others. The relevant question is not whether a human remains in the process, but which economically consequential capabilities and decision interfaces the human position retains or acquires.

Productive participation also affects collective capability. Teams often possess coordination knowledge, routines, shared memory, and distributed competence that cannot be attributed to one member. High turnover, excessive fragmentation, or outsourcing can preserve short-run output while reducing collective capacity to diagnose unusual failures or redesign the process. Participation analysis therefore connects individual positions to the reproduction of organizational capability developed in Section 20.4.

Proposition 20.79 (Productive-participation condition). *Where productive activity depends on distributed judgment, maintenance, learning, or coordination, evaluation should examine whether the participation configuration reproduces those capabilities and recognizes their contribution rather than inferring productive adequacy from output or employment counts alone.*

20.6.2 Epistemic Participation Relations

Epistemic participation concerns entry into processes through which questions are formulated, evidence is produced, claims are interpreted, knowledge is verified, records are maintained, and later inquiry is oriented. The knowledge infrastructure developed in Section 20.5.4 provides conditions of possibility; epistemic participation concerns the positions from which subjects actually use and reshape that infrastructure.

Information access is therefore only one layer. A participant may be able to read a report without possessing the language, background knowledge, time, institutional standing, or verification tools required to challenge it. Conversely, local practitioners, patients, workers, community members, or users can possess relevant knowledge while lacking institutional channels through which it becomes legible to formal decision processes. Epistemic participation requires attention to both reception and contribution.

Question formation is especially important. If participation begins only after a problem, metric, dataset, or model has already been selected, participants can influence answers while remaining excluded from the framing that determines which answers matter. Economic institutions can therefore distribute epistemic standing through agenda-setting, data categories, evaluation criteria, expert credentials, access to records, and the authority to define uncertainty.

Definition 20.80 (Epistemic participation profile). *An epistemic participation profile specifies the practical ability of a participant or position to access, interpret, question, contribute to, verify, preserve, contest, and revise economically consequential knowledge, including the ability to participate in problem formation and evidential framing where relevant.*

Artificial intelligence can widen epistemic participation by lowering language, coding, search, modeling, or drafting barriers. It can also concentrate epistemic mediation where access to models, provenance, verification resources, or decision systems is uneven. The resulting configuration should therefore be evaluated through the distribution of question-forming capacity, verification capacity, interpretive autonomy, and correction pathways, not solely through access to generated answers.

Epistemic participation also has regenerative effects. Participation in inquiry can build later capability, while repeated dependence on opaque outputs can weaken independent verification. Archives, reproducible workflows, mentorship, open methods, and plural expert communities can increase the capacity of later participants to reconstruct or contest earlier knowledge. In this sense, epistemic participation is one mechanism through which an economic order preserves its ability to re-epistemize its own decisions.

Proposition 20.81 (Epistemic-participation condition). *Where knowledge materially shapes economic allocation, governance, or institutional action, participation should be evaluated through access to problem formation, interpretation, verification, contribution, contestation, and preservation rather than through information availability alone.*

20.6.3 Care Participation Relations

Care participation includes the provision, receipt, coordination, financing, maintenance, and institutional organization of relations through which bodily, emotional, developmental, and dependency needs are supported. Section 20.5.5 treated care as infrastructure because wider economic participation depends on its continuity. The present subsection examines care as a participation relation with its own standing, burdens, capabilities, and value processes.

Care relations often combine asymmetrical needs with mutual dependence. Infants, older persons, persons with disabilities, patients, and others can require support that cannot be reduced to market exchange or reciprocal contribution within a short horizon. Caregivers can possess specialized knowledge and responsibility while having limited institutional authority or economic recognition. Recipients can depend heavily on continuity while having weak control over scheduling, provider changes, or eligibility rules. Participation analysis therefore has to include both caregiver and care-recipient positions.

Care also changes the participation possibilities of others. Reliable childcare can expand education, employment, civic, or community participation. Inadequate care can shift time and risk into households, often making one person's formal opportunity depend on another person's unpaid or under-supported labor. The relevant economic relation is thus distributed across care recipients, caregivers, households, employers, public systems, community institutions, and service providers.

Definition 20.82 (Care participation profile). *A care participation profile specifies the care roles, time commitments, dependencies, continuity requirements, recognition, compensation, decision standing, support infrastructure, capability effects, and transition conditions experienced by relevant caregivers, recipients, and coordinating positions within a care configuration.*

Care participation also produces knowledge. Long-term caregivers can hold tacit knowledge about routines, vulnerabilities, communication, and context that is difficult to reconstruct after abrupt turnover. Recipients can possess experiential knowledge about what forms of support are usable or dignified. Institutions that treat care as standardized delivery can therefore lose relational knowledge that is central to quality and continuity.

A generative economic order does not require all care to become formal employment. Informal, familial, communal, and professional care can coexist. The analytical requirement is to make the burden, dependency, standing, support, and capability effects visible enough that one form of participation is not sustained through systematic depletion of another.

Proposition 20.83 (Care-participation condition). *Where wider economic participation depends on care relations, evaluation should identify how care responsibilities, continuity, recognition, decision standing, and support are distributed and whether the care configuration reproduces the capabilities of both recipients and caregivers across time.*

20.6.4 Institutional Participation Relations

Institutional participation concerns the positions through which members, users, workers, affected groups, experts, funders, regulators, or other relevant subjects enter institutional processes. Section 20.4.5 established participation and institutional standing as one dimension of generative institutions. The present subsection broadens that analysis to economic order by examining how standing is distributed across heterogeneous institutions and how institutional participation connects to consequential decisions.

Formal consultation is a weak proxy for institutional participation. Participants may be invited to meetings after key options have already been excluded, may receive information too late to influence decisions, or may lack the technical support required to interpret proposals. Representation can also become disconnected from represented positions where representatives have weak accountability or limited access to the experiences they are expected to convey.

Institutional participation therefore includes agenda access, information access, deliberative opportunity, representation, decision influence, challenge, review, and correction. The appropriate combination depends on the institution. A court, central bank, school, research funder, hospital, cooperative, utility, and digital platform do not require identical participation arrangements. The participation architecture should correspond to the mandate, authority, affected positions, risks, and feasible forms of standing.

Definition 20.84 (Institutional participation profile). *An institutional participation profile specifies the information, agenda, deliberative, representative, decision, challenge, review, and correction interfaces practically available to a participant or affected position within an institution or institutional network.*

Participation can also distribute responsibility. Institutions sometimes invite front-line workers, community representatives, or users to contribute to decisions without giving them authority over resources or implementation, while later attributing re-

sponsibility to the participatory process. Such configurations can create symbolic inclusion while leaving power relations largely unchanged. Participation analysis should therefore keep decision influence, responsibility, and accountability distinct.

Institutional participation can nevertheless be generative when it improves problem detection, preserves plural knowledge, creates learning across positions, and strengthens the capacity of institutions to revise themselves. These effects depend on whether contributions receive consequential response and whether participants can see how decisions were transformed by the process.

Proposition 20.85 (Institutional-participation condition). *Where institutions exercise consequential authority over affected positions, participation should be evaluated through practical information, agenda, representation, decision, challenge, and correction pathways and through the correspondence between assigned responsibility and actual influence.*

20.6.5 Community Participation Relations

Community participation concerns repeated contribution to shared practices, local institutions, commons, mutual support, culture, stewardship, maintenance, and collective problem solving. Communities can supply capabilities that neither markets nor formal public institutions reproduce easily: local knowledge, trust, continuity, mutual aid, social memory, cultural interpretation, informal care, and stewardship of shared resources. Yet these capacities can be depleted when treated as free background conditions.

Participation in communities is heterogeneous. Some members contribute labor; others contribute money, knowledge, space, contacts, or care. Some participate intermittently because of age, disability, employment, migration, or caregiving responsibilities. Some are strongly affected by community decisions while having weak formal membership. A community participation architecture therefore needs more than attendance counts or volunteer hours.

Community participation can also carry exclusion. Longstanding norms can privilege incumbents, informal networks can make entry difficult, and high expectations of unpaid contribution can burden those with fewer resources. Strong internal cohesion can coexist with exclusion of neighboring groups or newcomers. GRE therefore treats community participation through access, standing, reciprocity, burden, recognition, conflict resolution, and exit rather than romanticizing community as inherently inclusive.

Definition 20.86 (Community participation profile). *A community participation profile specifies practical entry, contribution forms, standing, reciprocal support, recognition, burden, learning, conflict-resolution access, stewardship roles, and exit or mobility conditions within a community-based economic configuration.*

Community participation can generate collective capability. Repeated collaboration creates shared routines, local knowledge, trust, governance experience, and the capacity to respond to events that were not anticipated when the institution was designed. This capacity can be lost through demographic change, displacement, platform substitution, commercialization, or withdrawal of shared space even where in-

dividual capabilities remain.

Relational infrastructure therefore matters again. Public space, meeting facilities, digital systems, transport, legal recognition, funding channels, and knowledge repositories can determine whether community participation remains practical. Section 20.5 provides the infrastructural side of this relation; community participation identifies the collective practices those infrastructures enable.

Proposition 20.87 (Community-participation condition). *Where community practices provide economically consequential stewardship, care, knowledge, culture, maintenance, or mutual support, evaluation should examine whether contribution burdens, standing, reciprocity, entry, conflict resolution, and collective capability are reproduced rather than treating community capacity as an uncosted background resource.*

20.6.6 Post-Employment Participation Pathways

Employment has historically bundled several functions: income, daily structure, social recognition, skill development, institutional membership, contribution, access to networks, and sometimes political or organizational representation. These functions can separate. A person can receive income without employment, perform socially consequential activity without wages, work through intermittent contracts without durable membership, or remain employed while much consequential contribution migrates elsewhere.

This separation becomes especially important under automation and artificial intelligence. Reduced demand for particular forms of labor does not determine whether persons can continue to participate in research, education, care, culture, ecological stewardship, public institutions, communities, open-source production, local governance, or exploratory activity. The participation problem is therefore broader than income replacement.

Definition 20.88 (Post-employment participation pathway). *A post-employment participation pathway is an institutionally or relationally supported route through which a person or collective can enter economically consequential activity, learning, contribution, governance, care, knowledge, culture, stewardship, or community formation without practical admission depending primarily on conventional employment status or scarcity of the participant's labor.*

Such pathways require material time. Income security, housing, healthcare, care support, mobility, digital access, public space, education, and legal standing can all determine whether nominal opportunities become usable. They also require consequential interfaces. A person who is materially supported but has access only to recreational or symbolic activities can remain excluded from processes through which institutions, knowledge, infrastructures, or shared futures are actually shaped.

Post-employment participation does not imply that every activity should be publicly funded or institutionally recognized. Nor does it imply the disappearance of employment. The analytical issue is whether economic standing and meaningful participation remain excessively coupled to one labor-market relation under conditions in which productive necessity becomes more uneven. Plural pathways can include public institutions, cooperatives, commons, research networks, community organiza-

tions, cultural institutions, educational systems, care arrangements, entrepreneurial activity, and hybrid forms that do not fit traditional employment categories.

Proposition 20.89 (Post-employment participation condition). *Where employment becomes a weaker organizer of income, contribution, and social standing, economic-order evaluation should examine whether material security is coupled with practical pathways into consequential learning, contribution, governance, care, knowledge, community, cultural, and stewardship activity.*

20.6.7 Participation Inequality

Formal participation opportunities can be distributed equally while practical participation remains highly unequal. Time, income, language, education, health, disability, care obligations, mobility, digital access, legal status, documentation, social networks, safety, reputation, and institutional familiarity can all affect whether a participation pathway is usable. Participation inequality is therefore a conversion problem as well as an admission problem.

Unequal participation can accumulate. Early access to selective institutions creates credentials, relationships, confidence, and knowledge that expand later opportunity. Repeated exclusion can have the opposite effect. A single participation gap can therefore alter later capability and standing even after formal barriers are removed. This cumulative structure connects participation inequality to the historical and option-space evaluation developed in Section 20.2.9.

Unequal burden is another dimension. Some participants bear disproportionate maintenance, care, emotional, administrative, or coordination work while others receive more visible recognition or decision authority. A participatory institution can therefore appear inclusive while reproducing unequal burdens within the participation process itself.

Definition 20.90 (Participation conversion profile). *A participation conversion profile specifies the material, temporal, spatial, informational, linguistic, legal, social, technological, care, and capability conditions through which a formal participation opportunity becomes practical entry, sustained contribution, consequential standing, and viable exit for a specified participant or position.*

Participation inequality should also include asymmetric exit. Persons with wealth, credentials, portable reputation, alternative networks, or legal mobility can leave a failing institution or platform more easily than those whose income, care, identity, data, status, or community ties are concentrated within it. Strong nominal participation can therefore coexist with weak bargaining power when exit is structurally unequal.

This subsection does not imply that all participation outcomes should be equal. Different roles, expertise, responsibilities, and preferences can support differentiated participation. The evaluative task is to identify whether differences correspond to defensible functions and choices or arise from avoidable conversion barriers, concentrated dependency, inherited exclusion, or unrecognized burden.

Proposition 20.91 (Participation-inequality condition). *Claims of participatory inclusion should be qualified by the conversion conditions governing practical entry, sus-*

tained contribution, recognition, influence, burden, and exit and by the cumulative effects through which present participation differences alter later capability and standing.

20.6.8 Generative Economic Participation

The preceding dimensions can now be integrated. Productive, epistemic, care, institutional, community, and post-employment participation differ in object and mechanism, yet each can reproduce or deplete the capabilities and relations through which later participation remains possible. Generative participation names this recursive property.

Definition 20.92 (Generative economic participation). *Generative economic participation* is participation whose operation materially contributes to economically consequential activity while also reproducing, enlarging, or making more revisable the capabilities, relations, standing, knowledge, infrastructures, and participation pathways through which relevant subjects or collectives can take part in later economic formation.

The definition does not require every participation episode to increase every capability. Training can involve temporary dependence; care can constrain caregiver time; emergency institutions can centralize decisions; specialized production can narrow task scope. Generativity is evaluated relative to purpose, horizon, affected positions, and the wider configuration. The relevant question is whether the participation arrangement systematically renews or erodes the conditions of later participation.

Generative participation also has a recognition dimension. Contributions that remain persistently invisible can be difficult to reproduce because participants lack income, status, institutional memory, succession pathways, or bargaining power. Yet recognition need not always take the form of payment. Attribution, credentialing, representation, public acknowledgment, access rights, governance standing, community reciprocity, and capability return can all matter depending on the domain.

Participation and value therefore connect directly to the next section. Participants contribute labor, knowledge, care, maintenance, trust, data, legitimacy, ecological stewardship, culture, and institutional capacity. These contributions can generate value that is captured elsewhere, dissipated, or returned to the substrates that made generation possible. Section 20.7 will examine these return and reinvestment pathways in detail.

Generative participation also provides one response to generative foreclosure. Where an economic order preserves plural practical pathways into knowledge, institutions, care, production, communities, culture, and stewardship, technological or institutional change is less likely to eliminate the capacities through which alternatives can later be formulated and organized. This does not guarantee just outcomes. It preserves a wider field in which affected positions can continue to learn, contest, contribute, and reorganize.

Proposition 20.93 (Generative-participation condition). *An economic participation configuration has stronger generative warrant when it couples practical access and consequential contribution with capability formation, recognition, contestability, revis-*

able dependency, viable transition or exit, and the reproduction of pathways through which affected subjects and collectives can participate in later economic formation.

Economic participation is therefore neither a residual social objective nor a simple count of workers, voters, members, users, or volunteers. It is an architecture of positions through which economic subjects enter processes of production, knowledge, care, institutions, communities, and future formation. Sections 20.4 and 20.5 established the institutional and infrastructural conditions that carry these positions. The present section has specified how participation itself can reproduce or erode later capability and standing. Section 20.7 turns next to value recirculation and social reinvestment, asking how value generated through these distributed participation relations returns to the capabilities, infrastructures, communities, and institutions on which continued generation depends.

20.7 Value Recirculation and Social Reinvestment

The role of this section is to specify how value generated, realized, accumulated, or captured within a generative relational economic order can return to the relations and substrates that support continued generation. Its objective is to connect the value-process architecture of Chapter 14, the generative-return analysis of Chapter 19, and the institutional and participation architectures of Sections 20.4–20.6 at the level of economic order. The section develops ten dimensions: return-flow architecture, public reinvestment, community reinvestment, knowledge reinvestment, capability reinvestment, relational reinvestment, long-horizon reinvestment, generative depletion, transfer pathways and incidence, and justice in return–transfer relations. The method is relational, provenance-sensitive, and non-scalar. GRE asks which value-bearing conditions are generated, which positions and substrates contribute to that generation, where value is realized or captured, through which pathways it returns, what the return actually maintains or regenerates, and which burdens or depleted conditions remain outside the apparent cycle.

Chapter 14 distinguished value generation, transmission, conversion, recirculation, accumulation, dissipation, and generative return. The present section does not redefine those processes. It asks how an economic order organizes them recurrently across institutions, infrastructures, communities, public systems, knowledge environments, and heterogeneous forms of participation. This order-level perspective matters because a value-generating activity can remain locally profitable or productive while progressively depleting public capacity, ecological conditions, care relations, knowledge commons, worker capability, community trust, or technical infrastructure. Conversely, a return can be economically consequential even where it is neither paid to the original contributor nor expressed in the same value form as the contribution.

Return, recirculation, reinvestment, redistribution, and maintenance should therefore remain distinct. A *return* identifies a later flow or condition connected to an earlier generative relation. *Recirculation* requires that a returned condition re-enter later maintenance, regeneration, coordination, conversion, or generation. *Reinvestment* is a purposeful commitment of resources or capability to conditions expected

to support later activity. *Redistribution* concerns the reallocation of resources, rights, burdens, or claims across positions and need not re-enter a generative substrate. *Maintenance* concerns preservation of function or relation and can itself be generative where continued functioning preserves later possibility. These processes can overlap, but treating them as synonyms makes it difficult to identify what an apparent return actually does.

Social reinvestment is used here in a similarly bounded sense. It does not imply that every social relation should be financed, monetized, or evaluated through an investment metaphor. Nor does it presume a single public authority or one distributive formula. It identifies the recurrent commitment of value-bearing conditions to shared, public, community, epistemic, capability, relational, or intergenerational substrates whose continued viability materially shapes later economic participation and generation. The relevant return can be financial, infrastructural, epistemic, institutional, ecological, relational, or capability-bearing.

Definition 20.94 (Economic value-recirculation architecture). An *economic value-recirculation architecture* is a history-bearing arrangement of generation, realization, capture, transfer, return, conversion, maintenance, reinvestment, and incidence pathways through which value-bearing conditions produced within an economic configuration re-enter, bypass, or deplete the capabilities, relations, infrastructures, institutions, communities, and other substrates relevant to later economic generation.

Definition 20.94 makes the architecture broader than one circular flow. Several return paths can coexist; some can be blocked; some can move across scales; and one substrate can be regenerated while another is depleted. A platform can reinvest heavily in technical infrastructure while underinvesting in participant capability or community trust. A public system can expand service expenditure while allowing maintenance capacity to erode. A community enterprise can return revenue locally while relying on ecological depletion outside the community boundary. Order-level analysis should therefore reconstruct a portfolio of return and depletion pathways rather than infer adequacy from the existence of one visible cycle.

Proposition 20.95 (Recirculation-specification condition). *A claim that an economic arrangement recirculates value should identify the originating or contributing relations, the value-bearing condition realized or captured, the return pathway, the receiving position or substrate, the conversion through which the return becomes usable, the relevant time horizon, and any materially significant depletion or burden displaced outside the stated cycle.*

Table 20.7 summarizes the ten dimensions developed below. The rows are analytical perspectives rather than exclusive categories. One return can simultaneously be public, epistemic, capability-bearing, relational, and long-horizon.

20.7.1 Return-Flow Architecture

Return flows form the immediate connective tissue of recirculation. An economic process can generate revenue, knowledge, reputation, capability, data, public revenue, ecological improvement, or other value-bearing conditions. Some of these conditions remain with the realizing institution; some move to investors, workers,

Table 20.7: Dimensions of value recirculation and social reinvestment in generative relational economic order.

Dimension	Primary return object	Generative question	Characteristic analytical failure
Return-flow architecture	Resources, rights, knowledge, recognition, capability, restoration, or other value-bearing conditions	What returns, to whom or what, through which conversion pathway, and with what re-entry effect?	Treating any reverse flow as regeneration
Public reinvestment	Public capacity, common infrastructure, services, maintenance, and public knowledge	Do publicly mobilized returns reproduce the conditions of collective provision and practical access?	Expenditure volume without conversion, maintenance, or capability analysis
Community reinvestment	Shared capability, local infrastructure, stewardship, institutions, and relational continuity	Does generated value strengthen the community capacities on which later collective action depends?	Romanticized locality that hides internal asymmetry or externalized burden
Knowledge reinvestment	Documentation, verification, preservation, training, provenance, and open or shared epistemic capacity	Can generated knowledge be understood, tested, transmitted, and reused later?	Information release without interpretive or verification capacity
Capability reinvestment	Human, collective, institutional, technical, and maintenance capability	Does current activity reproduce the abilities required for later action and oversight?	Present service or output accompanied by later deskilling or capacity loss
Relational reinvestment	Trustworthiness, coordination, care, recognition, legitimacy, and durable cooperation pathways	Which economically necessary relations are maintained or repaired through the return?	Treating relational substrates as costless background conditions
Long-horizon reinvestment	Renewal, succession, reserves, ecological regeneration, preservation, and option capacity	Are delayed maintenance and regeneration requirements visible across relevant horizons?	Short-horizon return combined with deferred depletion
Generative depletion	Erosion of capabilities, relations, infrastructure, knowledge, ecology, or future options	Which substrates are consumed faster than they are maintained, regenerated, substituted, or legitimately transformed?	Positive current return masking reproductive deficit
Transfer pathways and incidence	Intermediaries, rules, eligibility, timing, control, leakage, conversion, and burden	Where does the return actually arrive, and who controls or bears the pathway?	Nominal allocation treated as realized incidence
Return-transfer justice	Claims of contribution, affectedness, need, standing, historical burden, and shared substrate	Which return claims are relevant, how are conflicts mediated, and which remainders remain after transfer?	One distributive rule presented as universally sufficient

users, communities, public authorities, or shared infrastructures; some dissipate; and some never become practically available to positions that contributed to generation. Return-flow analysis traces these paths without assuming that source contribution and later receipt are identical in form or quantity.

A return can be direct or converted. Wages, royalties, dividends, tax receipts, repayments, and shared revenues are relatively direct financial examples. Converted returns include training financed from revenue, public infrastructure supported by taxation, maintenance funded from service income, knowledge returned through documentation, ecological restoration financed from extractive activity, or improved institutional procedures derived from participant experience. Cross-form return is common, but conversion creates an additional evaluative burden. A symbolic ac-

knowledge does not automatically compensate for material extraction; financial payment does not automatically restore ecological function; and infrastructure provision does not automatically replace political standing.

The source position also requires care. Value is often generated through configurations rather than isolated generators. A scientific result can depend on researchers, participants, public funding, prior knowledge, data infrastructure, software, reviewers, and institutional support. A platform service can depend on workers, complementors, users, data, public infrastructure, standards, and community-generated content. A care system can depend on paid workers and unpaid household labor simultaneously. Return claims therefore cannot always be derived by identifying one originator.

Definition 20.96 (Return-flow profile). *A return-flow profile specifies, for a bounded value-generating process, the relevant contributing relations and substrates, the value-bearing conditions later realized or captured, the pathways through which returns move, their form and timing, the positions or substrates receiving them, the conditions required for realization, and the material residuals or burdens left outside the return path.*

A return-flow profile can reveal asymmetry even when total return is large. Early, liquid, enforceable returns can accrue to positions with strong control, while delayed, contingent, symbolic, or infrastructure-dependent returns accrue elsewhere. Some contributors can receive benefits only if they remain inside a platform, employer, jurisdiction, or institutional relationship. Timing and control are therefore part of incidence rather than administrative detail.

Proposition 20.97 (Return-flow adequacy condition). *Evaluation of a return flow should preserve the form, timing, control, conversion requirements, incidence, and residual burden of the return and should avoid inferring regenerative adequacy from the gross quantity returned alone.*

20.7.2 Public Reinvestment Architecture

Public systems are major sites of recirculation because they mobilize taxation, fees, public revenues, borrowing capacity, common assets, regulatory authority, knowledge, and administrative capability and redirect these conditions toward infrastructures and services that shape later economic possibility. Public reinvestment can support transport, education, research, health, care, legal administration, digital infrastructure, ecological restoration, public space, social protection, and institutional maintenance. The generative question concerns how these returns reproduce practical access and collective capability rather than whether expenditure is public in form.

Public reinvestment should therefore be separated from spending volume. A capital project can expand nominal infrastructure while creating unsustainable maintenance obligations. A social programme can transfer resources while leaving administrative access weak. Research funding can generate outputs while eroding long-term institutional capacity through unstable employment or fragmented infrastructure. Public reinvestment is generative when the return supports the conditions through which later provision, participation, maintenance, adaptation, and correction remain

possible.

Public return also has scale. National revenue can support local systems; local taxation can finance shared infrastructure; public research can diffuse across sectors; ecological restoration can create downstream benefits beyond the financing jurisdiction. Cross-scale return can be desirable, but it can also obscure incidence where one region, community, or generation bears the cost while another receives the benefit. A public reinvestment architecture should therefore trace territorial, institutional, and intergenerational incidence where these differences matter.

Definition 20.98 (Public reinvestment architecture). A *public reinvestment architecture* is the arrangement through which publicly mobilized resources, capabilities, knowledge, authority, or returns are committed to the maintenance, regeneration, expansion, or revision of public and shared conditions of economic participation across specified positions, scales, and time horizons.

The definition leaves open the institutional vehicle. Public reinvestment can operate through direct public provision, grants, procurement, shared funds, public enterprises, intergovernmental transfers, partnerships, or support for community and knowledge infrastructures. The analytical requirement is to specify the relation between public mobilization and later public or shared capability.

Proposition 20.99 (Public-reinvestment condition). *Claims of generative public reinvestment should identify the public or shared capability, infrastructure, relation, or option structure being reproduced, the conversion pathway through which expenditure becomes usable capacity, and the maintenance, learning, and distributional conditions required for that return to persist.*

20.7.3 Community Reinvestment Architecture

Communities often contribute value that is only partially represented in formal accounts. Local knowledge, mutual aid, cultural practice, trust, stewardship, maintenance, informal care, volunteer activity, social coordination, and place-specific legitimacy can support enterprises, public systems, tourism, research, platforms, commons, and development interventions. Community reinvestment asks how generated value returns to the collective capabilities and shared conditions through which those contributions remain possible.

Local return should not be romanticized. A transfer to a community organization can reproduce internal hierarchy; a locally owned enterprise can externalize ecological burdens; a community fund can benefit highly visible groups while overlooking less organized positions. Community boundaries themselves can be contested. The relevant unit is therefore the return relation and its incidence, not locality as an automatic marker of justice.

Community reinvestment can take many forms: maintenance of shared spaces, local training, commons stewardship, cooperative reserves, cultural transmission, community health, legal support, local data governance, participatory funds, shared equipment, or support for care and volunteer infrastructures. The value form returned need not match the contribution form. What matters is whether the returned condition strengthens a relation or capability materially involved in later community

action.

Definition 20.100 (Community reinvestment pathway). A *community reinvestment pathway* connects value generated partly through community relations, knowledge, labor, legitimacy, place, or shared resources to later maintenance, capability, infrastructure, stewardship, participation, or institutional capacity within the relevant community configuration.

Community reinvestment can also support autonomy from the returning institution. Training, portable infrastructure, shared ownership, open knowledge, or diversified funding can reduce dependence even when they arise from a current partnership. In this sense, a strong return can enlarge the recipient community's later capacity to choose different relations.

Proposition 20.101 (Community-reinvestment condition). *Evaluation of community reinvestment should identify internal incidence, boundary and representation questions, externalized burdens, and whether the returned value strengthens practical collective capability and option space rather than merely reproducing dependence on the source of return.*

20.7.4 Knowledge Reinvestment Architecture

Knowledge is a particularly recursive value form because generated knowledge can become infrastructure for later generation. Research findings, operational lessons, software, documentation, datasets, archives, classifications, models, and tacit practices can all increase later capability when they remain interpretable, verifiable, maintainable, and practically accessible. Knowledge reinvestment concerns the conditions through which epistemic outputs are returned to future inquiry, practice, education, institutional learning, and public understanding.

Publication or data release is therefore only one possible return mechanism. A document can be formally open yet practically unusable because of missing provenance, inaccessible language, proprietary dependencies, absent metadata, lost software environments, or lack of interpretive capability. Knowledge can also remain trapped inside an institution when staff turnover, outsourcing, undocumented automation, or weak archival practice removes the ability to reconstruct how decisions were made.

Knowledge reinvestment includes documentation, preservation, training, replication, provenance, versioning, translation, verification capacity, maintenance of software and data infrastructures, and the return of findings to participants or practitioners where appropriate. It can also include time for reflection and synthesis. An economic order oriented only toward immediate output can underinvest in these slower epistemic functions even while producing large quantities of information.

Definition 20.102 (Knowledge reinvestment architecture). A *knowledge reinvestment architecture* is the arrangement through which knowledge, evidence, records, methods, data, models, software, and interpretive capability generated through economic activity are preserved, verified, transmitted, taught, maintained, and made practically reusable for later inquiry and action.

This definition connects directly to the epistemic economy of Chapter 17. Knowledge return is generative where later actors can re-epistemize prior claims rather

than merely inherit conclusions whose evidential history has disappeared.

Proposition 20.103 (Knowledge-reinvestment condition). *Knowledge reinvestment should be evaluated through later interpretability, provenance, verification, maintainability, transmission, and reuse capacity rather than through information volume or formal openness alone.*

20.7.5 Capability Reinvestment Architecture

Economic activity continually uses capability. Workers exercise skills, institutions consume administrative and professional capacity, communities use stewardship and coordination capacity, caregivers expend time and attention, technical systems require maintenance expertise, and public infrastructures rely on institutional competence. Activity can also form capability through learning, mentoring, problem solving, responsibility, and repeated practice. Capability reinvestment asks whether the configuration reproduces the abilities it relies upon or progressively substitutes for, concentrates, or exhausts them.

The distinction between service substitution and capability formation developed earlier in the book becomes especially important here. Outsourcing or automation can provide excellent immediate service while reducing the recipient's ability to verify, maintain, adapt, or exit later. Conversely, requiring every participant to reproduce specialist capability internally can be inefficient or unrealistic. Capability reinvestment is therefore selective. It asks which capabilities need to remain distributed, local, public, collective, or independently recoverable given the relevant dependency and risk structure.

Capability return can operate through training, apprenticeships, professional development, mentoring, participatory practice, documentation, shared technical systems, institutional succession, protected experimentation, and opportunities to exercise judgment. It can also involve creating time and security for learning. Formal training budgets are an incomplete proxy where work organization leaves no practical opportunity to acquire or use the capability.

Definition 20.104 (Capability reinvestment profile). *A capability reinvestment profile specifies which human, collective, institutional, technical, epistemic, maintenance, or governance capabilities an economic configuration uses, forms, concentrates, substitutes for, depletes, or returns and identifies the pathways through which those capabilities can be reproduced or recovered over time.*

Capability reinvestment also has distributive implications. One position can accumulate strategic knowledge while others become deskilled; one institution can internalize data and model capability while dependent organizations lose independent verification; one generation can benefit from inherited public capacity while failing to reproduce it. These are return questions as well as capability questions.

Proposition 20.105 (Capability-reinvestment condition). *Where continued economic activity depends materially on a capability, evaluation should examine whether that capability is being reproduced, diversified, transferred, or recoverably substituted at a rate and distribution adequate to the relevant long-horizon dependency structure.*

20.7.6 Relational Reinvestment Architecture

Many economic processes depend on relational conditions that do not appear as separable assets. Trustworthiness, care, recognition, professional norms, legitimacy, mutual knowledge, coordination routines, shared expectations, and durable channels of communication can lower the cost of cooperation and make complex collective activity possible. These conditions can be generated through repeated interaction, but they can also be consumed. Organizations can rely on worker commitment while weakening reciprocity; public institutions can rely on compliance while eroding procedural legitimacy; communities can provide social coordination while receiving little support for the relations that sustain it.

Relational reinvestment is broader than expenditure on social programmes. It concerns practices through which economically consequential relations are maintained, repaired, or made more revisable. Fair process, recognition, predictable obligations, time for coordination, conflict resolution, continuity of care, transparent explanation, participatory governance, and repair after institutional error can all function as relational returns.

The relation should be specified rather than idealized. Trust can support coordination but can also conceal weak verification. Strong relational continuity can become exclusionary. Loyalty can be extracted. Care can be imposed unequally. Relational reinvestment therefore includes contestability, boundary conditions, and the possibility of exit alongside continuity.

Definition 20.106 (Relational reinvestment pathway). *A relational reinvestment pathway is a process through which resources, recognition, time, authority, care, repair, or institutional support are directed toward maintaining or regenerating an economically consequential relation, together with the standing and revision conditions required for that relation to remain viable without becoming coercively closed.*

This concept links value recirculation to the relational architecture of GRE directly. Some returns matter because they preserve a relation rather than because they create a transferable asset. Such return remains economically consequential where later generation depends on that relation.

Proposition 20.107 (Relational-reinvestment condition). *Claims of relational reinvestment should specify the relation being maintained or repaired, the contribution of that relation to later economic capability or coordination, the distribution of relational burden, and the mechanisms through which participants can contest, renegotiate, or exit the relation where warranted.*

20.7.7 Long-Horizon Reinvestment Architecture

Return timing can materially alter an economic trajectory. Some returns are realized quickly through income, consumption, or current service. Others require long periods of maintenance before their value becomes visible. Education, research, ecological restoration, institutional capacity, public infrastructure, cultural preservation, archives, care systems, and technical standards can all depend on recurrent commitments whose immediate measurable return is modest relative to their later enabling role.

Long-horizon reinvestment concerns these delayed reproduction requirements. It asks which present configurations depend on conditions that will deteriorate without renewal, succession, reserve capacity, or regeneration. The relevant horizon varies by object. Software dependencies can become obsolete within years; transport networks can require maintenance over decades; ecological processes can unfold across much longer periods; institutional trust and professional capability can accumulate slowly and erode rapidly.

Discounting and uncertainty complicate long-horizon return. GRE does not require one universal discount rule. It asks that the horizon and normative assumptions be explicit and that uncertainty not automatically erase later affected positions from consideration. Some returns can be staged, diversified, or made reversible. Others involve irreversible loss or threshold effects that require different treatment.

Definition 20.108 (Long-horizon reinvestment profile). *A long-horizon reinvestment profile identifies delayed maintenance, regeneration, succession, reserve, preservation, and option-support requirements associated with an economic configuration and relates them to the timing, uncertainty, reversibility, and intergenerational incidence of present return decisions.*

Long-horizon reinvestment also includes preservation of institutional and epistemic memory. A later generation cannot exercise meaningful revisability where records, provenance, expertise, or infrastructure have disappeared. Reinvestment in memory can therefore be part of preserving future option space.

Proposition 20.109 (Long-horizon reinvestment condition). *Where current economic benefit depends on conditions subject to delayed deterioration or regeneration, evaluation should make future maintenance, succession, preservation, reserve, and restoration requirements visible together with the positions expected to finance, perform, or bear those obligations.*

20.7.8 Generative Depletion Dynamics

Recirculation analysis becomes most informative when it can also identify failure of return. An economic configuration can generate considerable present value while consuming the conditions of its own continuation or transferring the cost of reproduction to less visible positions. This is *generative depletion*: erosion of capabilities, relations, infrastructures, knowledge, ecological functions, care capacity, legitimacy, or future options that are materially relevant to later generation.

Depletion is not identical to resource use. Some conditions are deliberately transformed; some capabilities become obsolete; some institutions should disappear; some ecological or technical substitutions are warranted. The question is whether the loss is accompanied by adequate maintenance, regeneration, substitution, transition, or legitimate closure. A reproductive deficit exists where the arrangement persistently draws on a relevant substrate without reproducing, replacing, repairing, or intentionally winding down the dependency that makes the substrate necessary.

Generative depletion can be hidden by accounting boundaries. A firm can appear productive while households reproduce labor capacity through unpaid care. A platform can appear asset-light while relying on public digital infrastructure and user-

generated data. A public service can meet targets while degrading staff capability. A research system can increase publication counts while eroding replication, archives, or mentorship. A low-price commodity can externalize ecological restoration costs. Order-level analysis should therefore ask where the reproduction cost has gone.

Definition 20.110 (Generative depletion profile). A *generative depletion profile* specifies the capabilities, relations, infrastructures, knowledge conditions, ecological functions, standing, or option structures materially consumed or weakened by an economic configuration, the positions bearing that depletion, and the extent to which maintenance, regeneration, substitution, transition, or legitimate closure addresses the resulting reproductive deficit.

Depletion can be cumulative and nonlinear. Small annual reductions in maintenance or training can produce sudden later failure. Trust can deteriorate after repeated procedural injury. Ecological systems can cross thresholds. Institutional knowledge can disappear abruptly when experienced cohorts leave. The visibility of current output can therefore be a poor guide to the depth of a latent reproductive deficit.

Proposition 20.111 (Generative-depletion condition). *An economic arrangement should be treated as generatively depleting, for the purpose of a bounded inquiry, where it persistently weakens a condition materially required for later generation without an adequate pathway of maintenance, regeneration, recoverable substitution, transition, or justified closure at the relevant scale and horizon.*

20.7.9 Transfer Pathways and Incidence

A reinvestment decision is not complete when a budget is allocated. Transfers pass through administrative, financial, organizational, legal, technical, and relational pathways that can alter their form and incidence. Eligibility rules, timing, intermediaries, transaction costs, matching requirements, procurement procedures, platform fees, information asymmetry, conversion conditions, and control rights can determine whether a nominal return becomes a practical one.

The distinction between intended recipient and realized incidence is therefore essential. A subsidy directed toward households can partly capitalize into prices. Funding for a community can be controlled by a narrow intermediary. Training money can reach providers while participants receive little usable capability. Public infrastructure spending can increase land values elsewhere. Knowledge-return requirements can produce documents that satisfy formal reporting without becoming usable by contributors. Return should be traced through its pathway rather than inferred from the destination named in policy.

Incidence also includes burden. A return programme can require unpaid administrative labor, data disclosure, compliance costs, travel, documentation, or care time from the intended beneficiaries. A community grant can increase reporting obligations. Portability schemes can shift technical integration costs onto smaller organizations. The pathway itself can therefore generate new dependencies or exclusions.

Definition 20.112 (Return-transfer pathway). A *return-transfer pathway* is the ordered or partially ordered set of institutional, financial, legal, technical, administra-

tive, and relational interfaces through which a value return or reinvestment commitment moves from its mobilization point toward realized incidence, including intermediaries, conversion conditions, control rights, timing, transaction burdens, and residual leakage or displacement.

This definition makes transfer pathways compatible with the broader intervention methodology of the book. The same nominal allocation can have different effects under different institutional pathways, and pathway redesign can sometimes matter more than increasing the nominal transfer.

Proposition 20.113 (Return-incidence condition). *Evaluation of social reinvestment should distinguish mobilized resources, nominal allocation, pathway control, practical access, realized incidence, conversion into capability or maintenance, and burdens created by the transfer process itself.*

20.7.10 Justice in Return–Transfer Relations

Return and transfer also raise questions of justice. A value-generating configuration can involve contributors, investors, workers, users, affected communities, public infrastructures, knowledge commons, ecological systems, caregivers, and later generations whose claims differ in kind. Some claims arise from contribution; some from affectedness; some from need, standing, prior entitlement, historical burden, public mandate, stewardship, or responsibility for future maintenance. GRE should preserve these different bases rather than derive one universal entitlement from the concept of generativity itself.

Contribution is therefore relevant but not exhaustive. An actor can have a strong claim to protection or return without having produced the value in question. Children, disabled persons, future persons, ecological systems, and populations affected by externalities illustrate why contribution cannot exhaust justice. Conversely, contribution claims can matter where labor, knowledge, data, care, community legitimacy, or ecological stewardship create value captured elsewhere. Justice analysis should identify which claim is being made and why.

Return form also matters. Financial payment can be appropriate for some claims, while others concern access, capability, repair, restoration, recognition, governance rights, public provision, or changes in control. Cross-form return can be justified, but the conversion should be explicit. An institution should not presume that one value form compensates for another where the affected positions reject or cannot practically use the substitution.

Justice also concerns who decides the return. A formally generous reinvestment can remain paternalistic where affected positions have no standing in defining the relevant substrate, choosing the form of return, or contesting the conversion. Participation from Section 20.6 therefore re-enters the value architecture. Return justice includes procedural standing as well as material incidence.

Definition 20.114 (Return–transfer justice profile). *A return–transfer justice profile identifies the relevant bases of claim in a return or reinvestment process, the affected and represented positions, the forms and timing of return, the conversion and transfer pathways, the distribution of control and burden, the procedures for contestation*

and revision, and the material normative remainder left after the transfer.

The normative remainder is important because a return can be justified along one dimension while remaining problematic along another. A compensation payment can address material loss without restoring political standing. Community investment can support local capability while leaving ecological harm unresolved. Open access can improve knowledge return while leaving data extraction or labor recognition contested. Justice analysis should preserve these residual claims rather than treat the return as closing the case automatically.

Proposition 20.115 (Return–transfer justice condition). *A justice claim concerning value return or social reinvestment should specify its basis of claim, affected positions, return form, conversion pathway, incidence, control, temporal horizon, and contestability and should preserve materially relevant normative remainders where one transfer cannot settle heterogeneous claims.*

The ten dimensions developed in this section provide an order-level account of how generated value can return to the conditions of later generation. Return-flow architecture identifies the path; public and community reinvestment locate collective sites of reproduction; knowledge and capability reinvestment reproduce epistemic and practical ability; relational reinvestment maintains cooperative substrates; long-horizon analysis exposes delayed obligations; depletion analysis identifies reproductive deficits; transfer analysis reconstructs realized incidence; and justice analysis keeps heterogeneous claims and procedural standing visible.

Value recirculation therefore does not imply a closed or harmonious economic cycle. Generative relational economic order can contain extraction, dissipation, justified consumption, transformation, redistribution, accumulation, and irreducible conflict alongside recirculation. The analytical contribution is narrower and more useful: it asks whether an order can see the substrates on which its value generation depends, trace how returns reach or fail to reach them, distinguish maintenance from depletion, and revise return architectures when value generation persistently consumes the conditions of later possibility. Section 20.8 turns next to economic order under plural values, where the problem of return must be situated within deeper incommensurability among value forms, subjects, and normative claims.

20.8 Plural-Value Economic Order

The role of this section is to specify how a generative relational economic order can be evaluated and organized where several value structures, subject positions, and domain-specific normative claims coexist without complete commensurability. Its objective is to connect the heterogeneous value architecture of Chapter 14, the subject–value analysis developed for artificial-intelligence-mediated economies in Chapter 18, the domain translations of Chapter 19, and the evaluation, institutional, participation, and recirculation architectures developed in Sections 20.2–20.7. The discussion develops eight dimensions: value-plural order architecture, incommensurable value relations, heterogeneous subject–value standing, plural-value coexistence, procedural accommodation and mediation, domain-specific value structures, aggregation scope and evaluative remainders, and open normative economic

order. The method is relational, institutionally explicit, and procedurally plural. It treats value disagreement as part of economic order rather than as a residual problem to be removed before economic analysis can begin.

Chapter 14 established that material, financial, capability, relational, epistemic, institutional, participatory, option, future, and ecological values can coexist and undergo only partial conversion. Chapter 18 further showed that heterogeneous human, artificial, collective, and non-human subject positions can become economically consequential without sharing one ontology, one utility representation, or one form of standing. The present section shifts the analytical level. It asks how an economic order can coordinate allocation, participation, infrastructure, institutional authority, return, and long-horizon revision when the relevant value field remains plural.

Plurality should not be equated with permanent disagreement or with the absence of decision. Economic coordination often requires closure at a particular time, scale, or institutional interface. A budget must be allocated, a standard adopted, a service configured, a right adjudicated, a platform rule applied, or an ecological threshold respected. GRE therefore distinguishes *operational closure* from *normative closure*. Operational closure produces a decision or rule sufficient for action within a bounded setting. Normative closure makes the stronger claim that the relevant values have been fully compared, translated, or resolved. The first can be necessary even where the second remains unwarranted.

The resulting problem is architectural. Economic order requires institutions and procedures capable of making heterogeneous values actionable while preserving material remainders, subject standing, provenance, and routes of contestation. Some values can be monetized for limited purposes; some can be represented by thresholds, constraints, rights, lexicographic priorities, or multi-criteria procedures; some can be translated only partially; and some can remain explicitly unresolved. The adequacy of the order therefore depends partly on how it organizes comparison and non-comparison, not merely on which aggregate outcome it produces.

Table 20.8 summarizes the eight dimensions developed below. The table is diagnostic rather than prescriptive. Different institutions can instantiate the dimensions through different legal, political, market, professional, community, technical, or deliberative mechanisms.

20.8.1 Value-Plural Order Architecture

A plural-value economic order begins from the observation that economically consequential activity can generate, depend on, and transform several value forms at once. A hospital can produce health capability, professional knowledge, public trust, employment, institutional continuity, financial obligations, and relational care. A research system can produce knowledge, prestige, training, infrastructure, public capability, and future options. A platform can generate revenue, data, convenience, network access, dependence, visibility, and forms of cultural or political influence. One scalar account can illuminate part of such a configuration while leaving other value-bearing relations outside its field of representation.

Order-level analysis therefore requires a map of value sources, carriers, realization sites, conversion interfaces, and institutional standing. The purpose is not to

Table 20.8: Dimensions of plural-value economic order in Generative Relational Economics.

Dimension	Primary analytical object	Order-level question	Characteristic analytical failure
Value-plural order architecture	Heterogeneous value forms, sources, carriers, and decision interfaces	Which values enter the order, through which representations, and with what institutional standing?	Treating one visible metric as the complete value field
Incommensurable value relations	Partial comparison, failed conversion, incomparable dimensions, and normative remainder	Which comparisons are warranted, which remain partial, and what is lost through conversion?	Treating numerical representation as proof of commensurability
Subject-value standing	Subjects, affected positions, representatives, and typed standing	Whose values become actionable, through which standing or representation pathway?	Treating institutional legibility as equivalent to complete subject representation
Plural-value coexistence	Institutional plurality, bounded domains, thresholds, rights, and parallel value spaces	How can heterogeneous value structures coexist without forced equivalence or destructive isolation?	Equating coexistence with either total integration or complete separation
Procedural accommodation	Deliberation, rights, review, negotiation, mediation, justification, and appeal	Which procedure is authorized to close a bounded conflict, and how can the closure be challenged or revised?	Treating procedure as neutral to power, access, or representation
Domain-specific value structures	Domain-local values, conversion interfaces, and translation remainders	Which value structures are local to education, care, ecology, research, culture, or other domains?	Importing one domain's metric into another without translation warrant
Aggregation scope	Scalar, vector, threshold, lexicographic, constrained, and partially ordered representations	At what scope does aggregation preserve enough material structure for the decision at hand?	Extending a locally useful aggregate into a universal welfare criterion
Open normative order	Normative records, revision triggers, unresolved disagreement, and future standing	How can economic coordination remain revisable as subjects, values, evidence, and conditions change?	Prematurely treating temporary institutional closure as final normative settlement

create an exhaustive catalogue before action. The purpose is to prevent one readily measured form of value from silently defining the economic order for every affected position. Which value forms require explicit representation depends on the research question, domain, scale, and stakes.

Value plurality also has a temporal dimension. Present income, future capability, institutional maintenance, ecological regeneration, cultural continuity, epistemic preservation, and option-space preservation can become relevant on different horizons. An economic order can appear coherent at one horizon while transferring large reproduction costs into another. Section 20.7 treated such transfer through recirculation and generative depletion. The present section adds that the relevant losses can remain normatively heterogeneous even where they are causally linked.

Definition 20.116 (Value-plural order architecture). A *value-plural order architecture* is a history-bearing arrangement of value forms, subject positions, realization and conversion interfaces, institutional standing, comparison rules, decision procedures, and revision pathways through which heterogeneous values become economically consequential without requiring complete commensurability among them.

Definition 20.116 keeps plurality connected to institutional process. Values become

economically consequential through budgets, rights, prices, professional standards, community rules, public mandates, ecological constraints, technological objectives, participation structures, and other interfaces. These arrangements can preserve plurality, compress it, exclude it, or transform it.

Proposition 20.117 (Value-plural specification condition). *A plural-value evaluation of economic order should identify the value forms materially relevant to the bounded inquiry, the positions through which they are generated or affected, the interfaces through which they become institutionally legible, and the material value dimensions that remain outside the operative representation.*

This condition supports bounded analysis. A transport project may require monetary cost, mobility capability, disability access, ecological burden, neighborhood continuity, and future-option analysis without requiring every possible value to enter one model. Adequacy depends on the relation between the decision and the material values omitted or represented.

20.8.2 Incommensurable Value Relations

Value plurality becomes analytically demanding when conversion or comparison remains partial. Incommensurability can arise for different reasons and should therefore be typed rather than invoked as a general prohibition on comparison. Two values can lack a defensible common unit; conversion can depend on a disputed institutional rule; comparison can be meaningful only within a limited range; one value can function as a threshold or side constraint; or the values can represent different subject positions whose interpersonal comparison remains normatively contested.

The distinction between *incommensurability*, *incomparability*, and *non-equivalence* is useful here. Values can be non-equivalent while still permitting partial comparison. Two alternatives can be comparable for a particular decision without the underlying values being reducible to one substance. Conversely, numerical scores can be assigned to heterogeneous objects without establishing that the scores preserve the normative structure relevant to the decision. A monetary estimate of ecological restoration cost, for example, can be useful for budgeting while remaining an incomplete representation of ecological value, irreversibility, or intergenerational standing.

Conversion therefore leaves remainders. Chapter 14 developed conversion loss and provenance as part of value transformation. At order level, the relevant issue is how institutions treat the remainder. It can be ignored, recorded, protected through constraints, represented by another institution, carried forward for later review, or used to block a proposed conversion. The treatment of remainder is itself part of economic governance.

Definition 20.118 (Incommensurability profile). *An incommensurability profile specifies the value dimensions or claims whose comparison, conversion, aggregation, or substitution is partial, contested, threshold-bound, or unsupported within a stated decision context, together with the institutional rule, evidential basis, provenance, and normative remainder associated with the attempted relation.*

An incommensurability profile can therefore be local. Health outcomes may be

compared within one clinical allocation procedure while some rights remain non-tradable. Ecological damage may be monetized for one compensation calculation while specific irreversible losses remain subject to separate protection. Research proposals may be scored on feasibility and expected contribution while disciplinary plurality or high-risk exploration is protected through portfolio rules.

Proposition 20.119 (Incommensurability-preservation condition). *Where an economic decision relies on partial comparison among heterogeneous values, the decision architecture should identify the scope of the comparison, the rule authorizing it, the dimensions excluded from the comparison, and any material normative remainder that should constrain, qualify, or remain contestable after operational closure.*

The proposition allows comparison while preserving scope. It also prevents incommensurability from becoming a rhetorical device that blocks analysis. The task is to specify where comparison is possible, how it is justified, and where the relation remains incomplete.

20.8.3 Heterogeneous Subject–Value Standing

Values do not enter economic order independently of subjects, affected positions, institutions, and representation. Persons, households, organizations, communities, future generations, ecosystems, artificial agents, professional bodies, public institutions, and other configurations can become economically relevant through different dimensions of standing. Chapter 18 examined heterogeneous subject–value structures under artificial-intelligence-mediated conditions. The present analysis generalizes the standing problem to economic order.

Standing should be typed. A subject can have a right to receive information, participate in deliberation, claim protection, contribute evidence, appeal a decision, receive compensation, exercise delegated authority, or hold decision power. These positions should not be collapsed into one generic category of stakeholder status. A future generation cannot directly participate in current deliberation but can be represented through institutional obligations, trusteeship, ecological standards, or intergenerational procedures. An ecosystem can be causally affected and institutionally represented without assuming that it participates through the same mechanism as a human citizen. An AI system can execute delegated transactions without thereby inheriting the moral or legal standing of the delegating institution.

Representation also changes value expression. Preferences, rights claims, capability indicators, legal testimony, expert assessment, ecological measurement, community deliberation, model outputs, and organizational objectives preserve different structures. The route by which a value becomes legible can amplify some dimensions and suppress others. Standing analysis therefore requires attention to representation provenance as well as formal inclusion.

Definition 20.120 (Subject–value standing profile). *A subject–value standing profile identifies an economically relevant subject or affected position, the value dimensions attributed to or represented for that position, the institutional channels through which those dimensions become actionable, and the associated rights of information, contribution, protection, representation, challenge, appeal, or decision influence.*

The profile supports differentiated participation. A community can possess standing over land-use decisions while individuals retain distinct rights. A professional body can represent expertise without representing every affected citizen. A public authority can act for a diffuse public mandate while remaining contestable by those subject to its decisions. Multiple standing relations can therefore overlap without becoming interchangeable.

Proposition 20.121 (Standing-specification condition). *An economic-order decision that claims to accommodate heterogeneous values should specify which subject positions possess standing, how those positions are represented, which value dimensions the representation preserves, and which routes exist for challenging misrepresentation, exclusion, or unauthorized substitution among subject positions.*

This condition links plural value directly to power. The ability to define who counts, what can be represented, and which forms of evidence are admissible can shape the effective value field before aggregation or deliberation begins.

20.8.4 Plural-Value Coexistence

Economic orders often coordinate groups and institutions that do not share one comprehensive value structure. Coexistence therefore requires more than mutual tolerance and less than complete normative integration. Different communities can retain distinct cultural practices while sharing public infrastructure. Professional domains can use different standards of evidence while coordinating through common legal rules. Public institutions can protect rights that constrain market exchange while markets continue to coordinate many other transactions. Ecological thresholds can limit otherwise permissible production without converting ecological value into the same metric used for profitability.

Several institutional architectures can support such coexistence. Jurisdictional boundaries can allocate decision authority across domains or scales. Rights can protect some dimensions from routine aggregation. Thresholds can establish minimum conditions. Parallel institutions can preserve alternative modes of valuation. Modular or federated systems can permit local difference while sharing infrastructure. Portfolio rules can preserve diversity where the appropriate future value remains uncertain. None of these mechanisms is automatically adequate; each can generate exclusion, fragmentation, lock-in, or hidden hierarchy.

Coexistence also requires interfaces. Complete separation is rarely feasible because value domains interact through land, labor, finance, technology, public budgets, data, environmental effects, and shared institutions. The question is therefore how interfaces are governed. A value boundary that protects one domain may transfer burden into another. Institutional pluralism needs mechanisms for cross-boundary incidence, conflict, and revision.

Definition 20.122 (Plural-value coexistence architecture). *A plural-value coexistence architecture is an arrangement of domain boundaries, shared rules, protected standing, thresholds, parallel institutions, translation interfaces, and conflict-resolution pathways through which heterogeneous value structures can operate within one economic order without requiring full equivalence or complete institutional separation.*

Coexistence can therefore be layered. Some rules can be common across the order, such as procedural protections or baseline rights, while valuation practices remain domain-specific. Other issues can require negotiated interfaces. The architecture should make clear which differences are protected, which are translated, which are aggregated, and which are subject to common constraints.

Proposition 20.123 (Plural-value coexistence condition). *A plural-value economic order is more adequately specified where the boundaries among value domains, their shared infrastructures and obligations, the interfaces through which conflicts propagate, and the procedures for revising those boundaries are made explicit rather than left to implicit dominance by the most institutionally powerful value representation.*

The proposition does not presume that every value system deserves institutional preservation. Coexistence remains bounded by rights, evidence, public obligations, ecological constraints, and other justified limits. The point is that closure should be institutionally specified rather than concealed inside an apparently neutral aggregate.

20.8.5 Procedural Accommodation and Mediation

Plural values require procedures because many economically consequential decisions cannot remain indefinitely open. Procedural accommodation concerns the authorized processes through which competing claims become represented, compared where appropriate, negotiated, constrained, justified, decided, reviewed, and revised. Relevant procedures include markets, contracts, courts, public budgeting, professional review, community governance, administrative hearings, standards processes, democratic institutions, negotiated agreements, and mixed human–technical systems.

Procedure does not become neutral merely because it is formal. Agenda setting, admissible evidence, representation cost, technical complexity, time requirements, appeal rights, default rules, and enforcement capacity affect who can participate effectively. A technically consistent procedure can therefore reproduce asymmetry if some positions lack the capability to use it. Section 20.6 treated participation conversion at the order level. Procedural accommodation adds that value mediation depends on the practical accessibility of the procedure itself.

Several closure rules are possible. Majority decision, consent, bargaining, rights-based constraint, professional judgment, random selection, judicial review, delegated expertise, threshold rules, and multi-criteria assessment each encode different standing and comparison assumptions. GRE does not identify one universal procedure. It asks whether the procedure fits the object, preserves relevant standing, makes its comparison rules visible, supports challenge, and remains revisable where conditions or evidence change.

Definition 20.124 (Procedural value-mediation architecture). *A procedural value-mediation architecture is an authorized arrangement of representation, evidence, comparison, deliberation, negotiation, constraint, decision, explanation, review, appeal, and revision through which a bounded plural-value conflict becomes operationally actionable while preserving materially relevant standing and normative remainder.*

This definition makes the procedure itself part of economic architecture. AI-assisted systems can support translation, summarization, simulation, matching, forecasting, or administrative processing within such architectures. Their role does not remove the need to specify who authorized the objective, who can contest the representation, and where responsibility for closure remains located.

Proposition 20.125 (Procedural-accommodation condition). *A procedure used to accommodate plural economic values should make visible its standing rules, evidential requirements, comparison or constraint logic, decision authority, burden of participation, review pathway, and conditions of revision, especially where the procedure can systematically privilege one value representation or subject position.*

Procedural adequacy is therefore partly relational. A low-cost appeal channel can matter more than formal transparency where decisions are frequently erroneous. Representation support can matter where participation costs are uneven. Multiple decision fora can reduce dependence on one gatekeeper while also increasing complexity. The appropriate architecture remains contextual.

20.8.6 Domain-Specific Value Structures

Chapter 19 demonstrated that values acquire different practical meanings across education, research, work, development, welfare, communities, platforms, public institutions, migration, ecology, and culture. Capability in education differs from professional capability in an organization; ecological regeneration differs from institutional maintenance; cultural continuity differs from knowledge preservation; public legitimacy differs from platform trust. Shared vocabulary can therefore conceal domain-specific value structures.

Economic order coordinates these domains through budgets, labor, law, infrastructure, technology, taxation, property, data, public authority, and interdependence. Coordination can create pressure for a common metric. Cost-benefit analysis, accounting standards, performance indicators, rankings, procurement criteria, and automated objectives can all support coordination, yet each can also export the value assumptions of one domain into another. Domain-specific value analysis asks when such transfer is warranted and what remainder it leaves.

The same caution applies in reverse. Domain specificity should not become a reason to ignore cross-domain incidence. A cultural preservation rule can affect housing access; an ecological restriction can affect employment and mobility; a healthcare priority can affect public budgets; a research-funding decision can reshape regional capability. The value structures remain domain-specific while their consequences propagate across domains.

Definition 20.126 (Domain value profile). *A domain value profile specifies the value forms, standing relations, realization practices, evidential indicators, conversion interfaces, temporal horizons, and normative remainders characteristic of a bounded domain, together with the interfaces through which those values interact with other parts of economic order.*

Domain value profiles are provisional and revisable. They can change as technologies, institutions, cultural practices, ecological conditions, and research knowledge

change. Their function is analytical: they prevent cross-domain coordination from silently erasing the structures through which value is locally realized.

Proposition 20.127 (Domain-value translation condition). *Where an economic-order decision transfers a metric, criterion, or value representation across domains, the analysis should state the structural correspondence supporting the transfer, the domain-specific dimensions transformed or omitted, and the institutional treatment of any resulting remainder or conflict.*

This condition carries forward the domain-translation discipline of Chapter 19. Cross-domain economic order requires translation, but translation remains a claim to be justified rather than an automatic consequence of shared terminology.

20.8.7 Aggregation Scope and Evaluative Remainders

Aggregation is often indispensable. Public budgets combine claims across programmes; firms compare projects; households allocate scarce time and income; platforms rank options; regulators assess risks; researchers construct indices. GRE therefore treats aggregation as a scoped representational operation rather than as an error in itself. The central question is what structure an aggregate preserves, what it compresses, and whether the compression is adequate for the decision at hand.

Several aggregation forms can coexist. Scalar aggregation combines dimensions into one number. Vector representations preserve several dimensions. Threshold and constraint architectures classify some dimensions as minimum conditions. Lexicographic rules give priority to specified values. Partial orders permit some alternatives to remain incomparable. Portfolio approaches can preserve diversity rather than select one global optimum. Deliberative procedures can use quantitative summaries without allowing the summaries to determine final closure.

The strongest risk arises when a locally useful aggregate acquires wider normative authority. A cost index can become a welfare criterion; an engagement score can become a measure of social value; a standardized test can become a proxy for educational worth; a publication metric can become a proxy for epistemic contribution. Such expansion can occur gradually through administrative convenience, data availability, automation, or institutional dependence.

Definition 20.128 (Aggregation-warrant profile). *An aggregation-warrant profile specifies the values and subject positions included in an aggregate representation, the comparison and weighting assumptions used, the decision scope for which the representation is intended, the dimensions retained through constraints or parallel indicators, and the evaluative remainder excluded from the aggregate.*

The profile turns aggregation into an auditable claim. It also allows different levels of aggregation. A local operational score can remain fully legitimate while broader normative evaluation uses additional dimensions. The issue is therefore scope discipline rather than rejection of quantification.

Proposition 20.129 (Aggregation-scope condition). *An aggregate value representation is warranted for a bounded economic-order decision to the extent that its comparison assumptions are defensible for that scope, materially relevant omitted dimensions are protected or separately evaluated, and the aggregate is not granted broader norma-*

tive authority without an additional argument.

Evaluative remainder should remain visible after aggregation. A policy can score well overall while imposing a severe burden on a small group; an investment can have positive expected value while crossing an ecological threshold; a productivity gain can weaken participation or capability. Separate standing, constraints, compensation, review, or veto structures can be necessary where aggregation alone does not preserve the relevant normative relation.

20.8.8 Open Normative Economic Order

Plural-value order ultimately requires a conception of normative openness. Openness does not mean indefinite hesitation, absence of law, or refusal to institutionalize commitments. Durable rights, standards, public mandates, contracts, safety rules, ecological protections, and long-horizon investments can all require stability. Normative openness concerns the relation between such closure and the possibility of justified revision when subjects, evidence, technologies, value structures, or historical conditions change.

The economic order therefore benefits from preserving a record of normative closure. A rule can record which values were considered, which positions possessed standing, which evidence supported the decision, which dimensions remained unresolved, what assumptions enabled aggregation, and under what conditions review should occur. Such a record makes later re-epistemization possible. It also allows institutional continuity without requiring later participants to reconstruct the original normative architecture from incomplete traces.

Openness has a distributive dimension. Future participants inherit present infrastructures, debts, ecological conditions, technical standards, legal rules, model dependencies, cultural institutions, and value-conversion interfaces. They also inherit the closures embedded in those arrangements. Preserving future normative agency therefore concerns more than preserving abstract choice. It can require records, contestability, institutional capacity, interoperability, succession, and practical pathways through which inherited arrangements can be understood and revised.

Definition 20.130 (Open normative economic order). An *open normative economic order* is an economic configuration whose operational rules can support durable coordination while preserving sufficiently intelligible records, standing, contestability, evaluative remainder, institutional capability, and revision pathways for later reconsideration of materially consequential normative closures.

The definition does not privilege permanent institutional fluidity. Some commitments appropriately raise the cost of revision because they protect rights, continuity, safety, trust, or long-horizon cooperation. The analytical task is to make the revision architecture proportionate to the stakes, reversibility, uncertainty, and burden distribution of the closure.

Proposition 20.131 (Open-normative-order condition). A *plural-value economic order* preserves normative openness where consequential closures are accompanied, at a level proportionate to their stakes, by identifiable standing, justification, provenance, unresolved remainders, review conditions, and practical institutional capacity for cor-

rection or revision when the grounds of the closure materially change.

This final condition links plural values to the wider architecture of Chapter 20. Generative evaluation in Section 20.2 requires plural profiles rather than automatic scalar collapse. Policy in Section 20.3 requires conversion and revision architecture. Institutions in Section 20.4 require standing, contestability, and learning. Relational infrastructure in Section 20.5 determines whether plural standing is practically usable. Participation in Section 20.6 determines whose values can enter economic formation. Value recirculation in Section 20.7 determines which substrates and claims receive return. Plural-value economic order integrates these dimensions while preserving the possibility that important normative disagreement remains real after a decision is made.

The next analytical problem concerns the distribution of scarcity itself. Technological, institutional, and AI-mediated change can reduce some material, symbolic, or informational scarcities while intensifying scarcity in attention, trust, orientation, participation, and generative opportunity. Section 20.9 therefore examines productive abundance together with the relocation and transformation of scarce economic conditions.

20.9 Productive Abundance and Scarcity Relocation

The role of this section is to examine how increasing productive capacity changes the location and form of scarcity within a generative relational economic order. Its objective is to distinguish abundance of material output, symbolic production, and knowledge availability from the complementary scarcities that can emerge in attention, trust, orientation, participation, and access to future-forming opportunities. The section develops eight dimensions: material abundance and conversion constraints, symbolic abundance and representational bottlenecks, knowledge abundance and epistemic bottlenecks, attention allocation, trust formation, orientation, participation, and generative opportunity. The method is relational, positional, and historical. Abundance is analyzed relative to specified objects, positions, functions, infrastructures, and temporal horizons rather than as a claim that an economic configuration has escaped scarcity in general.

The analysis extends the abundance architecture developed in Chapter 17 and Chapter 18 to the level of economic order. Chapter 17 showed that expanded informational and epistemic production can coexist with scarce verification, attention, orientation, and trust. Chapter 18 then examined artificial productive capacity, symbolic abundance, research orientation, and generative participation under radical capability asymmetry. The present section asks a broader economic-order question. When production, reproduction, computation, communication, or symbolic generation become substantially cheaper or more scalable, which constraints are relaxed, which complementary capacities become binding, and which positions acquire greater control over the resulting bottlenecks?

Scarcity relocation should be distinguished from a simple substitution of one scarce good for another. Some scarcities are technically reduced. Others become more visible because an earlier constraint has been relaxed. Still others are generated

by the abundance process itself. Cheap content generation can increase verification burdens; abundant options can increase orientation burdens; widespread formal access can intensify competition for visibility; productive automation can reduce labor requirements while narrowing pathways through which people acquire recognition, experience, or institutional standing. The resulting configuration can therefore contain simultaneous abundance and scarcity at different layers.

Definition 20.132 (Abundance–scarcity relocation profile). An *abundance–scarcity relocation profile* specifies, for a bounded economic configuration, the objects or operations whose supply, reproducibility, or productive capacity has materially expanded; the positions for which that expansion is practically available; the complementary capacities, infrastructures, conversion pathways, and institutional permissions required for use; the scarcities relaxed, intensified, revealed, or generated; and the later capability, dependency, participation, and option-space effects associated with the resulting configuration.

Definition 20.132 prevents abundance from being represented by output quantity alone. The same productive change can be abundant for one position and inaccessible for another. It can remove a material bottleneck while increasing dependence on a technical infrastructure. It can enlarge the set of candidate actions while concentrating the capacity to rank or authorize them. Table 20.9 summarizes the eight dimensions developed below.

Proposition 20.133 (Scarcity-relocation condition). *An increase in productive abundance improves a specified economic condition to the extent that it relaxes a materially relevant constraint for the affected positions and does not merely transfer the binding constraint into less visible conversion, verification, infrastructural, participatory, ecological, or institutional bottlenecks whose burdens offset or reverse the gain.*

Proposition 20.133 does not imply that every relocation is harmful. Scarcity can move toward functions that are easier to govern, distribute, or expand. Increased production can make specialized verification economically worthwhile. Reduced material scarcity can free time for education, care, culture, or research. Better infrastructure can transform a previously scarce service into a dependable background condition. The analytical task is to trace the new configuration rather than infer welfare, justice, or generativity from abundance alone.

20.9.1 Material Abundance and Conversion Constraints

Material abundance concerns conditions in which specified goods, productive services, energy services, computational resources, or physical outputs become available at substantially lower real cost, higher volume, greater reliability, or wider reproducibility relative to a relevant reference position. The concept is necessarily bounded. Food can be abundant at the national level while nutrition remains inaccessible to particular households. Electricity-generation capacity can be ample while grid constraints or payment systems restrict practical access. Manufactured goods can be inexpensive while housing, land, care, maintenance, or ecological assimilation remain scarce. Aggregate abundance therefore does not establish practical abundance across positions.

The conversion architecture developed in Chapters 13 and 20 is especially impor-

Table 20.9: Dimensions of productive abundance and scarcity relocation in generative relational economic order.

Dimension	Primary abundance or scarcity object	Generative question	Characteristic analytical failure
Material abundance	Goods, energy services, computation, productive throughput, or reproducible physical outputs	Which material constraints are genuinely relaxed, and which conversion, ecological, infrastructural, or access constraints become binding?	Treating aggregate output growth as universal practical abundance
Symbolic abundance	Text, images, code, signals, classifications, credentials, and representations	Which representational functions become cheap, and which provenance, verification, interpretation, or visibility bottlenecks relocate value?	Equating symbolic volume with meaning, credibility, or cultural value
Knowledge abundance	Information, explanations, models, methods, records, and candidate solutions	Can relevant positions locate, understand, verify, combine, and act on abundant epistemic objects?	Treating availability as warranted knowledge or usable capability
Attention scarcity	Reception, processing, deliberation, and institutional response capacity	How is finite attention allocated when available signals and claims exceed practical processing capacity?	Treating visibility as a neutral consequence of supply
Trust scarcity	Justified practical reliance on persons, institutions, procedures, representations, and infrastructures	Which verification, provenance, accountability, and correction structures support reliance under abundance?	Treating either reputation or formal verification as complete trust
Orientation scarcity	Selection of questions, priorities, trajectories, and commitments	Which capacities support consequential selection when candidate actions, problems, and solutions proliferate?	Treating a larger option set as automatically improving direction
Participation scarcity	Access to consequential roles, standing, contribution, recognition, learning, and decision interfaces	Do abundant outputs coexist with scarce pathways into the processes that shape economic formation?	Equating consumption or formal access with consequential participation
Generative opportunity scarcity	Practical access to future-forming projects, infrastructures, relations, and institutional pathways	Which positions can originate, sustain, revise, and realize new trajectories when outputs become abundant?	Equating abundant artifacts with abundant capacity to create future alternatives

tant here. Material supply becomes economically useful through transport, storage, standards, complementary infrastructure, information, legal permission, time, care, technical capability, and institutional access. A fall in production cost can consequently relocate scarcity toward these complements. Cheap computing hardware can increase demand for electricity, cooling, networks, data, and specialized expertise. Abundant manufactured devices can increase repair, recycling, disposal, and interoperability requirements. Abundant food calories can coexist with scarce access to nutritious diets, care time, or distribution infrastructure.

Material abundance also has a scale and boundary problem. A configuration can become materially abundant by drawing on distant ecological, labor, infrastructural, or geopolitical substrates. Low local prices can coexist with high extraction, waste, maintenance, or vulnerability elsewhere. Section 19.11 showed why ecological flows and regenerative capacity remain part of economic architecture. Material abundance should therefore preserve the resource, ecological, maintenance, and dependency conditions through which the apparent abundance is sustained.

Definition 20.134 (Material-abundance conversion profile). A *material-abundance conversion profile* specifies the material goods or productive services whose effective supply has expanded, the positions for which they are available, the complementary

infrastructures and capabilities required for use, the resource and maintenance conditions supporting continued provision, and the residual constraints or burdens that determine whether aggregate abundance becomes practical abundance.

The definition distinguishes a technologically feasible abundance from an institutionally realized one. It also makes room for abundance that is intentionally bounded. Safety, ecological protection, public-space limits, or long-horizon infrastructure constraints can justify restrictions even where marginal production is cheap. GRE therefore does not define progress as removal of every material constraint.

Proposition 20.135 (Material abundance–conversion condition). *Material abundance has broad practical significance where increased productive availability is accompanied by sufficiently accessible conversion pathways, maintainable complementary infrastructure, visible dependency conditions, and treatment of displaced ecological or social burdens at the scale relevant to continued provision.*

This condition prepares a broader point that recurs throughout the section. Productive abundance can reduce one cost while increasing the relative importance of conditions that were previously secondary. As marginal production becomes cheaper, maintenance, distribution, coordination, recognition, and institutional access can become more economically consequential than the production act itself.

20.9.2 Symbolic Abundance and Representational Bottlenecks

Symbolic abundance concerns the rapid and inexpensive production, reproduction, transformation, and circulation of text, images, audio, code, classifications, simulations, credentials, reports, and other representational artifacts. Digital systems already lowered reproduction costs for many symbolic objects; contemporary generative systems further lower the cost of producing new candidate artifacts. Sections 17.3 and 18.11 developed the epistemic and representational consequences of this shift. At the level of economic order, the additional question concerns which functions of symbolic production become abundant and where economic scarcity subsequently relocates.

A symbolic artifact can serve multiple functions: communication, evidence, coordination, advertising, cultural expression, identity, institutional record, software instruction, contractual specification, education, or research. Abundance affects these functions differently. Cheap production can broaden expressive access, reduce drafting costs, support translation, and multiply candidate designs. Yet the same abundance can weaken historical cues that once linked scarcity of production to presumed effort, expertise, authorship, or authenticity. Value can relocate toward provenance, reputation, institutional verification, curation, interpretation, live performance, trusted relationships, or controlled channels of attention.

Symbolic abundance also changes competitive visibility. When many positions can produce polished artifacts, the bottleneck can move from production to discovery. Search ranking, recommendation, platform distribution, institutional selection, editorial authority, professional credentials, and social networks can acquire greater influence over which artifacts become consequential. Section 19.8 showed that formal platform access can coexist with scarce effective visibility. Symbolic abundance generalizes this problem beyond platforms: a larger representational field can make

selection infrastructure more economically central.

Definition 20.136 (Symbolic-abundance bottleneck profile). A *symbolic-abundance bottleneck profile* specifies the symbolic objects whose production or reproduction has become abundant, the functions those objects are expected to perform, the provenance and verification requirements attached to consequential use, the attention and distribution mechanisms governing visibility, and the interpretive or institutional capacities that remain scarce.

Provenance is one useful response to symbolic abundance. The C2PA framework, for example, provides technical mechanisms for signed provenance assertions and validation while explicitly leaving broader judgments of truth or quality outside that technical layer (Coalition for Content Provenance and Authenticity 2026). This separation is consistent with GRE’s architecture. Better provenance can reduce uncertainty about production history without eliminating the need for interpretation, evidence evaluation, cultural judgment, or institutional responsibility.

Proposition 20.137 (Symbolic abundance–bottleneck relocation). *As the marginal cost of producing consequential symbolic artifacts falls, economic scarcity can relocate toward provenance, verification, interpretation, attention, distribution, recognition, and accountable institutional judgment; the resulting configuration should therefore be evaluated across these complementary layers rather than through symbolic output volume alone.*

The proposition also protects against an opposite simplification. Symbolic abundance need not imply representational degradation. It can increase linguistic inclusion, experimentation, accessibility, education, documentation, and cultural production. The relevant issue is which institutions and capabilities allow abundance to be converted into meaningful, credible, and plural symbolic participation.

20.9.3 Knowledge Abundance and Epistemic Bottlenecks

Knowledge abundance is more demanding than information or symbolic abundance. A configuration can contain vast quantities of documents, data, and generated explanations while reliable knowledge remains unevenly distributed. Knowledge requires relations of interpretation, warrant, provenance, verification, transmission, and practical use. Chapter 17 therefore treated epistemic abundance as a profile in which output expansion can coexist with scarcity in synthesis, expertise, verification, or institutional uptake. The economic-order question is how these epistemic bottlenecks affect production, governance, participation, and future capability.

The distinction is visible in research and professional practice. A larger literature can reduce search scarcity while increasing synthesis burdens. Open data can improve transparency while increasing demand for statistical, legal, or contextual expertise. Generated code can expand the supply of candidate implementations while making testing, security review, architecture judgment, and maintenance more important. Educational explanations can become abundant while sustained mentorship, feedback, assessment, and problem-forming capability remain scarce. Knowledge abundance therefore depends on more than the number of epistemic objects available.

The conversion pathway is again central. Epistemic objects must be located, understood, evaluated, combined, adapted, and institutionally authorized where appropriate. These operations require language, education, time, tools, domain knowledge, social standing, and access to verification infrastructure. Abundance can therefore widen the gap between positions that possess strong epistemic conversion capability and positions that merely receive more information.

Definition 20.138 (Knowledge-abundance use profile). A *knowledge-abundance use profile* specifies the epistemic objects and methods available to a position, the capabilities required to locate, interpret, verify, combine, preserve, and apply them, the institutional pathways through which epistemic claims acquire standing, and the bottlenecks that constrain warranted use despite high informational or symbolic availability.

Knowledge abundance can also change the value of preserved context. When new content is easy to generate, records of how claims were produced, revised, challenged, or withdrawn can become more important. Institutional memory, reproducible workflows, archival continuity, and provenance are therefore complementary infrastructures of abundant knowledge rather than relics of a scarcity regime.

Proposition 20.139 (Knowledge abundance–epistemic conversion condition). *An increase in available epistemic objects expands usable knowledge for a position to the extent that the position can practically locate, interpret, verify, combine, and apply those objects and can distinguish generated or available claims from institutionally warranted knowledge where the distinction matters for action.*

The condition links abundance directly to capability inequality. Cheap access to candidate answers can reduce one barrier while making epistemic judgment, professional responsibility, or verification infrastructure more consequential. Economic order under knowledge abundance therefore depends partly on how these complementary capacities are distributed and regenerated.

20.9.4 Attention Allocation and Reception Scarcity

Attention scarcity becomes structurally important when the supply of potentially relevant signals, claims, opportunities, products, problems, and requests grows faster than the reception and processing capacity of persons or institutions. Simon's account of information-rich environments identified the basic relation: abundant information consumes scarce recipient attention (Simon 1971). In GRE, attention scarcity is treated as an allocation problem with distributive and generative consequences.

Attention allocation determines more than what is seen. It can affect which complaints receive institutional response, which research questions obtain resources, which workers receive recognition, which cultural works become visible, which risks trigger investigation, which political claims enter an agenda, which products reach consumers, and which future possibilities receive sustained development. Under abundance, the architecture that directs attention can therefore acquire substantial economic power.

Attention capacity can be expanded. Search, indexing, filtering, delegation, summarization, specialization, scheduling, and automation can increase effective pro-

cessing. Yet each mechanism also redistributes visibility and dependence. A recommender system can reduce overload while concentrating ranking power. Professional curation can improve reliability while creating entry barriers. Organizational triage can protect scarce expert attention while systematically delaying low-status claims. The analysis should therefore track both capacity expansion and the institutional rules through which scarce attention is allocated.

Definition 20.140 (Attention-allocation profile). An *attention-allocation profile* specifies the objects competing for reception, the persons or institutions whose processing capacity is scarce, the mechanisms that rank, filter, defer, summarize, delegate, or exclude claims, the visibility and response positions created by those mechanisms, and the later capability or opportunity effects associated with sustained attention or neglect.

Attention is also recursive. Visibility can generate engagement, reputation, revenue, data, and future visibility. Neglect can weaken capability, reputation, or organizational survival even where the neglected activity is substantively valuable. Attention allocation can therefore contribute to cumulative advantage and path dependence without being equivalent to a final judgment of value.

Proposition 20.141 (Attention-scarcity governance condition). *Where abundant supply makes attention a binding economic bottleneck, an adequate order-level analysis should examine the criteria, infrastructure, authority, feedback, and contestability through which attention is allocated and should distinguish visibility from substantive value, standing, or merit.*

The proposition does not require equal attention to every claim. Scarce attention necessarily involves selection. The generative question concerns whether selection architectures preserve sufficiently diverse entry, correction, and discovery pathways for consequential signals that were not initially dominant.

20.9.5 Trust Formation and Reliance Scarcity

Trust scarcity concerns the conditions under which practical reliance becomes difficult even when information or symbolic signals are abundant. Economic coordination routinely requires reliance on persons, organizations, records, standards, infrastructures, contracts, models, and public institutions. Arrow emphasized the economic importance of trust and other social virtues in exchange relations (Arrow 1972). Under abundance, however, direct verification can become increasingly infeasible because the volume, speed, or technical complexity of relevant claims exceeds the checking capacity of each participant.

Trust should not be represented as a generalized attitude. A person can trust an institution's payment reliability while distrusting its data governance. A regulator can rely on a technical standard for interoperability while reserving judgment about the provider's incentives. A researcher can trust a repository's preservation procedures while independently verifying a substantive claim. Trust is therefore typed by object, function, scope, and fallback condition.

Abundance can relocate scarcity toward trustworthiness infrastructure. Provenance, professional standards, audits, warranties, review procedures, institutional

reputation, liability, redundancy, transparent records, and appeal pathways can support reliance. These mechanisms reduce the need for universal direct verification, but they can also concentrate gatekeeping power in certifiers, platforms, professional bodies, or public authorities. Trust architecture therefore requires both reliability and contestability.

Definition 20.142 (Reliance-trust profile). A *reliance-trust profile* specifies the object and function on which reliance is placed, the evidence or institutional pathway supporting that reliance, the verification burden retained by the relying position, the authority and incentives of relevant intermediaries, the consequences of error, and the correction, fallback, or exit mechanisms available when reliance fails.

This profile distinguishes trust scarcity from simple uncertainty. Some uncertainty can remain while a reliable institutional pathway makes action possible. Conversely, abundant ratings, badges, scores, or certificates can create an appearance of trust while their production conditions remain opaque. The issue is the structure through which justified reliance becomes practicable.

Proposition 20.143 (Trust-scarcity conversion condition). *In abundance-intensive configurations, trust scarcity is reduced where reliable provenance, verification, accountability, correction, and fallback mechanisms lower the cost of justified reliance without making consequential participation dependent on opaque or effectively unchallengeable trust intermediaries.*

Trust can therefore become a scarce institutional capability even where data and representations are plentiful. Its reproduction depends on practices, records, competence, accountability, and repair rather than on symbolic reassurance alone.

20.9.6 Orientation and Selection Scarcity

Orientation scarcity arises when the feasible set of questions, projects, products, explanations, investments, or institutional alternatives expands faster than the capacity to identify which trajectories deserve sustained commitment. Attention concerns what receives processing; orientation concerns the direction given to processing and action. A system can allocate attention efficiently while still directing it toward poorly framed objectives.

This distinction becomes important under generative systems. When candidate answers, designs, simulations, code, or plans can be produced rapidly, the scarce activity can move toward problem formation, criteria formation, contextual interpretation, historical sensitivity, and judgment about which possibilities merit development. Section 18.12 analyzed this issue within research orientation. At the level of economic order, the same structure appears in investment, public policy, organizational strategy, education, culture, and community development.

Orientation cannot be reduced to preference satisfaction. Preferences can be incomplete, historically formed, institutionally shaped, or themselves affected by abundant recommendation and symbolic production. Nor can orientation be reduced to expert selection. Experts possess domain-specific judgment but can remain distant from affected values, local knowledge, or emerging possibilities. Generative orientation can therefore require plural mechanisms: expertise, participation, experimen-

tation, historical inquiry, aesthetic or practical judgment, institutional memory, and explicit evaluation of uncertainty.

Definition 20.144 (Orientation-capacity profile). *An orientation-capacity profile specifies the actors and institutions involved in selecting questions, priorities, projects, or trajectories; the knowledge, evaluative criteria, historical context, participatory inputs, and judgment practices informing selection; the mechanisms for revising orientation; and the opportunity costs or excluded possibilities created by sustained commitment.*

Orientation has a temporal character. Early selection can shape later capability, infrastructure, data, reputation, and institutional attention. A research field can become highly capable in questions it repeatedly funds while losing capability elsewhere. A city can build complementary infrastructure around one transport regime. A platform can train participants to optimize for one ranking system. Orientation therefore changes the future landscape from which later selection occurs.

Proposition 20.145 (Orientation-scarcity condition). *Where productive or symbolic abundance expands the set of feasible trajectories faster than evaluative and institutional orientation capacity, economic performance increasingly depends on the quality, plurality, revisability, and historical awareness of the mechanisms through which problems and commitments are selected.*

The condition does not establish one ideal orientation procedure. Different domains can require different combinations of expertise, rights, public reasoning, market discovery, professional judgment, experimentation, or community governance. The analytical requirement is to make the selection architecture visible.

20.9.7 Participation Access and Standing Scarcity

Participation scarcity concerns the possibility that abundant goods, services, information, or generated outputs coexist with limited pathways through which subjects and collectives can contribute to, learn within, influence, or reshape consequential economic processes. Section 20.6 distinguished productive, epistemic, care, institutional, community, and post-employment participation. The present subsection asks how abundance changes the relative scarcity of these participatory positions.

Automation provides a clear example. If fewer human labor hours are required for a given level of output, material production can become less scarce while employment-mediated pathways to income, professional learning, recognition, social connection, and organizational standing become more selective. The appropriate response cannot be inferred from the productivity gain alone. Income support can address material security; education can support capability; public or community institutions can create alternative participation pathways; ownership or governance reform can affect standing. These mechanisms address different dimensions.

Symbolic abundance can produce a similar structure. Many people may be able to generate publishable-looking artifacts while editorial attention, recognized expertise, institutional affiliation, audience access, or decision standing remain scarce. Knowledge abundance can widen information access while research participation remains constrained by laboratories, credentials, funding, mentorship, or institutional per-

missions. Abundance therefore does not automatically democratize consequential participation.

Definition 20.146 (Participation-scarcity profile). A *participation-scarcity profile* specifies the consequential roles available within an abundant economic configuration, the access and conversion conditions governing entry, the contribution and learning opportunities attached to those roles, the recognition and standing they confer, the burdens and dependencies they create, and the pathways through which participants can influence or revise the configuration.

Participation scarcity is not solved by maximizing the number of roles. Some participation can be extractive, compulsory, unsafe, or responsibility-bearing without authority. The relevant issue is the distribution of consequential and capability-supporting pathways together with practical exit.

Proposition 20.147 (Abundance–participation divergence). *Productive abundance can coexist with narrowing economic participation where output growth or automation reduces the number, diversity, or accessibility of roles through which relevant subjects acquire capability, recognition, standing, or influence over future economic formation.*

The proposition also allows the opposite possibility. Abundance can free time, lower entry costs, reduce survival pressure, and enable wider participation in research, care, culture, community stewardship, entrepreneurship, or public life. Whether such expansion occurs depends on participatory infrastructure rather than on abundance alone.

20.9.8 Generative Opportunity and Future-Formation Scarcity

Generative opportunity scarcity is the deepest scarcity considered in this section. It concerns practical access to the resources, capabilities, relations, infrastructures, institutional standing, time, and option structures through which new economically consequential trajectories can be originated, sustained, revised, and realized. An economy can contain abundant consumption goods, abundant symbolic artifacts, and abundant candidate knowledge while access to future formation remains highly concentrated.

The distinction is visible when the cost of generating an artifact falls but the cost of making a consequential project durable remains high. A person may generate a business plan while lacking finance, legal standing, distribution, infrastructure, or time. A researcher may generate hypotheses while lacking experimental access. A community may formulate a development proposal while lacking land rights, administrative standing, or public investment. A creator may generate media while lacking audience pathways or cultural institutions. A small organization may build software while depending on proprietary compute, identity, payment, or platform infrastructures that determine whether the project can survive.

Generative opportunity therefore combines several scarcities already analyzed: material complements, epistemic capability, attention, trust, orientation, participation, infrastructure, and institutional access. It also has a temporal dimension. Some opportunities require durable investment before benefits become visible. Others de-

pend on option preservation, succession, maintenance, or the ability to survive early failure. A configuration that funds only already legible and immediately measurable projects can appear efficient while narrowing the range of later alternatives.

Definition 20.148 (Generative-opportunity profile). A *generative-opportunity profile* specifies the practical pathways through which a subject or collective can originate, develop, sustain, revise, and realize a consequential new trajectory, including relevant time, material resources, knowledge, infrastructure, finance, recognition, institutional standing, collaboration, attention, risk absorption, and exit or recovery conditions.

This profile differs from a static opportunity count. Ten nominal opportunities can be less generative than two practically reachable pathways if the former lack conversion conditions. It also differs from entrepreneurial opportunity in a narrow market sense. Generative opportunities include scientific, institutional, ecological, cultural, care, public, technological, and community trajectories whose value may remain heterogeneous and only partly monetizable.

Proposition 20.149 (Generative-opportunity scarcity condition). *An abundant economic order remains generatively scarce where the capacity to originate, sustain, revise, and realize consequential new trajectories is persistently concentrated in a narrow set of positions because complementary time, capability, infrastructure, finance, standing, attention, or institutional access remain practically unavailable elsewhere.*

The proposition connects abundance to the book's wider concern with generative participation and generative foreclosure. Abundant artifacts do not by themselves preserve plural future formation. An order can supply cheap consumption, rapid answers, and extensive symbolic production while progressively narrowing who can shape institutions, build durable alternatives, conduct consequential inquiry, maintain communities, or regenerate ecological and public capacities. Conversely, abundance can become deeply generative where it lowers entry barriers while relational infrastructure, capability formation, contestability, and participatory standing keep future-forming pathways broadly reachable.

Section 20.9 therefore reframes abundance as a problem of scarcity architecture. Material, symbolic, and epistemic abundance can relax important constraints, yet their economic-order significance depends on the complementary scarcities they transform. Attention, trust, orientation, participation, and generative opportunity become especially important where productive capacity expands faster than the social and institutional capacities required to direct, verify, distribute, and convert that capacity. This conclusion prepares the next economic-order problem: persistent capability asymmetry can determine who controls the infrastructures and bottlenecks through which abundance becomes consequential.

20.10 Radical Capability Asymmetry in Economic Order

The role of this section is to examine the architecture of economic order when capability differences become persistent, multidimensional, weakly substitutable, or recursively reinforcing across economically consequential positions. Its objective is to extend the capability-asymmetry analysis of Chapter 18 from the specific human-

AI field to the wider organization of economic relations. The section develops eight dimensions: persistent capability-asymmetry profiles, dependency-based power conversion, access and capability conversion, infrastructure control, human action-space preservation, generative participation, contestability and counter-power, and long-horizon coexistence. The method is relational and historical. Capability asymmetry is evaluated through the mechanisms by which it is reproduced, converted into dependence or power, mediated by institutions, and made more or less revisable over time.

Chapter 18 established three disciplines that remain binding here. First, capability is typed and task-relative, so superiority on one dimension does not establish a universal ordering. Second, capability asymmetry does not become power merely because the difference is large; a conversion mechanism involving dependence, control, mediation, or constrained alternatives must be identified. Third, governance under radical asymmetry cannot be reduced to capability equalization because some differences may remain technically, institutionally, or economically durable. Section 20.10 carries these disciplines into economic-order analysis, where capability differences can arise among persons, organizations, public institutions, communities, jurisdictions, infrastructures, and artificial systems.

The economic-order problem is broader than the distribution of productive skill. A position can possess weak direct productive capability while controlling infrastructure on which more capable positions depend. A community can possess rich local knowledge while lacking finance, legal standing, or access to complementary institutions. A public authority can possess formal mandate while relying on external technical systems that it cannot audit or replace quickly. A firm can possess frontier computational capacity while depending on public infrastructure, skilled labor, energy systems, or legal protections. Capability asymmetry is therefore a configuration of profiles, complements, access conditions, bottlenecks, temporal reserves, and institutional standing.

Definition 20.150 (Radical capability-asymmetry order profile). *A radical capability-asymmetry order profile specifies, for a bounded economic configuration and historical horizon, the materially relevant typed capabilities of participating positions; the mechanisms reproducing their differences; the complementary resources and infrastructures required to exercise those capabilities; the dependencies, access conditions, and bottlenecks connecting the positions; the pathways through which capability differences become power-relevant; and the counter-capacities, contestability, substitution, and revision mechanisms available within the order.*

Definition 20.150 makes radicality an order-level relational claim. Large capability differences can remain weakly consequential where alternatives, interoperability, counter-capacity, or institutional protection are strong. More modest differences can become structurally important where one position controls a critical interface or where repeated dependence compounds over time. Table 20.10 summarizes the eight dimensions developed below.

Proposition 20.151 (Order-level asymmetry condition). *A capability asymmetry becomes an order-level generative concern when its persistence and conversion mechanisms materially shape the distribution of feasible action, dependency, institutional standing, participation, or future-forming capacity across positions, especially where*

Table 20.10: Dimensions of radical capability asymmetry in generative relational economic order.

Dimension	Primary order-level object	Generative question	Characteristic analytical failure
Persistent asymmetry	Reproduced capability differences across positions and time	Which mechanisms make a capability gap durable, cumulative, or self-reinforcing?	Treating a present performance gap as a stable order-level relation
Dependency-based power conversion	Reliance, control, withdrawal capacity, and constrained substitution	Through which relation does capability difference condition another position's feasible action?	Equating capability superiority with power by definition
Access conversion	Admission, affordability, permissions, complements, learning, and practical use	Does wider formal access become usable capability, or mainly deeper dependence on an external position?	Treating availability as effective capability equalization
Infrastructure control	Compute, networks, energy, data, standards, identity, finance, logistics, legal and administrative systems	Which bottlenecks determine whether otherwise capable positions can operate, substitute, or exit?	Focusing on visible actors while ignoring infrastructural chokepoints
Human action space	Reachable alternatives and alternative-forming capacities retained by human positions and collectives	Which human and collective capacities remain practically exercisable, reorganizable, and institutionally consequential?	Preserving nominal choice while alternative-forming capacity erodes
Generative participation	Pathways into knowledge, institutions, care, communities, production, culture, and future formation	Can less capable positions still contribute to and reshape consequential collective processes?	Equating income support or service access with participation
Contestability and counter-power	Challenge, review, substitution, counter-capacity, organization, and correction	Can affected positions contest or reorganize capability-dependent relations without requiring capability symmetry?	Treating either transparency or equal capability as sufficient governance
Long-horizon coexistence	Durable coordination among heterogeneous capability profiles	Can asymmetry remain compatible with plural standing, regenerative participation, revisability, and future openness?	Treating coexistence as either equality or passive accommodation to dominance

affected positions possess weak substitution, contestation, or rebuilding pathways.

Proposition 20.151 keeps evaluation mechanism-specific. Capability equality is neither the baseline nor the automatic objective. Economic coordination routinely depends on specialization, differentiated expertise, delegated authority, and heterogeneous infrastructures. The stronger question is how capability difference is organized and whether the resulting relations remain practically governable, contestable, and generative for the positions whose later possibilities are affected.

20.10.1 Persistent Capability-Asymmetry Profiles

Persistent capability asymmetry concerns the historical reproduction of capability differences rather than their observation at one moment. Chapter 18 defined persistence through repeated interactions, reinforcing complementarities, and weak substitution. At the level of economic order, the reproduction mechanisms become wider. Education, finance, data, infrastructure, reputation, legal standing, organizational learning, network access, standards, ownership, procurement, and accumulated institutional memory can all reinforce a capability position across time.

Persistence can arise through cumulative advantage. A position with superior

capability can generate greater income, data, reputation, political access, or learning opportunities, which then increase later capability. Persistence can also arise through complementarity. A model provider can be replaceable in principle while an organization has invested so deeply in one surrounding workflow, identity system, data schema, and technical standard that substitution becomes costly. A jurisdiction can possess many skilled participants while lacking complementary infrastructure needed to mobilize their skills at scale. The relevant unit is therefore the capability configuration rather than the isolated actor.

Some persistence is socially useful. Professional expertise, institutional memory, public infrastructure, scientific competence, and trusted maintenance capability often require accumulation over long periods. The generative problem appears where persistence becomes difficult to challenge, reproduce elsewhere, transmit, or rebuild, especially when it controls access to consequential economic processes. Stability and concentration therefore require separate evaluation.

Definition 20.152 (Persistent capability-asymmetry profile). *A persistent capability-asymmetry profile specifies the capability differences that remain consequential across repeated interactions or historical extensions, the mechanisms that reproduce or compound those differences, the rate and cost at which alternative positions can learn or rebuild relevant capacities, and the institutional conditions that accelerate, stabilize, or weaken the asymmetry.*

This profile distinguishes durable specialization from self-reinforcing closure. A specialist institution can remain highly capable while training successors, publishing standards, supporting interoperability, and preserving alternative providers. Another institution can retain similar capability while enclosing knowledge, controlling complements, and weakening replacement capacity. The observed capability gap can be similar while the order-level consequences differ substantially.

Proposition 20.153 (Asymmetry-reproduction condition). *A persistent capability asymmetry warrants stronger order-level concern where the mechanisms that reproduce the asymmetry also reduce the practical capacity of affected positions to learn, substitute, organize counter-capacity, retain independent judgment, or construct alternative institutional pathways.*

The proposition connects capability persistence to generative foreclosure. A durable difference can remain compatible with a generative order where the surrounding configuration retains learning, succession, portability, counter-capacity, and entry pathways. The deeper concern is a reproduction process that weakens the mechanisms through which later alternatives could emerge.

20.10.2 Dependency-Based Power Conversion

Capability asymmetry becomes power-relevant through relational conversion. Section 18.3 showed that dependency, infrastructure control, access control, epistemic authority, decision mediation, and institutional stabilization can connect capability differences to another position's feasible action. Economic-order analysis retains this discipline and adds a wider question: how do multiple dependencies combine across sectors, institutions, and infrastructures so that one capability position gains durable influence over later economic possibilities?

Dependency is not inherently pathological. Complex economies depend on division of labor, public systems, technical standards, expertise, logistics, finance, care, and institutional specialization. A dependency can enlarge capability when the supplying position is reliable, accountable, substitutable, and embedded in reciprocal or legally protected relations. The power question emerges when withdrawal, repricing, rule change, withholding, or technical modification by one position systematically conditions another position's feasible action and when alternatives are costly, slow, or institutionally blocked.

Order-level dependency is frequently layered. A firm can appear to depend on an AI provider while both depend on cloud infrastructure, specialized hardware, energy, payment systems, identity services, legal permissions, and public networks. A community can depend on a platform for market access while the platform depends on public law and communication infrastructure. A public agency can formally govern a service while operationally depending on proprietary technical expertise. Power analysis therefore requires tracing dependency chains rather than stopping at the visible contractual relation.

Definition 20.154 (Dependency-based power-conversion pathway). A *dependency-based power-conversion pathway* is the identifiable sequence of capability reliance, complementary-resource control, constrained substitution, institutional mediation, and practical consequence through which a capability advantage or control position becomes able to condition another position's feasible action, timing, cost, continuity, or access to future alternatives.

The definition leaves room for reciprocal dependence. Two positions can rely heavily on one another while possessing different withdrawal capacities, temporal reserves, legal protections, or alternative partners. Power therefore depends on the structure of dependency, not on the existence of interdependence alone.

Proposition 20.155 (Dependency-conversion condition). A *capability asymmetry supports a stronger order-level power claim when the dependency-based power-conversion pathway is historically persistent, materially consequential, weakly substitutable over the relevant horizon, and supported by control over interfaces or complements that affect another position's practical alternatives.*

This condition prevents a general capability hierarchy from substituting for power analysis. It also prepares later governance analysis: weakening power concentration can involve substitution, interoperability, public alternatives, counter-capacity, temporal reserves, rights, or changes in the institutional conversion mechanism without eliminating the underlying capability difference.

20.10.3 Capability-Access Conversion

Access is one route through which capability asymmetry can be reduced, reproduced, or transformed. Shared tools, education, public infrastructure, open knowledge, affordable services, and institutional permissions can widen practical capability. Yet formal access does not establish effective capability equalization. Section 20.5 showed that infrastructure becomes economically useful only through practical conversion; the same principle applies to advanced capability.

An organization can receive access to a powerful model while lacking data governance, domain expertise, verification procedures, integration capability, or legal permission needed for reliable use. A learner can access abundant educational tools while lacking time, guidance, or institutional recognition. A small firm can access cloud services while remaining unable to bear switching costs or negotiate terms. A public institution can procure an advanced system while losing internal capability to audit, maintain, or replace it. Access can therefore enlarge practical capability and deepen dependency at the same time.

The relevant question is not whether a resource is open or available in the abstract. It is whether affected positions can convert access into durable and revisable capability without losing the complementary capacities required for independent judgment, substitution, or institutional self-direction. In some configurations, broad access can support substantial equalization. In others, the capability frontier can move faster than diffusion, preserving a large asymmetry even while absolute capability rises for many participants.

Definition 20.156 (Asymmetry-conditioned access). An *asymmetry-conditioned access profile* specifies the capability resource made available, the terms and continuity of access, the complementary knowledge, infrastructure, permissions, time, and organizational capacity required for use, the degree of practical capability gained, the dependencies created or reduced, and the retention of verification, substitution, and exit capacity.

The profile also distinguishes access to output from access to capability formation. A person can receive high-quality generated results while gaining little ability to reproduce, verify, or revise the process. A firm can purchase a service while remaining unable to internalize relevant expertise. The economic-order consequence depends on whether access changes the distribution of durable capability or mainly changes who can consume capability supplied elsewhere.

Proposition 20.157 (Access-conversion condition). *Widened access weakens a capability asymmetry more durably where affected positions can convert the accessed resource into practically retained capability, verification, complementary infrastructure, organizational learning, and credible substitution or exit rather than relying exclusively on continuing permission from the advantaged position.*

The proposition does not imply that every capability should be internalized. Specialization remains valuable. Its purpose is to separate capability-enhancing access from access that leaves the deeper asymmetry and its dependency structure largely unchanged.

20.10.4 Critical Infrastructure Control

Capability is exercised through infrastructure. Compute, energy, data systems, communication networks, identity, finance, payment systems, transport, logistics, legal registries, professional standards, public administration, and institutional knowledge can determine whether nominal capability becomes economically effective. Section 20.5 treated such systems as relational infrastructure. Under radical asymmetry, infrastructure also becomes a possible bottleneck through which capability differences are amplified or governed.

Infrastructure control differs from infrastructure ownership. A public infrastructure can be formally public while technical dependence on one contractor gives another position substantial operational control. A privately owned network can remain heavily regulated, interoperable, and contestable. A distributed technical ecosystem can still depend on one standard, identity layer, data format, or payment channel. The analytical question is who can alter, withhold, price, prioritize, or redesign an infrastructural function that other positions require.

Criticality is also relational. An infrastructure becomes critical relative to the operations that depend on it, the time available for substitution, and the consequences of interruption. A provider with modest market share can occupy a critical position if it controls a specialized complement with no rapid replacement. Conversely, a large provider can have limited power relevance where interoperability, redundancy, and credible alternatives are strong.

Definition 20.158 (Critical infrastructure-control profile). *A critical infrastructure-control profile specifies the infrastructural function required by economically consequential positions, the actors capable of modifying or withholding that function, the concentration and substitutability of relevant complements, the time and cost of transition, the dependencies propagated through connected systems, and the legal, public, technical, or organizational mechanisms that constrain or counterbalance control.*

This profile prevents visible model or firm capability from obscuring lower-layer bottlenecks. It also supports multiscale governance. Some concentration can be addressed through interoperability; some through public capacity or common infrastructure; some through redundancy, portability, reserves, or legal obligations. The appropriate mechanism depends on the infrastructure and failure mode.

Proposition 20.159 (Infrastructure-bottleneck condition). *Infrastructure control becomes a stronger amplifier of radical capability asymmetry where economically important positions depend on the controlled function, practical substitutes cannot be activated within the relevant horizon, and the controlling position can alter access, continuity, price, standards, or operating conditions in ways that materially reshape downstream feasible action.*

The proposition connects infrastructure to power without treating concentration as sufficient evidence of abuse. A critical infrastructure can support large collective gains while remaining strongly governed. The order-level issue is the combination of criticality, control, substitutability, contestability, and public or collective capacity.

20.10.5 Human Action-Space Preservation

Radical capability asymmetry raises a question that cannot be answered by access or income alone: what practical space of action remains available to human participants and human-governed collectives when more capable systems or organizations mediate consequential economic processes? Chapter 18 defined human action space through reachable alternatives and the means of generating additional alternatives. At the level of economic order, this action space spans work, knowledge, care, institutions, communities, culture, entrepreneurship, public reasoning, and the formation of new organizations and practices.

Action-space preservation does not require that humans remain the most capable position in every task. Such a requirement would confuse capability ranking with standing and generativity. A human participant can rely on highly capable systems while retaining authority to frame objectives, interpret context, challenge outputs, organize alternatives, and participate in institutional change. Conversely, nominal human authority can coexist with a very narrow action space when technical systems determine feasible options, institutional knowledge has been outsourced, or alternative infrastructures have disappeared.

The action-space question is therefore both current and intertemporal. A configuration can preserve current choice while weakening the capacity to generate later alternatives. For example, users can select among many AI-mediated services while lacking the knowledge, data portability, institutional standing, or infrastructure needed to build alternatives. Professionals can retain formal responsibility while losing the practical capability to inspect or revise automated workflows. Communities can retain platform access while losing independent spaces or institutions through which collective action could be reorganized.

Definition 20.160 (Order-level human action-space profile). An *order-level human action-space profile* specifies the practically reachable economic, epistemic, institutional, care, community, cultural, and organizational actions available to human participants and human-governed collectives, together with the capabilities, rights, infrastructures, records, time, resources, standing, and alternative-forming mechanisms required to sustain or expand that space across changing conditions.

The profile makes action space relational. Formal legal permission can coexist with weak practical reachability. Material support can coexist with weak institutional standing. Rich technological assistance can coexist with declining independent verification. The relevant question is the ensemble of conditions through which human action remains consequential and revisable.

Proposition 20.161 (Action-space preservation condition). An *economic order preserves a stronger human action space where capability asymmetry does not materially eliminate the practical capacities, rights, infrastructures, records, standing, and organizational pathways through which human participants and human-governed collectives can initiate, contest, reorganize, and institutionalize consequential alternatives.*

This criterion does not privilege unaided action as such. Human action space can be deeply technologically mediated. What matters is whether mediation expands or contracts the practical capacity to shape later relational configurations rather than leaving humans only as recipients of outputs selected elsewhere.

20.10.6 Generative Participation Architecture

Section 20.6 established economic participation as a differentiated architecture of productive, epistemic, care, institutional, community, and post-employment positions. Radical capability asymmetry changes the participation question because contribution can remain meaningful even where one position performs many operations more effectively. The central issue becomes whether participation pathways are organized around residual productive necessity or around the wider capacity to enter future-forming processes.

A highly capable economic order can distribute abundant services while concentrating agenda formation, interpretation, investment, institution building, and governance in a narrow set of positions. Material security can coexist with weak generative participation. Conversely, extensive asymmetry can coexist with meaningful participation where institutions preserve roles in problem formation, verification, care, stewardship, community organization, cultural generation, scientific inquiry, public reasoning, and institutional revision.

Participation requires more than symbolic inclusion. It needs time, infrastructure, education, recognition, standing, access to decision interfaces, and the capacity to sustain projects long enough for contributions to become consequential. Under asymmetry, the value of participation may also shift. Human participation can be economically important because of contextual knowledge, responsibility, care, legitimacy, situated judgment, relationship formation, or value articulation even where direct productive throughput is lower.

Definition 20.162 (Asymmetry-resilient participation architecture). An *asymmetry-resilient participation architecture* is a configuration of material support, capability pathways, rights, institutional roles, infrastructures, recognition practices, decision interfaces, and collective organizations through which less capable or differently capable positions can continue to make consequential contributions to knowledge, care, institutions, communities, culture, production, and future economic formation despite persistent capability differences.

The definition does not require preserving every historical role. Some roles can disappear legitimately as technologies and institutions change. Resilience concerns whether new pathways can be generated and whether participation remains capable of shaping the order rather than being confined to ceremonial or residual functions.

Proposition 20.163 (Generative-participation condition under asymmetry). *Persistent capability asymmetry is more compatible with a generative economic order where less advantaged positions retain practical pathways to capability formation, consequential contribution, institutional standing, organization, contestation, and creation of new participation forms that do not depend solely on their labor remaining scarce.*

This proposition connects Chapter 18's anti-foreclosure criterion to economic-order design. Income redistribution can support the material basis of participation, yet participation itself requires institutions and infrastructures through which supported positions can enter collective generation.

20.10.7 Contestability and Counter-Power Architecture

Capability asymmetry becomes more dangerous when affected positions cannot challenge the decisions, representations, rules, or infrastructures through which that asymmetry is converted into practical consequence. Contestability therefore concerns more than transparency. It includes explanation, evidence access, review, appeal, counter-expertise, representation, organization, substitution, correction, and the practical possibility of changing the governing relation.

Counter-power should also be distinguished from capability equality. Section 18.13 showed that governance can rely on counter-capacities even where the primary ca-

pability gap remains large. Public institutions can regulate a technically superior provider; professional bodies can establish standards; communities can organize collectively; shared infrastructure can reduce dependence; independent auditors can provide counter-expertise; interoperability can preserve exit. These mechanisms do not make capabilities equal. They alter the relational consequences of asymmetry.

Counter-power itself can create dependency. An organization established to discipline one dominant infrastructure can become a new gatekeeper. A public regulator can lack technical capacity and rely on the firms it supervises. A shared alternative can remain financially dependent on one sponsor. The relevant architecture therefore includes counter-capacity reproduction and contestability of the countervailing institutions themselves.

Definition 20.164 (Asymmetry contestability architecture). *An asymmetry contestability architecture specifies the practical mechanisms through which capability-dependent decisions, access conditions, representations, standards, and infrastructural controls can be questioned, reviewed, countered, corrected, substituted, or reorganized, together with the capabilities, independence, standing, and resources required to sustain those mechanisms over time.*

Contestability can be distributed. Different mechanisms can address different conversion sites: legal review for rights, technical audit for system behavior, public alternatives for infrastructure, collective bargaining for organizational dependency, professional standards for epistemic authority, and interoperability for exit. No single mechanism needs to carry the entire governance burden.

Proposition 20.165 (Counter-power adequacy condition). *Counter-power has stronger generative adequacy where it changes the practical conversion of capability asymmetry into constraint or dependence, remains sufficiently independent of the advantaged position, preserves its own learning and replacement capacity, and is itself subject to contestability and revision.*

The proposition avoids two opposite simplifications. Transparency without counter-capacity can leave an asymmetry intact, while concentrated counter-authority without review can reproduce the same structural problem in another form. A generative order requires an ecology of contestability appropriate to the relevant conversion mechanisms.

20.10.8 Long-Horizon Coexistence Architecture

The final economic-order problem is coexistence among persistently heterogeneous capability positions. Coexistence does not mean capability equality, passive tolerance of domination, or permanent assignment of fixed roles. It concerns whether an order can coordinate deeply unequal capabilities while preserving plural standing, generative participation, value heterogeneity, institutional learning, practical contestability, and future possibility.

Long-horizon coexistence is especially demanding because capability profiles evolve. Artificial systems can improve rapidly; institutions can accumulate or lose competence; communities can develop shared capacity; public infrastructure can expand or decay; education can alter distribution; standards can change which

capabilities matter. An order that is stable for one capability configuration can become brittle when the configuration changes. Coexistence therefore depends on trajectories rather than one equilibrium arrangement.

The analysis also returns to plural value. A more capable position does not acquire normative authority merely because it can predict, optimize, generate, or coordinate more effectively on selected dimensions. Economic order still requires standing, rights, procedural accommodation, domain-specific value structures, and open normative closure as developed in Section 20.8. Capability can inform decisions without exhausting the values by which decisions are judged.

Coexistence also requires a treatment of dependence that avoids a universal independence ideal. Human societies are constituted through interdependence. The generative criterion is stronger where critical dependencies remain visible, sufficiently governable, supported by transition capacity, and prevented from becoming mechanisms of irreversible foreclosure. Some dependencies can be accepted because they enlarge capability substantially; others may warrant redundancy or public alternatives because failure would remove basic participation or institutional standing.

Definition 20.166 (Asymmetry-compatible coexistence architecture). An *asymmetry-compatible coexistence architecture* is a long-horizon economic configuration in which persistent capability differences can support coordination and specialization while materially relevant dependencies, infrastructural controls, standing relations, participation pathways, value conflicts, counter-capacities, and revision mechanisms remain sufficiently visible and governable to preserve plural future formation.

The definition treats coexistence as a continuing institutional achievement. It can require education, public capacity, interoperability, rights, welfare, commons, professional institutions, technical standards, organizational diversity, archives, care systems, and other mechanisms developed throughout Chapters 19 and 20. Their combination will vary across domains.

Proposition 20.167 (Long-horizon coexistence condition). *Radical capability asymmetry is more compatible with a generative relational economic order where changing capability differences remain separated from automatic claims to normative authority, critical dependencies remain contestable and sufficiently substitutable or protected, human and collective action spaces remain capable of renewal, and institutions preserve practical pathways for participation, counter-capacity, learning, and reorganization as the asymmetry evolves.*

Section 20.10 therefore reframes radical capability asymmetry as an economic-order architecture rather than a problem of equalization alone. Persistent capability differences matter through their reproduction, access conditions, infrastructural bottlenecks, dependency-based conversion into power, effects on action space, and organization of participation and contestability. The resulting order can remain highly asymmetric while preserving substantial generativity, or it can become increasingly closed even while absolute capability and material abundance rise. The next section turns to the governance problem implied by this conclusion. Section 20.11 develops adaptive economic governance as the architecture through which monitoring, feedback, experimentation, reversibility, institutional learning, rule evolution, historical re-evaluation, and co-evolution can respond to changing configurations without pre-

suming that present arrangements should remain fixed.

20.11 Adaptive Economic Governance

Sections 20.1–20.10 developed an economic-order architecture spanning evaluation, policy, institutions, infrastructure, participation, value recirculation, plural values, abundance, and radical capability asymmetry. The present section addresses the temporal governance problem created by that architecture. Economic orders operate while technologies, ecological conditions, capabilities, dependencies, institutions, values, and the evidence used to justify governing arrangements continue to change. The section's role is to specify how an economic order can monitor such change, translate observations into governed response, learn across institutions, revise rules, and reconsider earlier settlements while preserving continuity, accountability, standing, and practical action space. Its objective is therefore broader than adaptive policy in Section 20.3: the analytical object is the coupled governance architecture of an economic order rather than one policy instrument or programme. The method is synthetic and historical, drawing on the adaptive decision architecture of Chapter 11, the governance analysis of Chapter 16, and the evaluation and institutional architectures already developed in this chapter.

Adaptive governance at economic-order scale should be distinguished from institutional volatility. Predictable rights, stable expectations, professional routines, infrastructures, and long-horizon commitments can themselves be generative. Adaptation concerns the organized capacity to reconsider arrangements when materially relevant evidence or conditions change. Evolution concerns slower transformation in rules, institutional carriers, interfaces, classifications, and authority structures. Neither process establishes improvement by itself. A governing arrangement can adapt in a harmful direction, and an evolving order can accumulate dependencies or exclusions while appearing responsive. The evaluative profile of Section 20.2 therefore remains necessary throughout adaptation.

Definition 20.168 (Adaptive economic-governance architecture). An *adaptive economic-governance architecture* is a versioned configuration of monitoring, feedback, bounded experimentation, reversibility and repair, distributed institutional learning, rule-change procedures, historical re-evaluation, and co-evolutionary review through which an economic order can revise governing arrangements as relevant conditions and consequences change while preserving identifiable authority, accountability, standing, and continuity.

The definition places *versioning* at the centre of adaptation. A sequence of changing decisions becomes governable when the relevant evidence, assumptions, authorities, rules, affected positions, expected consequences, and reasons for revision remain historically reconstructable. Versioning also matters for justice. Later participants need to know which commitments created current dependencies, which burdens were anticipated, which protections were promised, and which evidence supported earlier closure.

Table 20.11 summarizes the eight dimensions developed below.

Table 20.11: Dimensions of adaptive economic governance in generative relational economic order.

Dimension	Primary object	Characteristic governance question
Monitoring	Changes in outcomes, relations, capabilities, dependencies, infrastructures, and assumptions	What should remain observable, at which boundary and cadence, with what provenance and burden?
Feedback	Pathways from observation to interpretation and governed response	How do signals travel through institutions, delays, authority, strategic reaction, and correction?
Experimentation	Bounded variation introduced partly for learning	Which changes can be tested, with what exposure, safeguards, spillover control, and stopping conditions?
Reversibility and repair	Capacity to alter commitments and address residual effects	What can be rolled back, repaired, compensated, substituted, or transferred to a successor arrangement?
Distributed learning	Learning across multiple institutions and knowledge sites	How are local findings retained, compared, translated, and incorporated without erasing domain-specific remainder?
Rule evolution	Change in rules and meta-rules governing economic relations	Who may revise rules, through which procedures, and how are rights, expectations, and path dependence handled?
Historical re-evaluation	Reconsideration of earlier warrant in light of later evidence and values	How should previous decisions be re-epistemized without projecting present knowledge backward?
Co-evolution	Reciprocal change between governance and governed economic configurations	How do rules, actors, technologies, infrastructures, capabilities, and strategies alter one another over time?

20.11.1 Economic-Order Monitoring Architecture

Monitoring provides the observational infrastructure of adaptive economic governance. At economic-order scale, the monitoring object extends beyond target outcomes. Section 20.2 established that evaluation can concern relational incidence, propagation, delayed effects, capability regeneration, constraint transformation, option spaces, generative return, and history-space effects. Section 20.10 added capability asymmetry, dependency, infrastructure control, action space, participation, and counter-power. An adaptive economic order therefore requires monitoring architectures capable of observing changes in these structures where they are materially relevant.

The requirement does not imply comprehensive surveillance. Economic orders contain more potentially observable relations than any institution can monitor, and monitoring itself consumes resources, can alter behaviour, and can create new privacy or power concerns. The analytical task is to specify a proportionate monitoring boundary. High-consequence, rapidly changing, difficult-to-reverse processes can warrant shorter observation intervals and broader escalation channels. Stable, low-consequence arrangements can often tolerate slower review. Monitoring cadence should therefore relate to process speed, evidence latency, reversibility, consequence, and observation cost.

Monitoring also needs plural evidence. Administrative indicators can reveal utilization or expenditure while missing practical access. Aggregate productivity can

rise while maintenance capability declines. Employment statistics can miss care burdens or non-employment participation. System-uptime metrics can miss exclusion produced by authentication or documentation. A governance architecture should therefore preserve pathways for anomaly reports, qualitative evidence, affected-position testimony, expert judgment, audit, and evidence that the monitoring system itself is distorting behaviour.

Definition 20.169 (Economic-order monitoring profile). An *economic-order monitoring profile* specifies the economic objects and relations under observation, the relevant spatial and institutional boundary, indicators and qualitative evidence, provenance, cadence, temporal horizon, affected positions, uncertainty, observation burdens, responsible monitors, escalation conditions, and the authority through which monitoring can trigger review.

Monitoring should also make its omissions visible where those omissions are materially important. A monitoring system cannot observe everything, yet it can record which dimensions are outside its scope, which proxies are used, and which affected positions lack reliable representation. This prevents an operational dashboard from being mistaken for a complete representation of the economic field.

Proposition 20.170 (Monitoring-adequacy condition). *Adaptive economic governance has stronger monitoring adequacy where the monitoring boundary, evidence types, cadence, provenance, uncertainty, affected positions, observation burdens, and escalation pathways are specified in relation to the consequences and reversibility of the governed processes rather than inferred from indicator availability alone.*

The proposition treats monitoring as selective epistemic infrastructure. Its purpose is to support later judgment, including judgment about whether the selected monitoring architecture remains adequate.

20.11.2 Feedback and Response Pathways

Observation becomes adaptive governance only when materially relevant signals can alter interpretation or action. A feedback pathway therefore includes more than data transmission. It contains selection of signals, interpretation, authority, response rules, delay, implementation capacity, and later observation of the response. At economic-order scale, these steps frequently cross institutional boundaries. A financial signal can alter firm behaviour before regulatory review is complete; a welfare access failure can be visible to frontline organizations while budget authority sits elsewhere; an ecological threshold can be monitored scientifically while land-use authority is fragmented across jurisdictions.

Feedback can be delayed or amplified. A governing response based on stale evidence can arrive after the relevant relation has changed. A small policy adjustment can become large through markets, expectations, platform rankings, organizational routines, or financial leverage. Conversely, strong formal feedback can be absorbed by institutions with weak implementation capacity and produce little practical change. Adaptive governance therefore needs to track both the informational pathway and the conversion pathway through which response becomes effective.

Actors can also respond strategically to governance. Firms reorganize around

rules, households change eligibility behaviour, platforms modify interfaces, professional communities develop workarounds, and regulated organizations may shift activity across classifications or jurisdictions. Feedback is consequently reflexive. The response to a rule changes the field on which the next observation is based.

Definition 20.171 (Governance feedback pathway). An *economic-governance feedback pathway* is the sequence through which an observed change is selected, interpreted, assigned to an authority or decision process, converted into a governing response, implemented through relevant institutions or infrastructures, and re-observed together with the strategic and systemic reactions generated by that response.

Feedback design should preserve differentiation among signal, interpretation, and authority. The same evidence can support different interpretations under different causal models or value judgments. An automated trigger can be useful for bounded technical conditions while remaining inappropriate for value-laden or rights-sensitive decisions. Where interpretation remains contested, a feedback pathway can include multiple evidential channels and explicit review rather than compressing disagreement into a single trigger.

Proposition 20.172 (Feedback-conversion condition). *A feedback pathway has stronger adaptive adequacy where it makes visible the interpretation, authority, delay, implementation capacity, strategic response, and re-observation through which a signal is converted into economic-governance change, especially where cross-institutional transmission or high leverage can amplify error.*

This condition links adaptive governance to the conversion logic used throughout GRE. Information alone does not govern. It becomes consequential through relations, authority, capability, and institutional execution.

20.11.3 Bounded Governance Experimentation

Economic governance sometimes changes arrangements partly to learn. Pilot programmes, phased implementation, regulatory sandboxes, alternative service models, temporary standards, local trials, procurement variants, or institutional prototypes can generate evidence that observation of an unchanged system cannot supply. Experimentation can therefore support adaptation where causal uncertainty is substantial and the relevant change can be bounded.

Experimentation also redistributes exposure. A pilot is experienced by actual participants, organizations, communities, or environments. Learning benefits can accrue broadly while burdens concentrate locally. Spillovers can cross the formal experimental boundary through prices, labour markets, data systems, infrastructure, reputation, or ecological processes. Experimental governance therefore requires an incidence analysis similar to Section 20.2: who bears uncertainty, who gains information, which rights or protections remain in force, and what happens when the experiment stops.

Some governance objects are difficult to experiment on. Constitutional rights, irreversible ecological loss, basic legal standing, macroeconomic stability, long-lived infrastructure, and highly networked systems can resist small-scale isolation. A gener-

ative approach therefore treats experimentation as one learning mode among others. Historical comparison, simulation, scenario analysis, institutional comparison, qualitative inquiry, and carefully staged implementation can become more appropriate where direct experimentation would create disproportionate exposure or provide weak external validity.

Definition 20.173 (Bounded governance experiment). *A bounded governance experiment is a deliberately limited variation in an economic-governance arrangement introduced partly to generate learning, with specified scope, affected positions, comparison logic, safeguards, authority, spillover assessment, observation plan, stopping conditions, transition provisions, and limits on the claims that may be generalized from the resulting evidence.*

Experimentation should also preserve the possibility of negative learning. A trial that reveals weak conversion, unexpected dependency, administrative burden, or value conflict can justify withdrawal or redesign. Institutional incentives that reward only successful pilots can suppress precisely the evidence experimentation was intended to generate.

Proposition 20.174 (Experimentation-warrant condition). *Governance experimentation has stronger warrant where the expected learning value is material, exposure and spillovers are proportionate to that value, basic standing and safeguards remain protected, stopping and transition conditions are practicable, and the experiment's evidential scope is kept distinct from broader normative or institutional authorization.*

The proposition preserves a difference between learning that an arrangement can work under selected conditions and deciding that the arrangement should govern a wider population or domain.

20.11.4 Reversibility, Repair, and Successor Capacity

Adaptive governance depends partly on the ability to revise commitments, yet economic reversibility is rarely binary. A rule can be repealed while contracts, infrastructure, expectations, skills, debts, data, environmental effects, organizational structures, or dependency remain. Section 20.3 therefore treated policy exit as a configuration-level problem. At economic-order scale, reversibility must similarly distinguish formal rollback from practical recoverability.

Several forms of response should remain separate. *Rollback* restores an earlier rule where that state remains reachable. *Repair* addresses damage or capability loss that survives rule change. *Compensation* responds to burdens that cannot be physically reversed. *Substitution* creates an alternative infrastructure or relation. *Succession* transfers obligations, records, capabilities, and standing into a new arrangement. These mechanisms can be combined when a simple return to the previous configuration is unavailable.

Reversibility can also decay with time. A small pilot can be easy to stop before organizations restructure around it, while later reversal can become expensive after investments, skills, and expectations adapt. Critical data dependencies or technical standards can become harder to replace as complementary systems accumulate. Ecological or cultural losses can become only partly reparable. Adaptive governance

therefore benefits from observing the temporal profile of reversibility rather than treating a nominal sunset clause as sufficient.

Definition 20.175 (Governance recoverability profile). A *governance recoverability profile* records the practical capacity to roll back, repair, compensate, substitute, or succeed a governing arrangement across time, together with residual effects, dependency, sunk commitments, rights and obligations, retained records, transition costs, and domains in which recovery is partial or unavailable.

A recoverability profile can justify stronger caution where uncertainty and irreversibility coincide. It can also reveal cases where deliberate commitment is appropriate. Some infrastructures, rights, or ecological protections require durability to become effective. Reversibility is therefore a design variable rather than a universal objective.

Proposition 20.176 (Recoverability condition). *Where an economic-governance arrangement can create durable dependency, path dependence, or difficult-to-repair loss, adaptive design should identify the feasible modes and temporal limits of rollback, repair, compensation, substitution, and succession before treating formal revision authority as practical reversibility.*

This condition connects governance to the history-space analysis of Chapter 15: revision capacity depends on which later configurations remain reachable after the governing intervention has altered the path itself.

20.11.5 Distributed Institutional Learning

An economic order learns through many sites. Ministries, firms, courts, schools, hospitals, communities, regulators, professional bodies, research institutions, infrastructures, and platform operators can each observe different parts of the same economic process. Section 20.4 developed institutional learning within one institutional configuration. Economic-order learning adds the problem of translation among distributed institutions whose evidence, vocabularies, mandates, time horizons, and standing differ.

Centralization of all learning is neither feasible nor necessarily desirable. Local institutions often possess situated knowledge, while central institutions can compare patterns across regions or sectors. Professional communities can identify technical failures that aggregate data miss. Affected communities can reveal burden or meaning that administrative indicators fail to represent. Research institutions can test mechanisms beyond the operational capacity of frontline organizations. The order-level challenge is to preserve these differentiated epistemic positions while creating interfaces through which material findings can travel.

Learning across institutions can fail in several ways. Evidence can be trapped locally, stripped of provenance during aggregation, generalized beyond its domain, delayed until the governing condition has changed, or filtered by institutional incentives. Organizational turnover can erase memory. Successful practices can be copied without the relational or infrastructural conditions that made them effective. Section 19.1's domain-translation discipline therefore remains relevant inside governance itself: transfer requires correspondence, adaptation, and visibility of remain-

der.

Definition 20.177 (Distributed governance-learning architecture). A *distributed governance-learning architecture* is the configuration through which heterogeneous institutions generate, preserve, compare, translate, contest, and incorporate evidence about governing arrangements while retaining provenance, domain conditions, institutional memory, affected-position knowledge, and the authority pathways required for later revision.

Learning also requires capacity to act on what has been learned. An institution can recognize a problem yet lack budget, legal authority, technical expertise, coordination, or political standing to change it. Order-level learning therefore includes the distribution of revision capability, not only the circulation of knowledge.

Proposition 20.178 (Distributed-learning condition). *Adaptive economic governance has stronger learning capacity where differentiated knowledge sites can retain local evidence and provenance, exchange materially relevant findings through explicit translation interfaces, preserve unresolved disagreement, and connect learning to institutions with practical authority and capability to revise the relevant arrangements.*

The proposition links epistemic pluralism to institutional capacity. Knowledge that cannot enter a consequential review pathway remains informative without becoming governance learning.

20.11.6 Rule Evolution and Meta-Governance

Adaptation can alter the application of a rule while leaving the rule architecture intact. Longer-horizon change often reaches further: eligibility categories change, standards are recombined, institutions gain or lose authority, digital interfaces begin to execute rules automatically, professional discretion is redistributed, or new forms of participation and review are created. These changes constitute rule evolution because they modify the architecture through which later decisions are generated.

Rule evolution raises a meta-governance question: who may alter the rules of alteration. Amendment thresholds, delegated authority, emergency powers, judicial interpretation, technical standards bodies, platform governance, administrative guidance, collective bargaining, and community rule-making each allocate authority differently. A generative economic order therefore needs to observe both first-order rules and the meta-rules that determine how first-order rules may be revised.

Evolution can emerge without one deliberate designer. Repeated exceptions can become practice; technical standards can migrate across sectors; temporary procedures can become permanent; platform interfaces can normalize classifications before legislation catches up; institutional mergers can relocate authority. Historical reconstruction is therefore needed to distinguish explicit amendment from cumulative drift.

Definition 20.179 (Economic rule-evolution profile). An *economic rule-evolution profile* records the historical changes in substantive rules, classifications, authority, implementation interfaces, exceptions, interpretive practices, and meta-rules of revision, together with the institutions and affected positions through which those changes were generated, stabilized, contested, or displaced.

Meta-governance should preserve differentiated stability. Basic rights, legal standing, or safety protections can require high thresholds for change, while technical parameters can warrant faster revision. A uniform amendment cadence across all rule types would ignore their different functions and consequences.

Proposition 20.180 (Rule-evolution governance condition). *Rule evolution has stronger generative adequacy where the authority and procedures for changing different classes of rules are explicit, historical drift and exceptional practice remain reconstructable, affected positions retain proportionate standing, and meta-rules can themselves be reviewed when accumulated change alters the distribution of power, dependency, capability, or value.*

The condition preserves institutional continuity while allowing rule architectures to evolve when the economic relations they govern have materially changed.

20.11.7 Historical Re-Evaluation and Warrant Revision

Adaptive governance should be capable of revisiting earlier decisions without treating earlier decision makers as if they possessed later knowledge. Chapter 11 distinguished ex ante warrant from retrospective assessment, and Section 20.2 carried that distinction into economic-order evaluation. Historical re-evaluation develops the same discipline for governing arrangements whose evidence, values, causal understanding, and affected positions have changed over time.

A governing decision can remain reasonable relative to the evidence and alternatives available at the time even if later consequences reveal that it should now be revised. Conversely, a favourable later outcome does not automatically validate a poorly warranted original process. Re-evaluation therefore needs two temporal perspectives: reconstruction of the earlier warrant and assessment of the current warrant for continuation, modification, repair, or closure.

Historical re-evaluation can also expose excluded positions. Some affected groups may have lacked standing, data may have omitted informal or ecological burdens, and values treated as secondary may later become institutionally salient. Incorporating such evidence can revise current judgment while preserving an accurate record of the earlier institutional field.

Definition 20.181 (Historical governance re-evaluation record). *A historical governance re-evaluation record reconstructs the problem formulation, evidence, assumptions, value judgments, affected positions, alternatives, authority, uncertainty, and expected consequences supporting an earlier governing arrangement, then records later evidence, newly represented positions, revised causal understanding, changed conditions, and the resulting revision of present warrant.*

The record also supports responsibility. It can distinguish foreseeable harm ignored at the time from consequences that became intelligible only later. It can separate institutional negligence from reasonable uncertainty. Such distinctions matter for repair, compensation, accountability, and institutional learning.

Proposition 20.182 (Historical re-evaluation condition). *A governing arrangement has stronger historical revisability where present re-evaluation preserves the evidential and normative context of earlier decisions, incorporates later evidence and newly*

represented positions without projecting them backward, and makes explicit how the current warrant for continuation, repair, transformation, or closure differs from the earlier warrant.

Historical re-evaluation therefore supports re-epistemization at the level of economic order. The past remains fixed as history while the interpretation and warrant attached to inherited arrangements can change.

20.11.8 Governance–Economy Co-Evolution

Economic governance and economic order change one another. Rules alter investment, technology, organizational form, participation, and dependency. Those changes create new capabilities, constituencies, infrastructures, data, expectations, and power relations that can later alter governance. Adaptive governance therefore cannot be represented adequately as an external controller responding to an otherwise independent economy. The governing architecture is part of the field it governs.

Co-evolution is visible throughout the preceding sections. Public infrastructure changes reachability and later political demand. Platform regulation can alter technical architecture, which changes the object of later regulation. Welfare systems can stabilize life trajectories while generating administrative categories and institutional capacities. AI governance can change incentives for model development, deployment, verification, and public capability. Ecological regulation can redirect technology and land use while ecological responses alter later policy options. These reciprocal pathways can be generative, stabilizing, exclusionary, or destabilizing depending on their configuration.

The co-evolutionary perspective also changes the meaning of policy success. A rule can solve its initial problem and simultaneously transform the field so that a different problem becomes salient. A governance architecture should therefore retain the capacity to redefine its object rather than monitoring the original target indefinitely after the target has ceased to represent the material economic relation.

Definition 20.183 (Governance–economy co-evolution profile). A *governance–economy co-evolution profile* records reciprocal changes among governing rules, institutions, infrastructures, capabilities, technologies, participant strategies, value structures, dependencies, and practical option spaces, together with the feedback pathways through which changes in one part of the configuration alter the later conditions of governance in another.

Co-evolution can also transform governance boundaries. Activities previously treated as private coordination can become infrastructural; technical standards can acquire public significance; community practices can become formal institutions; public functions can migrate into platform interfaces; transnational dependencies can exceed one jurisdiction's capacity. Adaptive governance therefore needs mechanisms for reconsidering where governance responsibility is located.

Proposition 20.184 (Co-evolutionary governance condition). *Adaptive economic governance has stronger long-horizon adequacy where it can observe reciprocal change between governing arrangements and governed configurations, revise the definition and*

boundary of the governance problem when those relations materially change, and preserve learning, standing, contestability, and transition capacity as governance responsibilities themselves evolve.

Section 20.11 therefore treats adaptation as a property of economic-order governance rather than a demand for continuous policy change. Monitoring provides selective observation; feedback creates response pathways; experimentation generates bounded learning; reversibility and repair preserve recoverability; distributed institutions retain and translate knowledge; rule evolution governs changing rule architectures; historical re-evaluation revises warrant without rewriting history; and co-evolution keeps governance inside the changing economic field it helps constitute. The resulting architecture preserves continuity while maintaining the capacity for revision where evidence, capabilities, dependencies, values, or historical conditions materially alter the warrant for existing arrangements. Section 20.12 turns from adaptive governance to economic futures and examines the plurality of trajectories, path creation, option preservation, intergenerational possibility, long-horizon risk, radical uncertainty, and premature closure through which economic order remains open to later formation.

20.12 Economic Future Formation

Sections 20.1–20.11 developed an economic-order architecture concerned with evaluation, policy, institutions, infrastructure, participation, value recirculation, plural values, scarcity relocation, radical capability asymmetry, and adaptive governance. The present section addresses the future-facing problem created by that architecture. Economic orders do not merely allocate present resources or govern present relations. They also shape which later configurations remain imaginable, reachable, supportable, repairable, and institutionally admissible. The role of this section is therefore to specify how Generative Relational Economics can analyze economic future formation without treating the future as one forecastable path or reducing openness to an unlimited number of nominal options. Its objective is to connect plural trajectories, path creation, reachability, intergenerational standing, long-horizon risk, radical uncertainty, and closure discipline within one bounded economic-order framework. The method is historical and configurational, drawing on the generative-spacetime architecture of Chapter 15, the long-horizon asymmetry analysis of Chapter 18, and the evaluation and governance architectures of Sections 20.2 and 20.11.

Future formation should be distinguished from prediction. Prediction asks which event or state is likely to occur under specified assumptions. Future formation asks how present relations, institutions, infrastructures, capabilities, rules, values, and decisions change the practical field from which later paths can be generated. The distinction matters because an economic order can alter future possibility even where precise forecasting is weak. Infrastructure can create new reachable regions; professional training can preserve capabilities that later become useful in unexpected settings; ecological depletion can remove possibilities before their later value is known; standards can make some technical trajectories interoperable and others inaccessible; concentrated control of knowledge or compute can narrow who is able to initiate consequential alternatives. GRE therefore treats future possibility as a historically

Table 20.12: Dimensions of economic future formation in generative relational economic order.

Dimension	Primary object	Characteristic future-formation question
Future possibility	Represented, admissible, and reachable future configurations	Which futures remain practically open, for whom, and through which relational and institutional conditions?
Multiple trajectories	Coexisting economic paths with heterogeneous temporal and value structures	Which trajectories can coexist, diverge, reconnect, or become mutually exclusive without being collapsed into one forecast?
Path creation	Emergence of later trajectories not contained in the initial represented option set	Which capabilities, experiments, infrastructures, and forms of participation allow genuinely new paths to be generated?
Option preservation	Retention of meaningful later reachability	Which options warrant continued accessibility, and what maintenance, interoperability, reserves, or modularity make that accessibility practical?
Intergenerational possibility	Possibility structures inherited by later participants	Which capabilities, burdens, institutions, resources, records, and option structures are transferred across generations?
Long-horizon risk	Delayed, cumulative, systemic, and difficult-to-repair future effects	Which risks accumulate beyond ordinary planning horizons, and how should reversibility, monitoring, and protective capacity respond?
Radical uncertainty	Material uncertainty not reducible to stable probabilities or known scenarios	How should economic judgment proceed when future states, values, mechanisms, or model boundaries remain partly unknown?
Closure discipline	Commitments that narrow, stabilize, or foreclose later possibilities	Which forms of closure are warranted, how durable should they be, and what records and revision pathways should accompany them?

generated economic object.

Definition 20.185 (Future-formation profile). An *economic future-formation profile* records, for a bounded economic configuration, the currently represented and practically reachable future possibilities, the capabilities and infrastructures required to generate additional paths, the dependencies and constraints that condition transition, the distributions of standing over future-forming decisions, the temporal horizons of risk and maintenance, and the mechanisms through which later participants can reinterpret, revise, extend, or close inherited pathways.

The definition preserves several distinctions developed earlier in the book. Represented futures are not identical to admissible futures; admissible futures are not identical to practically reachable futures; and present reachability does not exhaust later path creation. The profile therefore treats future possibility as dynamic and historically conditional rather than as a fixed choice set.

Table 20.12 summarizes the eight dimensions developed below.

20.12.1 Future-Possibility Architecture

Economic analysis often represents the future through expected states, projected variables, or scenarios. These representations are useful, yet they do not exhaust the

future-facing structure of an economic order. A configuration also contains legal permissions, infrastructure, skills, knowledge, organizational capacity, social relations, ecological conditions, standards, financial access, and institutional standing that determine whether a represented possibility can be reached or sustained. Future possibility is therefore partly relational and infrastructural.

A useful distinction can be made among *represented possibility*, *admissible possibility*, and *practical reachability*. A possibility is represented when it enters the analytic or institutional field as an identifiable alternative. It is admissible when relevant legal, technical, normative, or institutional rules permit it. It is practically reachable when actors or collectives possess sufficient capability, access, coordination, time, resources, and transition pathways to move toward it. An option can exist at one level while being absent at another. Formal permission to form a cooperative, for example, does not establish practical reachability where finance, premises, legal knowledge, or organizational capability are missing.

Future possibility is also position-specific. A technological transition that expands one firm's feasible set can narrow workers' occupational options. A new transport link can widen regional opportunity while displacing communities with weak standing. A digital public service can create access for some while making participation more difficult for people lacking identity documents or recoverable digital credentials. Future possibility should therefore be profiled across affected positions rather than inferred from an aggregate count of available alternatives.

Definition 20.186 (Future-possibility architecture). A *future-possibility architecture* is the configuration of represented, admissible, and practically reachable future states and trajectories together with the capabilities, infrastructures, rules, value conditions, dependencies, standing relations, and transition pathways that make those possibilities differently available across economic positions and time horizons.

A future-possibility architecture can expand without becoming universally preferable. Some possibilities should be constrained by safety, justice, ecological limits, or rights. Conversely, a smaller set of highly supported and revisable options can provide greater practical freedom than a large catalogue of nominal alternatives. GRE therefore evaluates the quality, distribution, reachability, and revisability of future possibilities rather than maximizing option count.

Proposition 20.187 (Future-possibility adequacy condition). *Future-facing economic analysis has stronger generative adequacy where represented alternatives are distinguished from admissible and practically reachable alternatives, where reachability is profiled across affected positions, and where the capability, infrastructure, dependency, standing, and transition conditions of later action remain explicit.*

The condition provides the base layer for the remaining subsections. Economic futures are shaped not only by which destinations are visible, but also by who can travel toward them and by whether additional destinations can later be generated.

20.12.2 Multiple Economic Trajectories

Economic orders frequently contain several trajectories at once. Technologies diffuse unevenly; institutions change at different speeds; regional economies follow distinct

paths; households, firms, communities, ecosystems, and public systems operate on heterogeneous temporal scales. A single aggregate forecast can therefore conceal divergent trajectories whose interaction matters for later order.

Multiple trajectories need not converge. A platform ecosystem can expand while public administrative capacity weakens. Material productivity can rise while ecological regeneration declines. Scientific capability can grow while participation in research narrows. Some trajectories can be complementary, some competitive, and some conditionally incompatible. Their future importance can also change when previously peripheral relations become critical.

Trajectory plurality matters for governance because intervention in one path can alter another. Subsidizing one technical standard can create complements that make alternative standards harder to adopt. Urban investment can increase land values and alter community continuity. Long-term contracts can stabilize supply while reducing later substitution. GRE therefore treats trajectory comparison as a relational problem involving interaction, coupling, divergence, and possible reconnection.

Definition 20.188 (Multiple-trajectory profile). A *multiple-trajectory profile* records the coexisting economic trajectories relevant to a bounded inquiry, their temporal scales, principal carriers, dependencies, value structures, points of coupling or conflict, transition conditions, and the ways in which change along one trajectory can expand, redirect, stabilize, or foreclose another.

The profile does not require one common metric. A public-capacity trajectory can be compared with an ecological trajectory through identified interfaces without assuming that administrative capability and ecological regeneration share a scalar value unit. This preserves the plural-value architecture of Section 20.8 while enabling future-facing coordination.

Proposition 20.189 (Trajectory-plurality condition). *Where economically consequential processes follow heterogeneous and interacting trajectories, future analysis should preserve their distinct temporal and value structures while identifying the interfaces through which one trajectory alters the later reachability, burden, dependency, or generativity of another.*

This condition limits the temptation to infer economic future from one dominant trend. A high-growth trajectory can coexist with generative depletion elsewhere in the order, and a slow-moving institutional trajectory can become decisive when faster technological change reaches an institutional boundary.

20.12.3 Economic Path Creation

The future cannot be represented only as selection among alternatives already visible in the present. Economic actors and institutions can create new paths through experimentation, invention, organization, learning, reinterpretation, coalition, institutional redesign, and recombination of existing resources. Future formation therefore includes the capacity to generate later trajectories that were not present in the initial option set.

Path creation depends on more than creativity or technology. A new cooperative form can require legal standing, finance, accounting capability, collective trust, and

institutional recognition. A scientific field can require instrumentation, preservation, training, and research time. A new care arrangement can require changes in public finance, labor rules, professional practice, and community participation. An ecological restoration pathway can require land access, stewardship knowledge, multi-jurisdictional coordination, and long temporal commitments. Generative opportunity therefore depends on the configuration described in Section 20.9, not merely on the production of ideas.

Path creation can also redistribute power. Actors that control standards, infrastructure, finance, data, or institutional authorization can influence which nascent paths become viable. Path creation should therefore be examined together with capability asymmetry and counter-power rather than romanticized as spontaneous innovation.

Definition 20.190 (Economic path-creation capacity). *Economic path-creation capacity* is the practical capability of subjects or collectives to originate, assemble, institutionalize, sustain, and revise consequential economic trajectories that are not exhausted by the currently represented option set, using available knowledge, relations, infrastructure, resources, standing, and recovery capacity.

Path-creation capacity is partly collective. No single participant may possess the legal, technical, financial, epistemic, and organizational capacities required to generate a new path. Institutions that support combination across heterogeneous capabilities can therefore be future-forming even when they do not directly produce the final innovation or organization.

Proposition 20.191 (Path-creation condition). *Economic future formation is more generative where relevant subjects and collectives retain practical pathways for experimentation, recombination, organization, institutionalization, and recovery through which additional trajectories can be created rather than limiting later action to selection among presently represented alternatives.*

The proposition does not imply that every new path should be supported. Path creation remains subject to evaluation, affected-position standing, ecological and safety constraints, and plural-value governance. Its role is to preserve the possibility of later formation where uncertainty makes the complete future option set unknowable in advance.

20.12.4 Option Preservation and Reachability

Preserving an option differs from merely refraining from prohibition. An option can remain legally permitted while its practical substrate disappears. Skills can atrophy, infrastructure can be dismantled, archives can become unreadable, ecosystems can cross thresholds, alternative suppliers can exit, public expertise can be outsourced away, or interoperable standards can be replaced by closed systems. Option preservation therefore concerns the maintenance of conditions that keep later transition practically possible.

Section 20.3 treated option-space preservation as a policy design problem. At economic-order scale, preservation is distributed across institutions and time. Redundant infrastructure, modular design, reserves, interoperability, professional

succession, public archives, ecological conservation, portability, and diversified supply can all preserve later reachability. These arrangements often impose present costs. Their value lies partly in maintaining future transition capacity that may never be exercised.

Option preservation should remain selective. Some paths warrant closure because they violate rights, generate unacceptable hazard, or create irreversible burdens without sufficient justification. Other options can be too costly to maintain indefinitely. The analytical task is to make the preservation decision explicit: which future transitions matter, for whom, over what horizon, and through which maintenance burden.

Definition 20.192 (Option-preservation profile). An *option-preservation profile* specifies the future transitions judged materially important to keep practically reachable, the capabilities, infrastructures, knowledge, ecological conditions, legal standing, interoperability, reserves, and maintenance required for that reachability, the positions benefiting from or bearing the preservation burden, and the conditions under which continued preservation should be reviewed.

Option preservation is therefore compatible with commitment. A society can commit strongly to decarbonization while preserving several technological or institutional transition paths within that constraint. A public system can adopt a digital infrastructure while retaining recoverable non-digital fallback for critical functions. Commitment and option preservation operate at different levels.

Proposition 20.193 (Option-preservation condition). *Where uncertainty, irreversibility, dependency, or long replacement times make later transition materially consequential, economic-order design should identify which options warrant practical preservation and should distinguish nominal permissibility from the maintained capabilities and infrastructures required to keep those options reachable.*

This condition also clarifies the relationship between efficiency and resilience. Removal of apparently unused capacity can improve current efficiency while narrowing future recovery or substitution. GRE evaluates that tradeoff explicitly rather than treating unused capacity as waste by definition.

20.12.5 Intergenerational Possibility Structures

Economic orders transfer more than assets across generations. Later participants inherit infrastructures, institutions, ecological conditions, public debt, technical standards, legal categories, archives, capabilities, maintenance obligations, social relations, cultural memory, unresolved disputes, and a structured field of possible action. Intergenerational analysis should therefore examine inherited possibility structures rather than only inherited wealth.

Future participants cannot fully specify their values in advance. Present institutions nevertheless make decisions that shape what later participants can know, revise, restore, or create. The challenge is to provide meaningful standing to future possibility without pretending to speak conclusively for future preferences. Preservation of records, repair capacity, ecological function, institutional revisability, and plural option structures can serve as procedural safeguards where substantive future

values remain uncertain.

Intergenerational possibility also involves burden distribution. A project can create current benefit by transferring maintenance, waste, debt, ecological restoration, institutional complexity, or technical dependency forward. Conversely, present investment in infrastructure, education, knowledge preservation, ecological regeneration, or public capability can enlarge later action space. These effects should be traced even when market prices incompletely represent them.

Definition 20.194 (Intergenerational possibility inheritance). An *intergenerational possibility inheritance* is the configuration of capabilities, infrastructures, ecological conditions, institutions, records, obligations, dependencies, maintenance requirements, unresolved burdens, and reachable future paths transferred from earlier economic arrangements to later participants.

The definition shifts attention from one intergenerational balance to a heterogeneous inheritance. Later participants can inherit greater material wealth while receiving narrower ecological options, weaker public institutions, or more concentrated infrastructural dependency. Intergenerational evaluation should therefore preserve plural dimensions.

Proposition 20.195 (Intergenerational possibility condition). *Long-horizon economic evaluation has stronger intergenerational adequacy where present decisions identify the material, institutional, ecological, epistemic, and relational conditions they transfer forward, make deferred obligations and difficult-to-repair burdens visible, and preserve sufficient records and revision capacity for later participants to reinterpret and reshape inherited arrangements.*

This condition avoids claiming that present actors can determine the good of future generations. It requires instead that present action remain accountable for the possibility structures it knowingly or foreseeably creates.

20.12.6 Long-Horizon Risk Architecture

Long-horizon risk differs from ordinary short-horizon uncertainty because consequences can accumulate after current institutions, decision makers, technologies, and evidence standards have changed. Climate effects, demographic shifts, infrastructure degradation, debt dynamics, skill erosion, ecological thresholds, institutional dependence, and technical lock-in can develop through mechanisms whose early signals are weak and whose later repair is expensive.

Risk at these horizons is often relational. The same disturbance can produce different consequences depending on infrastructure, public capacity, social protection, ecological condition, geographic position, access to finance, and substitution pathways. Aggregate probability and expected loss therefore provide only part of the relevant profile. GRE also asks which positions bear exposure, which capabilities absorb disturbance, which dependencies amplify failure, and which losses alter later path creation.

Long-horizon governance should distinguish risk reduction, resilience, recoverability, and transformation. Reducing the probability of one failure differs from creating capacity to absorb it. Recoverability concerns repair or substitution after distur-

bance. Transformation becomes relevant where the previous configuration should not or cannot be restored. These strategies can require different institutions and can redistribute burden differently.

Definition 20.196 (Long-horizon economic-risk profile). A *long-horizon economic-risk profile* records delayed and cumulative hazards, affected positions, exposure pathways, dependency amplification, capability buffers, thresholds and irreversibilities, evidence latency, monitoring horizons, recovery or transformation options, and the ways in which realized loss could alter later possibility and path-creation capacity.

Long horizons also intensify the problem of discounting and representation. A low present probability can coexist with severe irreversible consequence. Some harms are difficult to monetize, and some future values are not yet represented. GRE therefore avoids making one numerical reduction procedure the sole criterion of long-horizon adequacy.

Proposition 20.197 (Long-horizon risk condition). *Where economic decisions can generate delayed, cumulative, systemic, or difficult-to-repair effects, risk analysis should combine probabilistic information where warranted with profiles of exposure, dependency, threshold, irreversibility, capability buffering, recovery, transformation, and later possibility loss.*

The proposition is compatible with quantitative risk analysis. It specifies the wider relational architecture in which quantitative estimates acquire economic meaning.

20.12.7 Radical Uncertainty and Decision Scope

Some future-facing decisions confront uncertainty that cannot be reduced to a stable probability distribution. Relevant future states may be unknown; causal mechanisms may change; participant values may evolve; institutional boundaries may shift; technological categories may become obsolete; and the act of intervention can change the system being modeled. Chapter 15 treated generative spacetime as historically open, while Section 20.11 showed that governance and economy co-evolve. These conditions limit the authority of forecasts that assume a stable future state space.

Radical uncertainty does not remove the need for decision. It changes the appropriate scope of decision claims. A forecast can be treated as one conditional representation rather than as exhaustive description. Scenario sets can expose different mechanism assumptions without implying that the set is complete. Robustness analysis can identify options that perform acceptably across several represented conditions while leaving unrepresented remainder visible. Reversibility, modularity, monitoring, and staged commitment can become more important where confidence in the state space itself is weak.

Judgment also becomes explicit. Decisions can depend on historical analogy, professional experience, normative commitments, aesthetic or strategic orientation, and interpretation of incomplete evidence. Such judgment should remain attributable and revisable rather than disguised as model output.

Definition 20.198 (Radical-uncertainty decision profile). A *radical-uncertainty decision profile* records the represented future states and scenarios, the acknowledged

incompleteness of that representation, unstable or unknown mechanisms, evolving value and institutional conditions, model-boundary uncertainty, consequential judgment inputs, reversibility and staging options, monitoring requirements, and the scope of claims warranted by the available evidence.

The profile prevents uncertainty language from becoming either false precision or paralysis. It asks what can reasonably be claimed, what remains open, which consequences demand protection despite uncertainty, and how later evidence can revise the decision.

Proposition 20.199 (Radical-uncertainty scope condition). *Where the relevant future state space, mechanisms, values, or institutional boundaries are materially unstable or incomplete, economic decision making should proportion claims to the represented uncertainty, retain explicit judgment and remainder, and use staged commitment, monitoring, reversibility, robustness, or option preservation where these mechanisms are proportionate to the consequences of being wrong.*

This condition complements the adaptive-governance architecture of Section 20.11. Radical uncertainty makes later learning part of present decision design.

20.12.8 Closure Discipline in Future Formation

Economic order requires closure. Budgets must be adopted, infrastructures built, legal standards chosen, institutions created, contracts honored, and safety or ecological limits enforced. Future openness therefore cannot mean indefinite deferral or permanent reversibility. The relevant question is how closure is made when its consequences extend into a future that remains partly unknown.

Closure can operate at several levels. A decision can close one instrument while keeping the objective revisable. A standard can stabilize an interface while allowing competing implementations. A right can be durably protected while administrative procedures evolve. An ecological prohibition can close destructive pathways while preserving plural forms of compatible activity. Conversely, a narrow technical or organizational choice can unintentionally close wider future pathways through dependency, complement accumulation, or loss of alternative capability.

The key distinction is between *warranted commitment* and *premature closure*. Prematurity cannot be determined by duration alone. A rapid closure can be warranted when delay creates severe harm and evidence is sufficient. A slowly accumulated closure can remain premature where alternatives disappear through path dependence without explicit assessment of consequences, standing, and revision. Closure discipline therefore concerns the relation among evidence, consequence, reversibility, affected positions, alternative pathways, and the level at which commitment is imposed.

Definition 20.200 (Future-closure profile). *A future-closure profile specifies the future possibilities constrained or stabilized by an economic commitment, the level and duration of closure, evidential and normative warrant, affected positions and standing, alternatives considered, reversibility or repair pathways, dependency and path-creation effects, review conditions, and the records through which later participants can reconstruct and reconsider the commitment.*

Closure discipline also preserves institutional memory. Later actors should be able to distinguish deliberate closure from accidental lock-in, justified commitment from legacy dependence, and unavoidable irreversibility from avoidable loss of alternative capacity. This requirement connects future formation to the historical re-evaluation architecture of Section 20.11.7.

Proposition 20.201 (Future-closure discipline). *Economic closure has stronger generative adequacy where the level, scope, duration, warrant, affected standing, alternative pathways, dependency effects, and recoverability of the commitment are explicit, and where durable closure is accompanied by sufficient records, maintenance, review, repair, or successor capacity for later participants to understand and, where materially possible, revise inherited consequences.*

The proposition completes the section by linking openness and commitment. A generative economic order is neither one that maximizes all future options nor one that fixes a preferred future in advance. It is an order capable of making consequential commitments while preserving the capabilities, records, institutions, plural standing, and path-creation capacity through which future participants can continue forming economic futures of their own.

Section 20.12 therefore treats economic future formation as an economic-order problem in its own right. Future-possibility architecture distinguishes representation from practical reachability; multiple trajectories preserve heterogeneous temporal and value structures; path creation keeps later novelty inside the economic field; option preservation maintains selected transition capacity; intergenerational possibility makes inherited action structures visible; long-horizon risk traces delayed and difficult-to-repair consequences; radical uncertainty disciplines the scope of present claims; and closure discipline permits commitment without silently converting current judgment into permanent normative authority. Section 20.13 turns next to the limits of GRE and asks where the programme's domain, ontology, epistemology, methodology, normativity, formalization, historical reach, and generalization remain bounded.

20.13 GRE Scope and Validity Boundaries

The role of this section is to state the scope and validity boundaries that accompany the economic-order synthesis developed in this chapter. Its objective is to identify where Generative Relational Economics (GRE) currently has analytical warrant, where its claims require additional assumptions or domain translation, and where its vocabulary should yield to other disciplinary, empirical, normative, or formal frameworks. The section develops eight boundary dimensions: domain scope, ontological commitment, epistemic access and warrant, methodological adequacy, normative authority, formalization and model scope, historical transfer, and programme-level generalization. The method is reflexive and claim-indexed. A boundary attaches to a particular object, proposition, representation, intervention, or generalization rather than functioning as a global verdict on the usefulness of the programme.

The need for explicit boundaries follows from GRE's own architecture. Chapters 4 and 5 separate ontological suspension from epistemic reconstruction. Chapters 6–9

preserve methodological plurality and treat research practice as part of the evidential architecture. Chapters 14–16 extend analysis toward heterogeneous value, generative spacetime, power, justice, and governance, where empirical and normative questions cannot be collapsed into one register. Chapter 19 further shows that domain translation can require decomposition, reinterpretation, local substitution, or withdrawal of GRE concepts. The present section therefore treats boundary specification as part of analytical adequacy.

This section is intentionally compact relative to the dedicated treatment of limits, open problems, and failure modes later in the book. Its purpose here is to place validity conditions around the economic-order claims of Sections 20.1–20.12 before the future research programme is stated. Detailed questions concerning representation error, relational reduction, closure, value conversion, power, justice, applied praxis, empirical identification, and falsification remain research objects in their own right. Section 20.13 supplies the boundary map needed to keep those later inquiries open.

Definition 20.202 (GRE validity-boundary profile). *A GRE validity-boundary profile specifies, for a stated GRE claim or analytical construction, the domain and scale to which it applies, the ontological commitments it assumes or suspends, the evidential access and uncertainty supporting it, the methods through which it is investigated, the normative authority it possesses, the status and scope of any formal representation, the historical conditions relevant to transfer, and the level at which generalization is warranted.*

Definition 20.202 makes scope explicit at the level of individual claims. A qualitative interpretation, a formal representation, an empirical regularity, and a normative proposal can all belong to GRE while carrying different kinds of warrant. Table 20.13 summarizes the eight dimensions developed below.

Proposition 20.203 (Boundary-explicit adequacy condition). *A GRE claim has stronger analytical adequacy when its domain, ontology, evidential access, method, normative standing, formal status, historical conditions, and generalization scope are sufficiently explicit for a reader to identify both what the claim supports and what remains outside its warranted reach.*

Proposition 20.203 treats boundary statements as substantive content. A narrow but well-specified claim can carry more research value than a broader statement whose domain, evidence, or normative authority remains ambiguous.

20.13.1 Domain Scope Boundaries

GRE is principally an economic research programme. Its relational vocabulary can illuminate interfaces with law, political theory, history, education, ecology, culture, artificial intelligence, and other domains, yet such illumination does not confer disciplinary jurisdiction. Chapter 19 demonstrates this through domain translation: economic concepts acquire domain-specific meaning only after subjects, relations, mechanisms, values, temporal scales, evidence, and institutional boundaries are respecified.

The first boundary therefore concerns domain containment. Economic analysis can examine how legal standing affects access, how educational arrangements re-

Table 20.13: Scope and validity boundaries of Generative Relational Economics.

Boundary dimension	Scope question	Required discipline	Characteristic overreach
Domain scope	Which economic object, domain, scale, and interface does the claim address?	Preserve domain-specific objects, mechanisms, and remainders	Treating an economic translation as authority over another discipline
Ontological commitment	Which entities or relations are assumed, represented, or ontologically suspended?	Separate useful representation from ultimate ontological claim	Reifying relational, field, spacetime, or subject representations
Epistemic access and warrant	What can be observed, inferred, reconstructed, or only hypothesized?	Track provenance, uncertainty, identifiability, and model dependence	Treating partial manifestation as complete access to the target
Methodological adequacy	Which method is adequate to the local research question?	Combine or separate interpretive, empirical, formal, and computational modes as warranted	Treating one method as universally sufficient
Normative authority	Which values, standing relations, and evaluative premises authorize the conclusion?	Keep normative premises, conflicts, and unresolved remainder visible	Deriving justice or goodness directly from generativity or efficiency
Formalization and model scope	What analytical work does the formal representation perform?	State assumptions, semantics, identification conditions, and empirical interfaces	Treating formal elegance or analogy as empirical or ontological proof
Historical transfer	Which categories and mechanisms depend on a historical configuration?	Index claims to time, institutions, technologies, and category change	Projecting historically situated mechanisms as timeless laws
Generalization scope	At what level may the result travel beyond the case or domain?	Distinguish local, cross-domain, and programme-level claims	Converting recurring vocabulary into universal theory

produce capability, how ecological processes condition production, or how cultural recognition shapes value realization. These interfaces remain economic objects insofar as the research question concerns allocation, conversion, capability, dependency, infrastructure, value processes, participation, or economic-order formation. Questions internal to jurisprudence, pedagogy, ecology, aesthetics, or other disciplines may require concepts and standards of adequacy that GRE does not supply.

Domain scope also depends on scale. A concept that works at the level of an organization may become misleading at the level of a jurisdiction, transnational system, household, or ecosystem. Likewise, a relation identified at one boundary can disappear or change type after the analytical boundary is expanded. Domain adequacy therefore requires explicit specification of the unit and interface being studied.

Definition 20.204 (GRE domain-containment profile). A *GRE domain-containment profile* records the economic object of inquiry, the relevant domain interface, analytical boundary and scale, the GRE concepts transferred into the inquiry, the domain-specific concepts retained, and any remainder that requires reinterpretation, local substitution, or withdrawal of the transferred concept.

The profile keeps interdisciplinary work reciprocal. A domain can revise GRE when economic vocabulary fails to represent an important mechanism, standing relation, temporal structure, or evidential object.

Proposition 20.205 (Domain-containment condition). A *GRE analysis crossing disciplinary boundaries should preserve the receiving domain's independent objects, standards of evidence, normative questions, and conceptual remainders wherever those elements materially affect the economic claim being made.*

This condition supports interdisciplinary dialogue while containing economic

overreach. It also preserves the possibility that a useful economic relation is only one partial representation of a wider domain object.

20.13.2 Ontological Commitment Boundaries

GRE uses relational beings, fields, configurations, histories, spacetime representations, capability profiles, and institutional structures as analytical objects. Their usefulness does not establish an ultimate ontology. Chapter 4 adopts ontological suspension precisely so that relational analysis can proceed without requiring premature settlement of metaphysical questions that the economic research task does not need to decide.

This restraint is especially important where formal or physical language is imported. A field representation can capture distributed influence without implying that social reality literally consists of a physical field. A 2-complex can provide a representation of history-bearing relational structure without establishing that the economic world is fundamentally a 2-complex. Dynamical, topological, operator-algebraic, or amplitude-like formalisms can reveal structural possibilities while their ontological status remains open.

The same boundary applies to economic subjects. Persons, organizations, communities, artificial systems, institutions, and represented non-human positions can possess economically consequential standing in different senses. Operational agency, relational subjecthood, legal status, moral standing, phenomenological experience, and ultimate ontology remain separate questions. GRE can analyze their economic interfaces without resolving all of them within economics.

Definition 20.206 (Ontological-commitment profile). An *ontological-commitment profile* records which entities, relations, processes, or structures a GRE analysis treats as empirically or analytically real for the local inquiry; which are representational devices; which stronger ontological interpretations remain optional; and which ontological questions are suspended because the argument does not require their resolution.

Proposition 20.207 (Ontological-restraint condition). *A GRE representation should not acquire stronger ontological authority than is required by its analytical role, evidential support, and explicit assumptions; where several ontological interpretations support the same economic analysis, the stronger commitment should remain open unless additional argument establishes it.*

Ontological restraint does not weaken relational analysis. It clarifies what the analysis depends on and permits later theories to revise the metaphysical interpretation without automatically invalidating every economic result obtained through the representation.

20.13.3 Epistemic Access and Warrant Boundaries

GRE often studies relations, capabilities, dependencies, value processes, future possibilities, and institutional effects that are only partially observable. Chapter 5 therefore treats manifestation and representation as mediated access rather than transparent disclosure. The relevant epistemic boundary concerns what can be directly

observed, what can be inferred from traces, what requires reconstruction, and what remains hypothetical or underidentified.

Partial access is especially consequential in long-horizon and generative analysis. A present increase in capability can be observed more readily than the later possibilities it enables. A dependency can remain latent until an attempted exit occurs. Institutional learning can be difficult to distinguish from temporary performance improvement. Value capture can operate through several conversion interfaces whose contribution is not directly separable. Future-option loss can be inferred from disappearing capabilities or infrastructures while the counterfactual future itself remains unobservable.

The epistemic problem is therefore wider than data scarcity. It includes non-invertibility, hidden relations, measurement error, model dependence, selection effects, changing categories, performative indicators, and weak counterfactual identification. Negative evidence also requires care: absence of an observed relation supports absence of the target only where trace generation, detection, coverage, and preservation are sufficiently warranted.

Definition 20.208 (Epistemic-warrant boundary). An *epistemic-warrant boundary* specifies, for a GRE claim, the observable traces and manifestations available, the inferential or reconstructive steps connecting them to the target, uncertainty and missingness, identifiability conditions, model dependence, counterfactual assumptions, and the strongest claim supported by the resulting evidential architecture.

Proposition 20.209 (Epistemic-scope condition). *Where a GRE target is only partially observed or reconstructed, the strength and scope of the conclusion should track the stability, specificity, independence, historical adequacy, and uncertainty of the evidential pathways through which the target is inferred.*

This condition is especially important for claims about generativity. Generativity can be investigated through later capability, reuse, regeneration, path creation, and option-space effects, yet a present indicator cannot by itself provide complete evidence of all later consequences.

20.13.4 Methodological Adequacy Boundaries

GRE is methodologically plural because its objects are heterogeneous. Historical reconstruction, interpretive inquiry, ethnography, institutional analysis, causal inference, experiments, network analysis, simulation, formal modeling, computational methods, and comparative case research can each provide relevant access to different aspects of relational economic configurations. None receives universal priority from the GRE framework itself.

Methodological adequacy is local to the research question. A randomized design can identify an average effect for a bounded intervention while leaving long-horizon institutional evolution outside its design. An ethnography can reveal tacit coordination and meaning while providing limited support for prevalence claims. A simulation can clarify consequences of specified mechanisms while remaining conditional on model closure. Historical comparison can illuminate path dependence while facing incomplete archives and changing categories. Formal analysis can expose struc-

tural consistency without establishing empirical magnitude.

Mixed methods can strengthen inquiry when the methods address complementary evidential problems. Their combination also requires care because evidence from different methods may concern different targets, populations, scales, or historical moments. Triangulation is strongest when the relation among those evidential objects is itself specified.

Definition 20.210 (Method-adequacy profile). A *method-adequacy profile* identifies the research question and target, the method or combination of methods used, the evidential role assigned to each method, the assumptions and exclusions introduced by the design, the scales and populations to which the result applies, and the claims that remain unsupported by that methodological configuration.

Proposition 20.211 (Methodological-pluralism condition). A *GRE research design* should select methods according to the evidential and interpretive requirements of the local question and should preserve the distinct warrant of heterogeneous methods when their outputs cannot be validly merged into one evidential scale.

Methodological pluralism also bounds practical decision analysis. Under urgency or incomplete information, the feasible evidence base can be narrower than ideal research design. Such decisions can still be warranted when evidential limitation, judgment, monitoring, and later re-evaluation are explicit.

20.13.5 Normative Authority Boundaries

GRE contains normative vocabulary concerning justice, participation, standing, value, dependency, future possibilities, and generative adequacy. These concepts support normative inquiry, yet generativity alone does not determine goodness. A process can generate extensive future capability while distributing burdens unjustly. Stability can preserve a valuable institution or an oppressive relation. Option expansion can benefit one position while imposing ecological or care burdens elsewhere. Efficient conversion can intensify domination if control over the conversion interface is concentrated.

The normative boundary therefore concerns authority. Descriptive findings about dependency, conversion, power, capability, or future-option structure can reveal normatively relevant facts. Moving from those facts to judgments of legitimacy, justice, priority, rights, or obligation requires normative premises concerning standing, value, burden, responsibility, entitlement, or acceptable procedure. GRE can organize those premises and show where they interact, but it does not make every normative conflict commensurable.

Plural-value analysis in Sections 20.8 and value recirculation in Section 20.7 reinforce this point. An order can require operational decisions while normative remainders remain unresolved. Normative adequacy therefore includes procedural standing, explanation, contestability, and revision where substantive agreement is incomplete.

Definition 20.212 (Normative-authority profile). A *normative-authority profile* records the evaluative object, affected positions and standing, values and rights invoked, normative premises, conflicts and incommensurabilities, procedural basis

of decision, distribution of burden and benefit, unresolved normative remainder, and the scope within which the resulting normative conclusion is claimed to apply.

Proposition 20.213 (Normative-underdetermination condition). *Where several normatively relevant values, rights, or standing relations remain incompletely commensurable, GRE analysis should preserve the premises and unresolved remainder of the decision rather than treating generativity, capability, efficiency, stability, or any other single economic property as sufficient normative authority.*

The proposition leaves space for stronger normative theories. Political philosophy, jurisprudence, ethics, democratic theory, ecological ethics, and domain-specific normative frameworks can supply commitments whose economic consequences GRE then analyzes relationally.

20.13.6 Formalization and Model-Scope Boundaries

Formalization has several legitimate roles in GRE. It can sharpen definitions, expose assumptions, distinguish mechanisms, represent partial orders, analyze conversion interfaces, model dynamic trajectories, identify invariants, or test internal consistency. The same formal language can also invite overreach when symbols acquire a precision that the underlying empirical or semantic objects do not support.

The formal boundary begins with model type. A schematic formalism organizes concepts. A structural model represents relations among typed objects. An analogical model imports selected structure from another field. A parameterized model connects variables to empirical quantities. A predictive model additionally requires a warranted relation to future observations. These forms carry different evidential obligations.

Closure is another boundary. Economic configurations are open, reflexive, historically changing, and partly constituted by the categories through which participants act. A formal model can close selected mechanisms for analysis while leaving an explicit remainder. Model usefulness depends partly on whether the excluded relations are small for the research purpose or materially capable of changing the conclusion.

The same discipline applies to mathematical imports from geometry, field theory, operator algebra, category theory, dynamical systems, or physics. Structural similarity can support inquiry without establishing identity of mechanism, semantics, or ontology.

Definition 20.214 (Formalization-scope profile). *A formalization-scope profile states the role of a GRE formalism, the semantics of its objects and operations, assumptions and closure conditions, empirical or interpretive correspondence, parameter-identification requirements where applicable, excluded relations, sensitivity to those exclusions, and the level of claim that the formal result can support.*

Proposition 20.215 (Formal-transfer condition). *A formal structure transferred into GRE has stronger warrant when the preserved relations, altered semantics, closure assumptions, empirical correspondences, and domain-specific remainders are explicit; formal resemblance alone does not establish shared mechanism, ontology, or empirical validity.*

Formalization can therefore remain ambitious while epistemically disciplined. A

formal object earns its place by clarifying an analytical problem and by keeping the route back to interpretation or evidence visible.

20.13.7 Historical Transfer Boundaries

GRE emerged from historically specific economic conditions and repeatedly treats institutions, categories, technologies, and value forms as historically generated. Its claims therefore require temporal indexing. Concepts such as employment, platform, corporation, public service, intellectual property, citizenship, data, artificial intelligence, or professional expertise can change their institutional meaning across periods and places.

Historical transfer presents at least three problems. First, categories can be anachronistic: a contemporary term can obscure how earlier actors understood their own relations. Second, mechanisms can change while labels remain stable. Third, similar mechanisms can operate through different institutional forms. A dependency relation in one historical configuration may rely on land tenure, while another relies on identity infrastructure, finance, data, or technical standards.

Historical analysis also faces incomplete archives and unequal preservation. Powerful institutions often leave denser records than informal communities, care relations, marginalized groups, or tacit maintenance practices. Apparent absence in the archive can therefore reflect preservation structure rather than absence in the historical economy.

Definition 20.216 (Historical-transfer profile). *A historical-transfer profile specifies the period and institutional configuration in which a GRE concept or mechanism is identified, the historical meaning of its categories, relevant changes in technology and institutions, archival and evidential asymmetries, comparison criteria used across periods, and the aspects of the claim that remain portable after those differences are taken into account.*

Proposition 20.217 (Historical-portability condition). *A GRE mechanism should be generalized across historical contexts only to the extent that the relevant relational structure, category meaning, institutional mediation, evidence, and causal pathway remain sufficiently comparable for the stated analytical purpose.*

This condition is consistent with recurrent economic structures. Dependency, allocation, maintenance, power, value conversion, or capability formation can recur historically while being realized through different institutional architectures. Historical recurrence should therefore be demonstrated at the level of mechanism relevant to the claim.

20.13.8 Generalization Scope and Programme Containment

The final boundary concerns the level at which GRE findings can travel. Chapter 19 distinguished domain-local, cross-domain, and programme-level generalization. Section 20.13 adds a further containment discipline: repeated success of GRE within economics would still not by itself establish a general theory of every social, legal, ecological, political, or cultural process.

Generalization should therefore preserve the route by which a claim travels. A

finding may remain case-specific. Several cases can support a domain-level mechanism. Repeated domain correspondences can support a cross-domain structural proposition. A programme-level concept can organize many inquiries while still carrying substantial empirical and normative variation. Movement among these levels requires evidence of correspondence, not recurrence of terminology alone.

Programme containment also protects GRE from conceptual inflation. If relation, generativity, capability, value, power, infrastructure, or possibility are defined so broadly that every observation confirms them, the concepts lose discriminating capacity. A productive programme requires conditions under which its distinctions fail, require decomposition, or are outperformed by rival explanations.

The relation between GRE and a future Generative Relational Theory (GRT) is therefore one of contribution rather than automatic elevation. GRE can provide domain-specific successes, failures, formalisms, counterexamples, and candidate invariants. Whether any of these support a broader theory depends on comparative work across independently constituted domains and on identification of what remains stable after economic assumptions are removed.

Definition 20.218 (GRE generalization-scope profile). A *GRE generalization-scope profile* records the evidential base of a finding, the cases and domains represented, the structural correspondence claimed across them, the assumptions preserved in transfer, counterexamples and transfer failures, rival explanations, and the level at which the resulting claim is warranted: case-local, domain-level, cross-domain, programme-level, or candidate input to a broader theory.

Proposition 20.219 (Programme-containment condition). *GRE has stronger cumulative warrant where successful explanations, failed transfers, rival accounts, boundary conditions, and required conceptual revisions remain visible, and where broader theoretical generalization is deferred until the relevant cross-domain invariants and non-transferable assumptions have been independently established.*

Programme containment completes the boundary architecture of this section. Domain specificity prevents economics from absorbing adjacent disciplines. Ontological suspension prevents analytical representations from becoming premature metaphysics. Epistemic boundaries calibrate claims to mediated access. Methodological boundaries preserve local adequacy and plural evidence. Normative boundaries keep evaluative premises and unresolved conflicts visible. Formalization boundaries preserve the distinction between structural insight and empirical or ontological proof. Historical boundaries limit anachronistic transfer. Generalization boundaries preserve the difference between a productive economic research programme and a completed general theory.

These boundaries are not a residual disclaimer added after GRE's positive claims. They specify how those claims remain testable, revisable, interpretable, and capable of cumulative refinement. Section 20.14 therefore turns next to the future research programme: empirical testing, formal development, comparative inquiry, institutional experimentation, longitudinal research, cross-cultural work, AI-era research, and theoretical revision can be organized around the boundaries identified here without presuming in advance which of them will narrow, extend, or substantially revise the present framework.

20.14 GRE Economic-Order Research Agenda

The role of this section is to convert the economic-order synthesis of this chapter into a bounded research agenda. Its objective is to identify the empirical, formal, comparative, experimental, longitudinal, cross-cultural, AI-era, and theory-revision tasks required to test and refine the claims developed in Sections 20.1–20.13. The section does not attempt to replace the dedicated GRE research programme developed later in the book. Its scope is narrower: it specifies what the economic-order architecture constructed in Chapter 20 now requires from subsequent research. The method is claim-linked and revision-oriented. Each research family is connected to identifiable objects, mechanisms, evidence, failure conditions, and possible consequences for the framework.

Section 20.13 established that GRE claims carry explicit validity boundaries. A future research agenda should therefore do more than accumulate supportive examples. It should distinguish descriptive reconstruction from mechanism identification, compare GRE explanations with rival accounts, investigate transfer failures, test whether formal distinctions correspond to observable structures, and preserve negative results as programme-level evidence. The relevant question is not whether every inquiry confirms GRE vocabulary. It is whether GRE distinctions improve explanation, measurement, intervention design, comparative understanding, or theoretical revision within the scope claimed.

The research agenda also inherits an important asymmetry from the book's architecture. Some claims are already conceptually developed but empirically underidentified. Others have empirical analogues but incomplete formalization. Still others concern long-horizon or counterfactual structures that cannot be validated through one method or one dataset. Research design should therefore follow the status of the claim rather than impose one universal evidential template.

Definition 20.220 (Economic-order research-agenda profile). An *economic-order research-agenda profile* specifies, for a GRE economic-order claim, the research object, claim status, relevant mechanism, evidential requirement, appropriate methods, comparison or counterfactual structure, temporal horizon, principal uncertainty, plausible disconfirming result, and the conceptual or formal revision that such a result would trigger.

Definition 20.220 links future research to programme revision rather than treating research topics as independent additions. Table 20.14 summarizes the eight research families developed below.

Proposition 20.221 (Research-revision linkage condition). A GRE economic-order research programme is stronger when major empirical, formal, comparative, and applied inquiries specify in advance which findings would strengthen, narrow, decompose, reinterpret, or withdraw the claim being investigated.

Proposition 20.221 makes revision conditions part of research design. The result is a programme that can accumulate knowledge through support, failure, and boundary discovery alike.

Table 20.14: Research families for the GRE economic-order agenda.

Research family	Primary object	Research task	Revision signal
Empirical identification and testing	Relational mechanisms and economic-order profiles	Operationalize claims, identify mechanisms, compare rival explanations, and estimate scope	Repeated non-identification, contradictory mechanism evidence, or superior rival explanation
Formal development and model comparison	Typed relations, trajectories, conversion, power, value, and option structures	Clarify semantics, derive implications, compare model classes, and connect formalisms to evidence	Formal inconsistency, empirical non-correspondence, or excessive dependence on closure assumptions
Comparative economic-order studies	Institutional configurations across domains and jurisdictions	Compare recurrent structures, differentiated mechanisms, and transfer boundaries	Failed structural correspondence or domain-specific remainder that changes the GRE object
Institutional experimentation and intervention	Policies, institutions, infrastructures, and governance arrangements	Test bounded changes with safeguards, monitoring, learning, and repair pathways	Burden displacement, unanticipated dependency, failure of conversion, or weak external validity
Longitudinal and historical tracking	Capability, dependency, infrastructure, value, and possibility trajectories	Observe cumulative change, delayed effects, path dependence, and re-epistemization	Short-run findings reverse, disappear, or change mechanism over longer horizons
Cross-cultural and cross-jurisdictional comparison	Category meaning, standing, value, institutions, and conversion conditions	Test portability without erasing local semantics and institutional differences	Apparent recurrence depends on imposed categories or incomparable institutional functions
AI-era economic-order research	Capability asymmetry, abundance, scarcity relocation, participation, and infrastructure control	Track rapid changes in productive and epistemic systems and their institutional mediation	Capabilities, dependencies, or participation pathways evolve faster than the framework's categories
Theory revision and cumulative programme learning	GRE concepts, boundaries, and claim hierarchy	Integrate positive, negative, and boundary evidence into explicit conceptual revision	Persistent anomalies, failed transfers, conceptual inflation, or stronger alternative architecture

20.14.1 Empirical Identification and Testing

The first research family concerns empirical identification. Many Chapter 20 concepts are structurally explicit but require empirical operationalization. Relational infrastructure, participation conversion, generative return, dependency-based power conversion, option preservation, institutional learning, and future-formation capacity cannot be tested adequately by attaching one indicator to each term. They are configurations whose observable traces may be distributed across institutions, time periods, administrative records, organizational practices, surveys, qualitative evidence, networks, and historical sequences.

Empirical research should therefore begin with the mechanism and claim level. A claim that documentation barriers reduce practical access requires different evidence from a claim that a platform's infrastructural control produces durable dependency, or that a public institution reproduces capability across personnel turnover. Some questions invite causal inference. Others require descriptive mapping, process tracing, comparative case reconstruction, relational measurement, or mixed-method

triangulation.

Operationalization also creates measurement effects. Indicators can redirect organizational behavior, change participant incentives, or privilege what is easiest to record. GRE research should therefore preserve the distinction between the target relation and the indicator used to approximate it. Where measurement becomes part of governance, the measurement system itself becomes an economic-order object.

Definition 20.222 (Empirical-identification profile). A *GRE empirical-identification profile* records the target relation or mechanism, observational unit, relevant positions, proposed indicators and their provenance, identification assumptions, comparison structure, missing or latent dimensions, likely measurement effects, rival explanations, and the evidential pattern that would count against the stated mechanism.

Proposition 20.223 (Mechanism-indexed empirical condition). *Empirical support for a GRE concept is stronger when evidence identifies the proposed relational mechanism and its boundary conditions, rather than only showing correlation between outcomes that are compatible with several competing explanations.*

A priority for future work is therefore the construction of reusable empirical protocols for relation-indexed access, capability regeneration, typed dependency, conversion pathways, standing, value return, and option-space change. These protocols need not impose one metric across domains. Their purpose is to make mechanism claims more comparable while preserving domain-specific semantics.

20.14.2 Formal Development and Model Comparison

The second research family concerns formal development. The book has used partial orders, networks, fields, dynamical representations, operator-like transformations, spacetime language, typed relations, and other formal devices to clarify selected structures. Future work should determine which formalisms provide genuine explanatory or computational gain for particular economic questions and which remain primarily conceptual scaffolds.

Formal development should proceed through model comparison rather than symbolic accumulation. A network representation may be adequate for one dependency architecture while a temporal event structure is required for another. Agent-based models may illuminate adaptive coordination where closed-form models obscure heterogeneity. Algebraic or category-theoretic representations may clarify conversion and composition without supplying empirical prediction. No single model class should be presumed to dominate simply because it accommodates the vocabulary of the programme.

The most important formal task is semantic discipline. Every formal object should correspond to a stated economic object or operation, and assumptions introduced for tractability should remain distinguishable from claims about the target system. Model closure, observability, parameter identification, and sensitivity to omitted relations should be explicit.

Definition 20.224 (GRE model-comparison programme). A *GRE model-comparison programme* compares alternative formal representations of the same economic-order problem by specifying their semantics, preserved relations, closure assumptions, em-

pirical interfaces, computational properties, identifiable implications, failure conditions, and the domain-specific remainder left outside each representation.

Proposition 20.225 (Formal-plurality research condition). *GRE formal development has stronger cumulative value when competing model classes are compared against a shared economic question and evidential interface, and when formal sophistication is separated from empirical adequacy or ontological authority.*

This agenda leaves room for ambitious formalisms while demanding that they earn analytical scope. The dedicated research programme later in the book can extend these model families systematically; the present chapter supplies the economic-order problems against which such extensions should be tested.

20.14.3 Comparative Economic-Order Studies

Chapter 19 demonstrated that recurrent GRE structures can appear across heterogeneous domains while retaining different mechanisms and remainders. Future comparative work should extend this discipline from domains to economic orders and institutional configurations. The research object is not a ranking of entire economies by one GRE score. It is the comparison of specific relational architectures across cases that differ in institutions, histories, technologies, value structures, and scales.

Useful comparisons might examine alternative welfare-access architectures, different forms of public or cooperative infrastructure, platform governance regimes, research systems, care infrastructures, migration-status arrangements, or arrangements for value recirculation. Comparative design should identify which functions are genuinely comparable and which institutional forms perform different roles despite similar labels.

Negative comparison is as important as positive correspondence. A concept that transfers successfully across several cases may fail in a case where category meaning, causal mechanism, or institutional scale differs. Such failure can identify a hidden assumption in the original GRE formulation.

Definition 20.226 (Comparative economic-order correspondence). *A comparative economic-order correspondence specifies the economic function or mechanism being compared, the cases and boundaries selected, relevant institutional and historical differences, the GRE structure hypothesized to recur, domain- or case-specific remainders, and the evidence required to distinguish structural correspondence from terminological similarity.*

Proposition 20.227 (Comparative-revision condition). *A comparative GRE study should treat failed correspondence as evidence about the scope of the concept being compared, including the possibility that the concept requires decomposition, narrower semantics, or case-specific replacement.*

Comparative work is therefore one route through which economic diversity disciplines theoretical abstraction. It can reveal recurrent structures without converting institutional variety into noise.

20.14.4 Institutional Experimentation and Intervention

The fourth research family concerns institutional experimentation. Sections 20.3 and 20.11 established that policies and governance arrangements can be designed with monitoring, staged commitment, reversibility, learning, and exit-sensitive closure. Research should test how these architectures perform in practice while recognizing that participants in institutional experiments bear real costs and dependencies.

Relevant experiments may include new access pathways, portability rules, participatory mechanisms, interoperability standards, value-return arrangements, maintenance regimes, public-service interfaces, community governance procedures, or AI-assisted administrative systems. The research question should extend beyond whether the intervention changes one target metric. It should examine conversion, burden distribution, capability formation, dependency, institutional learning, and the possibility that the experiment changes the field in which later evaluation occurs.

Ethical and institutional constraints are part of the research object. Reversibility may be limited, participants may have unequal exit capacity, and experimental benefits can be concentrated while burdens are dispersed. Institutional experimentation therefore requires standing, remedy, data governance, monitoring of externalities, and transition planning alongside causal learning.

Definition 20.228 (Generative institutional experiment profile). A *generative institutional experiment profile* specifies the institutional mechanism being changed, affected positions, expected conversion pathway, monitoring and evidential design, exposure and burden, safeguards, participation and standing, stopping and revision conditions, reversibility or repair limits, externalities, and the scope within which experimental findings may be generalized.

Proposition 20.229 (Experimentation-burden condition). *Institutional experimentation has stronger research and governance warrant when learning benefits are evaluated together with participant burdens, dependency effects, externalities, correction pathways, and the practical recoverability of the affected configuration.*

Institutional experimentation can thus serve theory development without treating society as a frictionless laboratory. The experiment itself becomes part of the relational configuration whose consequences must be studied.

20.14.5 Longitudinal and Historical Tracking

Many GRE claims concern reproduction and transformation across time. Capability regeneration, institutional learning, generative depletion, path dependence, value recirculation, infrastructure maintenance, participation trajectories, and future-option effects can be misidentified by short observation windows. Longitudinal research is therefore central to the economic-order agenda.

Longitudinal design should track not only outcomes but changing mechanisms and categories. A policy can initially expand access and later generate administrative dependency. A platform can initially widen participation and later concentrate infrastructural control. An institution can appear efficient while succession capacity gradually erodes. An educational or research system can produce strong short-run

outputs while losing the capabilities needed for future problem formation.

Historical research extends this temporal depth where prospective datasets are unavailable or categories themselves have changed. Archival reconstruction, institutional histories, oral histories, legal change, technical standards, and organizational records can reveal how present structures were generated and which alternatives were previously available but later closed.

Definition 20.230 (Longitudinal generative-trajectory record). A *longitudinal generative-trajectory record* tracks, across a stated period, changes in outcomes, relations, capabilities, dependencies, infrastructures, institutional rules, value-return pathways, participation positions, option structures, category meanings, and the evidential revisions required as the configuration changes.

Proposition 20.231 (Temporal-depth condition). A *GRE claim about regeneration, depletion, path dependence, institutional learning, or future possibility requires a temporal window sufficient to distinguish transient performance from changes in the mechanisms and capacities that reproduce the economic configuration.*

This condition makes temporal mismatch itself an empirical problem. Different components of an economic order can evolve on different clocks, and research designs should be capable of detecting those differences rather than forcing all effects into one horizon.

20.14.6 Cross-Cultural and Cross-Jurisdictional Comparison

Cross-cultural and cross-jurisdictional research tests whether GRE categories retain meaning when social practices, legal structures, institutional histories, linguistic systems, and normative traditions differ. This task is not reducible to adding country fixed effects to a common model. The categories through which economic standing, care, community, ownership, contribution, legitimacy, or obligation are understood can themselves differ across contexts.

Research design should therefore separate structural comparison from semantic imposition. A relation described as dependency in one context may be understood through kinship, public obligation, professional hierarchy, community stewardship, or contractual authority in another. Similar institutional labels can also conceal different rights, enforcement structures, or practical access conditions.

Translation is therefore substantive. Multilingual inquiry, local conceptual history, legal interpretation, ethnographic work, and co-designed measurement can reveal whether the GRE object survives translation or whether a local concept identifies a relation that the original framework missed.

Definition 20.232 (Cross-context translation profile). A *cross-context translation profile* records the GRE concept being compared, local categories and languages through which the relation is expressed, institutional and legal context, relevant historical formation, translation choices, measurement correspondence, normative differences, and the remainder that resists or revises the transferred concept.

Proposition 20.233 (Cross-context validity condition). A *GRE concept has stronger cross-cultural or cross-jurisdictional warrant when structural correspondence is established without requiring local categories, values, or institutions to be redescribed as*

imperfect versions of the original analytical case.

Cross-context research can consequently expand GRE by discovering missing categories, not merely by testing an unchanged framework in additional locations.

20.14.7 AI-Era Economic-Order Research

The seventh research family concerns rapid AI-mediated transformation. Chapters 17 and 18, together with Sections 20.9 and 20.10, identify a moving research frontier in which productive and symbolic abundance, epistemic mediation, capability asymmetry, infrastructure control, and participation can change faster than conventional institutional data are updated.

AI-era research should therefore track configurations rather than model benchmarks alone. Relevant objects include organizational workflow, verification burden, retained human capability, professional judgment, ownership and access to productive intelligence, infrastructure dependency, participation pathways, value capture, public capacity, and the reallocation of attention and orientation. The same nominal technology can have different economic effects when embedded in different institutional architectures.

Measurement will also need versioning. Model capability, platform policy, access conditions, interfaces, pricing, data practices, and organizational adaptation can change during the research period. A study that records only a product name or model class can quickly lose interpretive precision. AI-era research therefore requires provenance for technical and institutional conditions together with economic outcomes.

Definition 20.234 (AI-era economic-order research profile). An *AI-era economic-order research profile* records the artificial capability being used, model or system version where relevant, access and infrastructure conditions, organizational embedding, affected human and collective capabilities, verification architecture, dependency and control positions, participation and standing effects, value-capture pathways, and the temporal validity of the resulting claim.

Proposition 20.235 (AI-configuration research condition). *Research on AI-mediated economic order has stronger explanatory value when capability changes are studied together with institutional embedding, infrastructure control, verification, dependency, participation, and retained human or collective capability, rather than inferred from model performance alone.*

Rapid change also makes negative and obsolete findings valuable. A mechanism that disappears after technical or institutional change can reveal which part of the previous configuration carried the effect.

20.14.8 Theory Revision and Cumulative Programme Learning

The final research family concerns the programme's capacity to learn from its own investigations. A research programme can become self-sealing if every supportive case is counted as confirmation while failures are redescribed as additional complexity. GRE should instead preserve a versioned architecture of claims, evidence, counterexamples, competing explanations, domain failures, and conceptual changes.

Theory revision can take several forms. A concept may be narrowed because its original domain was too broad. A relation may be decomposed into several typed mechanisms. A formal representation may be replaced because its closure assumptions distort the target. A normative claim may be separated from an empirical mechanism. A domain remainder may become a new GRE concept. Repeated failure may justify withdrawal of a claim rather than indefinite repair.

Cumulative learning also requires claim genealogy. Later formulations should preserve enough history to reconstruct why earlier versions were adopted, which evidence challenged them, and what problem the revision was intended to solve. This prevents theoretical change from erasing the record needed to evaluate whether the programme is genuinely learning.

Definition 20.236 (GRE programme-revision record). A *GRE programme-revision record* is a versioned account of a GRE claim or concept that preserves its previous formulation, evidential basis, formal or interpretive assumptions, counterevidence, rival explanations, transfer failures, boundary changes, revised formulation, unresolved remainder, and the conditions under which further revision or withdrawal would be warranted.

Proposition 20.237 (Cumulative-revision condition). *GRE functions as an open cumulative research programme only where supportive findings, negative results, boundary evidence, rival explanations, and conceptual withdrawals can all alter the status and scope of its claims through an explicit revision record.*

This condition closes the Chapter 20 research agenda without exhausting the larger programme. Empirical identification can test whether proposed mechanisms are present. Formal work can sharpen and compare representations. Comparative studies can expose hidden assumptions. Experiments can test bounded institutional alternatives. Longitudinal work can distinguish reproduction from temporary performance. Cross-context research can reveal missing categories. AI-era inquiry can track rapidly moving configurations. Theory revision can integrate all of these results without treating the framework as fixed.

The dedicated research-programme chapter in Part VIII can develop these families into a substantially wider agenda covering GRE's concepts, formal methods, historical and interpretive research, measurement, falsification, negative results, intervention, and comparative theory. The present section has a narrower role: it identifies the research obligations generated by the economic-order synthesis of Chapter 20. Section 20.15 turns next to a different boundary question: what the economic-domain development of GRE may contribute to the future development of Generative Relational Theory, and what should remain domain-specific.

20.15 GRE Contributions to Future Generative Relational Theory

The role of this section is to clarify the relation between Generative Relational Economics (GRE) and the possible future development of a more general Generative Relational Theory (GRT). Its objective is to specify what the economic-domain work developed in this book can contribute to broader theory formation, which results re-

main specific to economics, and what evidential and comparative conditions would be required before a recurrent GRE structure could receive wider theoretical scope. The section proceeds through domain instantiation, explanatory gain, boundary evidence, cross-domain comparison, candidate invariants, domain-bound assumptions, generalization warrant, and general-theory formation discipline. The method is comparative and programme-theoretic: success, failure, non-transfer, and unresolved remainder are treated as evidence about scope rather than as stages in an assumed progression toward unification.

GRE has been developed throughout this book as a domain-specific research programme. Its central objects include economic subjects, allocation and conversion, value processes, institutions, infrastructures, productive and reproductive relations, power, participation, knowledge, artificial capability, and economic future formation. Many of the relational and generative distinctions used to study these objects may have analogues elsewhere, but an analogy does not establish a domain-independent structure. Chapter 19 already showed, within the economic programme, that recurrence across education, research, work, welfare, commons, platforms, public institutions, migration, ecology, and culture can coexist with different mechanisms, evidential requirements, temporalities, and normative remainders. Section 20.13 then made explicit that every GRE claim carries validity boundaries, while Section 20.14 linked those boundaries to a revision-oriented research agenda. The present section extends that discipline to generalization beyond economics.

A future GRT would require more than the removal of economic vocabulary from GRE. It would require independently developed domain programmes, explicit translation between their objects and methods, negative cases in which proposed structures fail to transfer, and evidence that any candidate invariant retains explanatory work after domain-specific assumptions are removed. GRE can therefore contribute cases, distinctions, formal experiments, boundary evidence, and candidate structures. It cannot, by itself, establish the scope of a general relational theory.

Definition 20.238 (Economic-domain contribution profile). An *economic-domain contribution profile* records a GRE concept or claim, its economic object and mechanism, evidential and formal support, known boundary conditions, domain-specific assumptions, observed failures or remainders, candidate cross-domain structure, and the additional comparative evidence required before a broader theoretical interpretation would be warranted.

Definition 20.238 treats generalization as a claim requiring its own warrant. Table 20.15 summarizes the eight dimensions developed below.

Proposition 20.239 (Domain-contribution condition). *GRE contributes most strongly to future GRT development when economic-domain results are transferred as scoped evidence, candidate structures, and boundary records whose broader validity remains open to independent cross-domain testing.*

Proposition 20.239 establishes the governing relation for the section. General theory, if it becomes warranted, should be reconstructed through domain comparison rather than obtained by abstraction from one successful domain programme.

Table 20.15: GRE contributions and restraints in future GRT development.

Dimension	GRE contribution	Possible broader-theory use	Required restraint
Domain instantiation	Economically specified relational and generative objects	Test case for domain realization of GR vocabulary	Preserve economic semantics and institutional specificity
Explanatory gain	Distinctions that improve reconstruction, explanation, measurement, or intervention	Evidence that a relational distinction can do substantive work	Do not convert local usefulness into universal validity
Boundary evidence	Failed transfer, weak identification, rival explanation, and conceptual remainder	Information about where a candidate structure changes or disappears	Preserve negative cases rather than absorb them as complexity
Cross-domain comparison	Explicit mapping of objects, mechanisms, scales, and evidence	Test of structural recurrence across independently developed domains	Compare structure rather than terminology alone
Candidate invariants	Recurrent patterns such as configuration, conversion, dependency, regeneration, and path formation	Hypotheses for broader relational theory	Treat recurrence as candidate status until counterdomains are examined
Domain-bound assumptions	Prices, property, economic institutions, production, allocation, and other economic closures	Clarification of what should remain domain-specific	Avoid exporting economic assumptions through abstract vocabulary
Generalization warrant	Comparative support, rival testing, boundary mapping, and formal correspondence	Justification for carefully scoped expansion of claim domain	Require evidence across domains and methods
Theory-formation discipline	Versioning, branching, deferred unification, and withdrawal	Architecture for cumulative GRT development	Permit plural GR formulations and failed generalization

20.15.1 Economic-Domain Instantiation of GR Inquiry

GRE can be understood as an economic-domain instantiation of a broader generative relational orientation. The word *instantiation* requires care. It does not mean that a complete GRT already exists and GRE merely substitutes economic nouns into a finished general schema. The direction of learning can run both ways. A domain programme may inherit provisional relational distinctions while also discovering objects, failures, and formal requirements that later reshape the more general vocabulary.

Economic inquiry gives relational concepts unusually concrete institutional carriers. Dependency can be mediated through employment, debt, infrastructure, property, platforms, welfare administration, legal status, or access to artificial systems. Conversion can involve resources, rights, money, data, knowledge, status, institutional standing, or productive capability. Generativity can appear through capability formation, maintenance, institutional reproduction, knowledge creation, ecological regeneration, or path creation. These cases give relational vocabulary observable and historically reconstructable economic forms.

At the same time, their economic specification matters. A price is not merely a generic relation. Property is not only a relation among abstract nodes. Employment, public infrastructure, monetary systems, welfare rights, contractual obligations, and productive organizations carry legal, historical, institutional, and normative struc-

tures that may have no direct equivalent in another domain. GRE therefore tests a generative relational orientation through economic specificity rather than escaping that specificity.

Definition 20.240 (Economic-domain instantiation profile). An *economic-domain instantiation profile* specifies the shared generative or relational concept being used, its economic objects and carriers, the mechanisms through which it is realized, the economic institutions or constraints that shape it, the evidence through which it becomes accessible, and the domain-specific remainder that should remain visible if the concept is compared beyond economics.

Proposition 20.241 (Instantiation-specificity condition). A GRE concept is a stronger candidate for later cross-domain comparison when its economic realization is specified precisely enough that shared structure can be separated from the economic institutions, semantics, and closure assumptions through which the structure became observable.

This condition also prevents abstract vocabulary from concealing economic assumptions. A future GRT should learn from how generative relations become institutionally realized in economics while retaining the possibility that other domains realize related structures through materially different objects.

20.15.2 Economic-Domain Explanatory Gains

The second contribution concerns domain-specific explanatory gain. A broader theory should not inherit a GRE distinction simply because it is conceptually appealing. The more relevant evidence is whether the distinction improves economic inquiry relative to available alternatives. Improvement can take several forms: a relation may reveal a mechanism obscured by object-centered description; a conversion analysis may explain why formal allocation produces unequal practical capability; a typed dependency may distinguish beneficial coordination from power-producing reliance; or a generative-trajectory analysis may reveal long-horizon depletion behind strong current performance.

Such gains remain claim-specific. GRE need not outperform existing economics as a whole in order to contribute useful concepts. A relational reconstruction may be valuable for one class of institutional problems while a conventional price model remains sufficient for another. A generative analysis may add information about capability reproduction without improving short-run forecasting. The evidential unit should therefore be the local explanatory or analytical task.

The same discipline applies to formal work. A 2-complex, network, field, partial-order, dynamical, or operator-like representation provides evidence for broader theory only where it clarifies a structure that simpler representations leave obscure and where its semantics remain identifiable. Formal richness alone cannot establish a general invariant.

Definition 20.242 (Economic-domain explanatory-gain profile). An *economic-domain explanatory-gain profile* records the target economic question, baseline descriptions or rival explanations, the GRE distinction or model applied, the mechanism or structure made visible, the evidential improvement obtained, remaining ambiguity, and the scope within which the gain has been established.

Proposition 20.243 (Explanatory-gain transfer condition). *A domain-specific GRE success supplies stronger evidence for future generalization when the source of its explanatory gain can be identified independently of the specifically economic assumptions that produced the case.*

Domain success therefore produces a candidate for comparison, not an automatic component of GRT. The distinction matters because a concept can be highly productive in economics precisely because it aligns with historically specific economic institutions.

20.15.3 Economic-Domain Boundary Evidence

Domain-specific failure is equally important for future theory formation. GRE may fail to identify a mechanism in a case, add little beyond a simpler account, require assumptions that cannot be defended, or encounter an economic object whose structure is poorly captured by its current vocabulary. Such results should not be treated merely as defects awaiting reinterpretation. They can reveal where a candidate general concept changes type, where a domain assumption was hidden inside the abstraction, or where an alternative theory provides a better account.

Boundary evidence can arise at several levels. An empirical mechanism may fail to appear. A formal representation may depend on closure assumptions that remove the relevant economic relation. A value-conversion analysis may not distinguish competing interpretations. A generativity concept may become too elastic to discriminate among cases. A cross-domain translation may produce a large remainder. Each failure has different implications for programme revision.

A future GRT would be especially vulnerable to self-sealing if domain failures were automatically redescribed as additional relational complexity. General theory requires the capacity to say that a proposed invariant does not travel, that a category is economics-specific, or that a concept should be divided into several domain-sensitive types.

Definition 20.244 (Economic-domain boundary-evidence record). An *economic-domain boundary-evidence record* preserves the GRE claim tested, case and boundary, expected mechanism, observed discrepancy or failure, rival explanation, domain-specific condition implicated, theoretical level affected, and whether the result warrants narrowing, decomposition, reinterpretation, local replacement, or withdrawal.

Proposition 20.245 (Boundary-evidence contribution condition). *Negative or boundary evidence from GRE contributes to future GRT when it changes the proposed scope or structure of a generalization rather than being absorbed automatically into a more permissive version of the same claim.*

A mature general theory would therefore need an archive of failed transfers alongside successful ones. GRE can contribute such records before broader theory is attempted.

20.15.4 Cross-Domain Comparative Architecture

Cross-domain comparison is the principal bridge through which GRE results could later become evidence about GRT. The relevant comparison is structural rather than lexical. Two domains may use words such as *relation*, *constraint*, *capacity*, *conversion*, or *generation* while referring to different objects, mechanisms, temporalities, and evidential practices. Conversely, structurally related mechanisms may be expressed through entirely different domain vocabularies.

Comparison should therefore begin from independently specified domain objects. A candidate structure can then be tested for correspondence across subject types, relation types, transformations, scales, histories, evidence, and practical consequences. This approach permits partial correspondence. One component may transfer while another remains domain-bound. A shared formal pattern may survive while its normative interpretation changes. A temporal architecture may recur while the relevant causal mechanism does not.

Chapter 19 provided an internal rehearsal of this discipline across heterogeneous economic domains. A future cross-domain comparison would require a stronger test because the receiving domain would not be economically constituted in the same way. The comparison must therefore preserve the receiving domain's own categories and standards of evidence.

Definition 20.246 (Cross-domain structural-correspondence profile). A *cross-domain structural-correspondence profile* records the source and receiving domains, independently defined objects, proposed shared relation or transformation, semantic translation, relevant scales and temporalities, evidential interfaces, formal correspondence where used, mismatches, domain-specific remainders, and plausible counterexamples.

Proposition 20.247 (Cross-domain correspondence condition). *Cross-domain recurrence supplies evidence for broader theory only when structural correspondence survives explicit comparison of semantics, mechanisms, scale, evidence, and domain-specific remainder.*

This condition makes non-translation informative. A general theory need not require every domain to instantiate every concept. Its credibility may instead depend on knowing which structures recur, which branch into typed variants, and which remain local.

20.15.5 Candidate Cross-Domain Invariants

GRE suggests several structures that may merit cross-domain testing. Their status in this section is strictly candidate. They are research hypotheses about possible invariance, not established universal properties.

One candidate is the *history-bearing configuration*: an analytical object whose present state depends on relations, prior transformations, and inherited constraints. A second is *generative transformation*: a process whose consequences include changes in later capabilities, relations, constraints, or possibility structures. Additional candidates include typed dependency, conversion interfaces, multiscale temporal coupling, maintenance and regeneration, differentiated standing, path cre-

ation, and the distinction between represented alternatives and practically reachable possibilities.

These structures have proved useful across many economic questions in this book. Their recurrence within GRE is meaningful because the economic cases differ substantially. Yet Chapter 19 remains inside an economic research programme. Repeated usefulness across economic domains therefore demonstrates internal portability more strongly than general-theory invariance.

Definition 20.248 (Candidate cross-domain invariant profile). A *candidate cross-domain invariant profile* specifies the proposed invariant structure, the economic cases in which it recurs, the transformation under which it is claimed to remain structurally recognizable, domain-specific realizations, known counterexamples or failures, competing abstractions, and the independent domains required for further testing.

Proposition 20.249 (Invariant-warrant condition). *A recurrent GRE structure should remain a candidate invariant until its proposed invariance has been tested across independently constituted domains and against plausible competing abstractions that explain the same recurrence.*

The phrase *candidate invariant* therefore carries a methodological burden. It requires specifying what is preserved through translation, not merely observing that several domains can be redescribed using the same general word.

20.15.6 Domain-Bound Assumptions and Remainders

Generalization also requires active identification of what should remain economic. GRE relies on concepts and closures that are powerful precisely because the economic domain contains institutions such as markets, money, property, firms, labor relations, public budgets, contracts, platforms, productive infrastructure, welfare systems, and legal-economic standing. Even where another domain has analogous coordination or exchange, the economic semantics and institutional history should not be presumed to transfer.

Some assumptions enter through measurement. Monetary valuation, prices, productivity, income, cost, ownership, or formal access can provide economically meaningful observations while having no domain-general status. Other assumptions enter through normative or institutional roles. Scarcity, allocation, participation, standing, and return have economic meanings shaped by rights, obligations, institutional rules, and historical organization.

Domain-specific remainder is therefore constructive. It identifies what a broader GRT should leave to economics rather than absorb into abstract vocabulary. A general theory that explains every economic object only by redescribing it at a higher level may lose the institutional specificity that made the explanation useful.

Definition 20.250 (Domain-bound assumption and remainder profile). A *domain-bound assumption and remainder profile* records the economic concept or closure being used, the institutional or historical conditions that give it meaning, which components may support cross-domain comparison, which components lack justified analogues elsewhere, and what explanatory loss would follow if the economic remainder

were removed.

Proposition 20.251 (Domain-containment condition). *Future GRT development should preserve economically specific assumptions and remainders whenever abstraction would erase mechanisms, institutional meanings, or evidential structures needed to explain the economic case.*

Domain containment is therefore part of successful generalization. A broader theory gains credibility by specifying what it does not absorb.

20.15.7 Generalization-Warrant Conditions

The seventh subsection states a provisional standard for future generalization. No single checklist can guarantee theoretical validity, yet several conditions can make a broader claim more defensible. The candidate structure should first be stated with semantics clear enough to survive domain translation. Independent domain programmes should then reconstruct their own objects without importing the conclusion. Structural correspondence should be supported by appropriate evidence within each domain. Rival explanations and counterdomains should be considered. Domain-specific remainder should remain visible. The generalization should also specify the level at which recurrence is claimed: descriptive pattern, mechanism, formal relation, generative transformation, normative implication, or some combination of these.

Methodological plurality matters because one mode of evidence can make a pattern appear more general than it is. A formal isomorphism may coexist with different causal mechanisms. Similar historical trajectories may arise through distinct relations. Comparable qualitative descriptions may conceal different scale structures. Cross-domain warrant is therefore stronger where several methods converge on the relevant structure while preserving their separate epistemic limits.

Generalization also needs a stopping rule. If the candidate concept must be broadened repeatedly to encompass every counterexample, the result can lose discriminative value. A useful general theory should permit some proposed generalizations to fail.

Definition 20.252 (Generalization-warrant profile). *A generalization-warrant profile records the candidate shared structure, source domains, independent domain specifications, semantic and formal correspondences, supporting and negative evidence, rival abstractions, methodological diversity, known remainders, counterdomains, proposed scope, and the findings that would require narrowing or withdrawal of the generalized claim.*

Proposition 20.253 (Cross-domain generalization condition). *A GRE-derived structure acquires stronger warrant for inclusion in future GRT when independently constituted domains support the proposed correspondence, relevant counterexamples and rivals have been examined, domain-specific remainders remain explicit, and the generalized claim retains conditions under which it can be narrowed or withdrawn.*

This standard is intentionally demanding. General theory has value only if its wider scope adds explanatory organization without purchasing that scope through conceptual vagueness.

20.15.8 General-Theory Formation Discipline

The final subsection concerns the discipline of theory formation itself. A future GRT may develop through accumulation, branching, competing formulations, partial unification, and the abandonment of unsuccessful generalizations. GRE should contribute to that process without treating generalization as the predetermined endpoint of domain inquiry.

One implication is that deferred generalization can be a positive theoretical state. If economics, law, ecology, education, history, governance, or other domains share some structures but diverge on others, a family of related domain theories may be more informative than a single maximally abstract formulation. General theory can remain layered: some invariants may be broad, some transformations typed by domain, and some concepts intentionally local.

A second implication concerns versioning. Candidate GRT concepts should preserve their domain sources, revision history, failed correspondences, and alternative formulations. Later unification should remain reconstructable rather than retroactively presenting the final vocabulary as if it had been implicit from the beginning.

A third implication concerns normative authority. Even if a relational or generative structure generalizes descriptively, normative conclusions need independent warrant. A general account of generativity would not by itself establish that generativity has overriding normative priority in every domain.

Definition 20.254 (General-theory formation record). A *general-theory formation record* is a versioned account of a candidate GRT concept or structure that preserves its domain sources, semantics, evidential support, formal representations, successful and failed transfers, competing formulations, domain remainders, revisions, current scope, and unresolved conditions for further generalization.

Proposition 20.255 (General-theory formation discipline). *Future GRT development is more robust when domain specificity, failed transfer, branching formulations, deferred unification, normative remainder, and claim withdrawal remain legitimate outcomes of theory formation.*

This discipline states the contribution of Chapter 20 without attempting to complete GRT. GRE supplies a developed economic instantiation, a record of internal cross-domain translation, a set of candidate structures, formal experiments, empirical obligations, and explicit validity boundaries. Its successes can identify promising candidates for wider inquiry; its failures can identify the conditions under which those candidates should change or remain economic. The chapter's closing section can therefore provide provisional closure at the economic level while leaving general-theory development contingent on future domain evidence, comparison, criticism, and revision.

20.16 Provisional Closure of Economic-Order Synthesis

The preceding sections have assembled the book's economic-order synthesis from the relational, generative, epistemic, institutional, political, and historical architectures developed across GRE. The present section gives that synthesis a provisional

Table 20.16: Dimensions of provisional closure for the economic-order synthesis

Closure function	Primary object	Required record	Programme consequence
Scoped establishment	Stabilized GRE contributions	Claim status, scope, assumptions, evidential and formal basis	Makes the present synthesis usable without universalizing it
Open remainder	Unresolved problems and tensions	Open question, reason unresolved, relevant evidence, next research interface	Preserves unresolved structure inside the completed chapter
Revisability	Claims and conceptual versions	Version lineage, revision trigger, supersession relation, retained provenance	Allows cumulative correction without rewriting intellectual history
Contestability	Critical challenge and alternatives	Rival account, objection, affected claim, response status, required adjudication	Prevents framework self-sealing and supports discriminative critique
Collaboration	Distributed research contributions	Domain, method, standing, contribution, disagreement, integration pathway	Makes plural expertise part of programme development
Re-epistemization	Future reconstruction of present warrant	Original evidence, assumptions, context, later evidence, revised interpretation	Enables historically disciplined reassessment
Open futures	Later theory and institutional formation	Preserved options, path-creation capacity, boundary conditions, handoff interfaces	Closes the chapter while keeping later formation practically open

closure. Its role is to distinguish a completed research cycle from a completed theory. Its objective is to state which economic-order contributions have reached sufficient conceptual stabilization for criticism and reuse, which questions remain open, how claims should remain versioned and contestable, how collaborative development can proceed, and how later evidence can re-epistemize the chapter's present conclusions. The discussion proceeds through scoped contributions, unresolved remainders, revisability, contestability, collaboration, future re-epistemization, and open generative futures. The method is architectural: closure is represented as a documented state of the programme rather than as a terminal judgment on economic order.

Definition 20.256 (Economic-order synthesis closure profile). An *economic-order synthesis closure profile* records the principal claims stabilized in a bounded GRE synthesis, their current scope and status, unresolved questions and remainders, revision conditions, contestation pathways, collaboration interfaces, preserved evidential and formal lineages, and the future developments that can reopen or transform the synthesis.

Definition 20.256 treats closure as a programme state with explicit boundaries. Chapter 20 can therefore close while retaining empirical, formal, normative, historical, and cross-domain questions. The relevant issue is whether the chapter now contains a sufficiently explicit architecture for later researchers to identify what has been proposed, what supports it, what remains unsettled, and what kinds of evidence or argument could change it.

Table 20.16 summarizes the seven closure functions developed in this section.

The table also places the present section inside the book's larger architecture. Section 20.1 synthesized the programme; Section 20.2 established multidimensional economic evaluation; Sections 20.3–20.11 developed policy, institutions, infrastructure, participation, recirculation, plural values, abundance and scarcity relocation,

capability asymmetry, and adaptive governance; Section 20.12 treated future formation; Sections 20.13–20.15 stated validity boundaries, research obligations, and the bounded interface to future GRT. Provisional closure therefore integrates these results without adding a new substantive master criterion.

20.16.1 Established Architecture and Scoped Contributions

The first closure function is to state what the chapter has actually established at its present level of warrant. The relevant object is not a list of slogans or a declaration that GRE has solved economic-order design. The relevant object is the set of conceptual architectures, distinctions, scope conditions, and research interfaces that have become sufficiently explicit to support criticism, comparison, and further use.

Several contributions have reached that status. Economic order has been represented as a history-bearing configuration of subjects, relations, institutions, infrastructures, capabilities, values, dependencies, and possibility structures. Allocation has been linked to conversion rather than treated as equivalent to realized access. Value has been represented as heterogeneous, relational, transmissible, convertible, circulatory, and incompletely commensurable. Generative spacetime has made path dependence, reachability, delay, reversibility, transition, and historical inheritance part of economic analysis. Power has been separated from asymmetry while remaining traceable through dependency, infrastructure, access, and conversion mechanisms. Knowledge, AI, participation, maintenance, regeneration, and value return have been integrated into the economic-order frame without becoming one scalar objective.

These contributions also carry explicit restraints. Generativity has not been established as an overriding normative value. Relational description does not settle ultimate ontology. Formal models do not acquire empirical or normative authority through elegance alone. Cross-domain recurrence does not establish a completed GRT. Economic-order analysis does not select one universally preferred institutional arrangement.

Proposition 20.257 (Scoped-establishment condition). *A contribution of the Chapter 20 synthesis is provisionally established only at the level supported by its stated semantics, assumptions, evidence, formal role, domain scope, and validity boundaries; chapter completion does not expand that warrant.*

Proposition 20.257 makes chapter closure compatible with epistemic humility. A concept can be stable enough to use while remaining open to narrower semantics, better measurement, rival formalization, or empirical revision. The achievement of the chapter is therefore an organized economic-order architecture with explicit interfaces, not final constitutional doctrine.

20.16.2 Open Questions and Unresolved Remainders

A completed synthesis should preserve unresolved structure rather than compress it into a polished terminal narrative. The second closure function therefore converts remaining uncertainty, conflict, and domain-specific remainder into an explicit research object.

Open questions occur at several levels. Empirically, many proposed mechanisms still require identification across diverse institutions and historical settings. Formally, several representations remain schematic or exploratory, and competing model families can encode different closures. Normatively, plural values, differentiated standing, intergenerational claims, ecological representation, AI-mediated participation, and distributive versus generative justice continue to require premises that GRE alone cannot supply. Institutionally, the practical design of contestability, interoperability, counter-power, maintenance, and value return remains context-sensitive. Historically, concepts that appear coherent in contemporary economies may change meaning as technical, legal, ecological, or political conditions evolve.

The domain work of Chapter 19 also leaves remainders that should remain visible. Education adds judgment and capability formation; research adds epistemic reproduction; care reveals dependency and social reproduction; ecology introduces biophysical constraints and non-human affectedness; culture adds interpretation and symbolic inheritance; migration adds multi-jurisdictional standing; platforms add executable institutional architecture. Such remainders may support later revision of GRE rather than simple absorption into a fixed vocabulary.

Definition 20.258 (Open GRE remainder register). An *open GRE remainder register* records an unresolved question, mismatch, counterexample, normative remainder, model limitation, domain-specific structure, or evidential gap together with the claim it qualifies, the reason it remains unresolved, and the forms of inquiry capable of materially changing its status.

Proposition 20.259 (Remainder-preservation condition). *Provisional closure is stronger when material unresolved remainders are preserved as qualified components of the research state rather than converted into implicit assumptions of framework completeness.*

The remainder register turns incompleteness into programme continuity. It also prevents future researchers from treating omissions as settled absences. Some open questions may later disappear because better theory resolves them; others may reveal that a current GRE category was too broad, too narrow, or wrongly constituted.

20.16.3 Revisability and Claim-Version Discipline

The third closure function concerns revisability. A framework that emphasizes adaptive governance, re-epistemization, and future formation should preserve its own conceptual development in a form that can be reconstructed. Revision should change the framework where warranted while keeping the lineage of earlier claims visible.

This requirement applies at several scales. A definition may acquire a narrower domain. A proposition may move from a programme-level claim to a heuristic. A formal representation may be replaced by another while its empirical target remains. A concept may branch into typed variants. A cross-domain generalization may be withdrawn while its economic version survives. A normative implication may be separated from the descriptive architecture that originally accompanied it.

Revision therefore differs from silent rewriting. If a later version removes the evidence, assumptions, or failures that motivated the change, the programme loses in-

formation about its own learning process. Version lineage is particularly important for interdisciplinary work because concepts can change semantics when transferred among economics, law, ecology, political theory, computation, and other fields.

Definition 20.260 (GRE claim-version record). A *GRE claim-version record* preserves a claim's formulation, status, semantics, scope, supporting evidence, formal representation where relevant, known counterevidence, revision triggers, subsequent modifications, supersession relation, and unresolved remainder across successive versions of the programme.

Proposition 20.261 (Revisable-closure condition). A *provisionally closed GRE synthesis remains cumulatively revisable when substantive conceptual or evidential change is recorded through explicit claim lineage rather than through retroactive replacement of earlier formulations.*

Claim-version discipline also supports stronger disagreement. Critics can target a particular formulation rather than an indefinitely shifting framework, and later researchers can distinguish correction from extension. Revisability thereby becomes a condition of cumulative rigor rather than a license for conceptual elasticity.

20.16.4 Contestability and Critical Challenge

The fourth closure function is contestability. GRE has repeatedly treated consequential institutions as stronger when their rules, evidence, power, and decisions can be challenged through practical pathways. The same principle applies to the research programme. A framework becomes less informative when every counterexample can be redescribed as another manifestation of its own concepts.

Contestability requires more than openness to criticism in the abstract. Rival explanations should be representable in terms that do not presuppose GRE. Competing economic theories should be permitted to explain some phenomena more parsimoniously or precisely. Domain specialists should be able to reject proposed translations. Empirical results should be capable of weakening, narrowing, or withdrawing claims. Formal countermodels should be able to expose hidden closures. Normative critics should be able to identify premises that the descriptive framework cannot settle.

Definition 20.262 (GRE contestability record). A *GRE contestability record* specifies a challenged claim, the strongest available objection or rival account, the evidence or reasoning supporting the challenge, the programme response, the current adjudication status, and the findings that would materially alter the claim.

Proposition 20.263 (Research contestability condition). *GRE remains meaningfully contestable when rival theories, counterexamples, failed translations, adverse empirical findings, and normative objections can change the scope or status of its claims without first being redescribed as confirmations of GRE vocabulary.*

This condition also clarifies the role of theoretical dialogue in the following chapter. Dialogue is useful when it can produce correction in both directions. GRE need not subsume neighboring theories, and neighboring theories need not accept GRE's conceptual architecture before comparison can begin. Provisional closure should therefore hand the programme forward in a criticizable form.

20.16.5 Collaborative Programme Development

GRE spans historical inquiry, economics, political economy, law, philosophy, governance, computation, ecology, education, organizational research, and other fields. No single investigator or method can provide equally strong access to every object that the programme brings into view. The fifth closure function therefore concerns collaboration as part of epistemic architecture rather than merely project organization.

Collaboration can divide labor by domain, method, scale, empirical site, or formal representation. It can also supply forms of criticism unavailable from within one disciplinary language. Legal scholars can challenge assumptions about rights and institutional standing; ecologists can constrain economic accounts of regeneration; historians can expose false portability; practitioners can identify implementation relations absent from formal models; communities and affected participants can reveal conversion barriers and burdens that administrative data miss; formal researchers can clarify which arguments depend on hidden closure assumptions.

Collaborative work nevertheless introduces its own translation problems. Shared terms can conceal different semantics, prestige hierarchies can distort whose evidence is taken seriously, and integration can erase domain-specific remainder. Collaboration therefore requires explicit interfaces for contribution, disagreement, attribution, and unresolved difference.

Definition 20.264 (Collaborative GRE development profile). *A collaborative GRE development profile records the participating domains and positions, their objects and methods, contribution and attribution pathways, translation interfaces, disagreement procedures, evidential responsibilities, domain-specific remainders, and the mechanism through which collaborative findings can revise programme claims.*

Proposition 20.265 (Collaborative-development condition). *Collaborative GRE development is generative when plural expertise and affected knowledge can alter the programme while preserving attribution, methodological difference, and domain-specific remainder rather than being assimilated into one predetermined vocabulary.*

Collaboration therefore has a substantive role in programme development. It widens the space of possible criticism, evidence, and theory formation while increasing the need for careful translation and provenance.

20.16.6 Future Re-Epistemization of GRE

The sixth closure function concerns future re-epistemization. Chapter 20 is written from a particular historical position, with particular technologies, institutions, evidence, theoretical resources, and economic problems available to inquiry. Later researchers may observe consequences that are currently latent, gain access to better data, develop new formal tools, or encounter institutional forms that change the meaning of existing categories.

Future reassessment should therefore distinguish what the present work could reasonably claim from what later knowledge makes visible. A later failure does not automatically show that an earlier claim was irrational given the evidence then available. Conversely, historical context does not exempt a claim from revision once its assumptions or consequences become better understood.

Re-epistemization requires preservation. Sources, definitions, model versions, conceptual lineages, domain translations, verification records, failed arguments, and reasons for closure should remain reconstructable. This requirement gives archival and versioning practices an epistemic role: they allow a future community to recover the conditions under which the current synthesis acquired warrant.

Definition 20.266 (Future GRE re-epistemization pathway). A *future GRE re-epistemization pathway* is a reconstructable process through which later evidence, concepts, methods, institutions, or historical outcomes are compared with the preserved warrant conditions of an earlier GRE claim, allowing its interpretation, scope, or status to be revised without erasing its original epistemic context.

Proposition 20.267 (Re-epistemizable-closure condition). *Provisional closure supports future learning when the evidence, assumptions, formalizations, context, and reasoning that produced present claims remain sufficiently preserved for later reconstruction and revision.*

This principle also limits present overconfidence. Some claims may become more important than expected; others may lose relevance; still others may require complete reformulation. The programme's present value partly depends on whether later researchers can identify those changes rather than inherit a frozen summary detached from its evidential history.

20.16.7 Open Generative-Futures Programme

The final closure function places Chapter 20 inside an open future-formation process. The chapter has argued that economic order shapes future possibility through infrastructure, capability, standing, dependency, maintenance, value return, institutional learning, and path creation. A parallel discipline applies to research programmes: present theory should not unnecessarily foreclose later conceptual, methodological, or domain trajectories.

Openness does not require indefinite incompleteness. Chapter 20 can close because its present architecture is sufficiently explicit for reuse and criticism. Part VII can close because domain translation has been followed by economic-order synthesis. The book can proceed to dialogue, research-programme development, wider interfaces, failure analysis, and open-programme synthesis. These transitions represent commitments to a next research stage rather than claims that the present stage has exhausted its object.

An open generative future for GRE therefore contains several simultaneously legitimate possibilities. Some concepts may become empirically stronger and more precisely measurable. Some may remain useful interpretive architectures. Some may branch into domain-specific variants. Some formal models may become operational while others remain heuristic. Some proposed cross-domain structures may support future GRT development, while others remain economic or are withdrawn. Rival theories may absorb GRE insights without adopting GRE terminology, and GRE may incorporate mechanisms originally developed elsewhere.

Definition 20.268 (Open GRE future-formation commitment). An *open GRE future-formation commitment* is the programme-level commitment to preserve plural path-

ways for empirical testing, formal development, domain translation, theoretical dialogue, normative inquiry, institutional experimentation, claim revision, and possible theory branching without predetermining which trajectory must become the final form of GRE or GRT.

Proposition 20.269 (Provisional programme-closure condition). *Chapter 20 reaches provisional closure when its economic-order architecture, validity boundaries, open questions, revision conditions, contestation pathways, research obligations, and future interfaces are explicit enough to support cumulative inquiry without treating the present synthesis as constitutionally final.*

Proposition 20.269 states the closing position of Chapter 20. GRE now has a developed economic-order synthesis, but the synthesis remains a research object. Its future depends on evidence, rival explanations, historical change, institutional experience, cross-domain comparison, and the ability of later participants to generate questions that the present framework does not yet contain. Provisional closure therefore marks a completed stage of formation. The next stage begins with theoretical dialogue, where GRE's concepts can be compared with alternative accounts of economic order without presuming that convergence, subsumption, or final synthesis is required.

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