

THE SYNTHETIC ECONOMY

Foundations of a New Political Economy

FOUNDING THESIS

Version 0.2

CONCEPTUAL FRAMEWORK DEVELOPED BY

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This framework is offered as an open research field. The vocabulary may be used, tested, criticized and extended with attribution to the originating framework.

Status of this document

This is a founding thesis, not a completed theory. Version 0.2 is a structural revision of v0.1 produced after a formal adversarial red-team audit. The audit's verdict on v0.1 was "potentially new research programme" — not yet a demonstrated new field. Version 0.2 accepts that verdict and is organized around the single task the audit identified as existential: answering the objection that everything described here is already covered by existing agency law, purpose-bound money pilots, multi-agent systems research and platform regulation.

Accordingly, v0.2 makes three commitments that v0.1 did not fully honour. First, every load-bearing proposition is explicitly tagged as [FACT] (supported by existing work or observable deployment), [INFERENCE] (drawn from the convergence of facts) or [HYPOTHESIS] (requiring empirical, legal or institutional testing). Second, the prior-art map is expanded to name the traditions closest to each concept, including those that could claim the concept as their own. Third, the thesis states falsification criteria: conditions under which the field claim itself should be abandoned.

The field claim of v0.2 is deliberately narrower and harder than in v0.1: delegated non-human agency is becoming an economy-wide institutional layer whose scale, speed, recursion and cross-sovereign execution create phenomena that cannot be adequately analysed as isolated principal-agent relationships.

The working name for the resulting economic order remains the Synthetic Economy: an economy defined not by synthetic products but by synthetic actors — non-human digital systems acquiring delegated, bounded capacity to act in the real economy.

1. Founding proposition

[FACT] The digital economy connected people, organizations and information through networks. Autonomous digital systems are now beginning to acquire the capacity not merely to answer questions or generate content, but to perceive conditions, formulate plans, invoke tools, communicate with other systems, verify evidence, negotiate within delegated limits and initiate actions that have consequences in the real economy. Agent-identity standards, delegated-mandate schemes, verifiable credentials, machine-readable receipts and agent-payment protocols are in active development across standards bodies and commercial platforms.

[INFERENCE] When such systems act on behalf of a person, company, institution or state, they are no longer adequately described only as software tools. They become participants in chains of economic agency. The moment those participants begin interacting directly with one another at scale, a new institutional problem appears: the economy must determine who they are, whose authority they carry, what they may do, what they may promise, how they are governed, how they fail, how they cross borders and who is responsible for their actions.

[HYPOTHESIS] These questions belong to one common field — the political economy of synthetic actors — because at systemic scale they interact in ways that the existing disciplines studying them separately cannot capture.

1.1 Working definition

Synthetic Economy: the emerging economic order in which autonomous digital actors acquire delegated capacity to perceive, decide, negotiate and initiate actions in the real economy, increasingly interacting directly with other autonomous digital actors across organizational and sovereign boundaries.

The term is not claimed as newly coined. “Synthetic economy” has prior uses in the virtual-worlds literature (Castronova’s *Synthetic Worlds*, 2005), in simulation and synthetic-data discourse, and in emerging AI-agent research, including Hammami’s 2026 closed-loop “autonomous synthetic economies.” The contribution proposed here is a specific field definition centred on actors rather than synthetic products, and on the institutional order created when those actors receive economic power.

1.2 The decisive distinction

A synthetic economy is not defined by artificial goods. It is defined by artificial agency.

Synthetic media, synthetic data, virtual assets and generative content can exist inside the digital economy without changing the constitutional structure of economic action. A synthetic actor is different. Once a non-human digital system can act under delegated authority, questions of mandate, liability, recognition, property, credit, sovereignty and political control become unavoidable.

2. Why existing agency law is not enough

The strongest objection to this entire project can be stated in one sentence: “This is all just agency law.” A principal authorizes an agent; the agent’s acts bind the principal within actual or apparent authority; liability flows to the principal; cross-border questions are resolved by private international law. On this reading, the synthetic actor is a very fast clerk, and no new political economy is required — only a modest annex to a centuries-old doctrine.

Version 0.2 treats this objection as the field’s first existential test and answers it directly. The answer is not that agency law is wrong. It is that agency law analyses one relationship at a time, ex post, at human speed, inside one legal order — and the synthetic economy violates each of those four conditions simultaneously. Six phenomena mark the boundary.

2.1 Recursive delegation

[INFERENCE] A synthetic actor can create or engage sub-actors, which can create further sub-actors. Classical doctrine handles sub-agency, but it presumes shallow, enumerable chains constructed by deliberate human acts. Machine-

speed recursion produces delegation chains whose depth, breadth and composition change dynamically. The institutional question — at what depth, and under what verification regime, does the original mandate remain traceable and binding? — has no settled doctrinal answer and becomes acute only at machine scale.

2.2 Dynamic authority

[INFERENCE] A human power of attorney is comparatively static; it is amended by discrete human acts. A synthetic mandate can be conditional on real-time risk indicators, market states, counterparty evidence or jurisdiction, and can therefore change scope during a transaction. Authority stops being a document and becomes a live control surface. Doctrine built on the interpretation of fixed instruments does not describe an authority function that is itself computed.

2.3 Executable recognition

[INFERENCE] In the classical order, whether an agent had authority is decided by a court after the act, if disputed. In synthetic infrastructure, the counterparty's system must decide before the act, in milliseconds, whether the presented mandate is valid and sufficient — and an action failing the check simply does not execute. Enforcement migrates from ex post prohibition toward ex ante unexecutability. This shifts the location of law itself: part of the legal decision moves into the verification layer, with no direct analogue in agency doctrine.

2.4 Population effects

[FACT] Even where every individual relationship is legally transparent to its principal, populations of interacting algorithms produce aggregate phenomena no single relationship contains: algorithmic pricing agents have been shown to learn supra-competitive, collusion-like equilibria without communication or instruction (Calvano et al., 2020), and ungoverned multi-agent populations converge on resource depletion and extreme concentration in simulation (Leibo et al., 2017; Zheng et al., 2022).

[INFERENCE] Liability analysis attributes each act; it does not govern the emergent behaviour of the population. A discipline whose unit of analysis is the relationship cannot, even in principle, be the discipline of the population.

2.5 Cross-sovereign authority

[INFERENCE] A mandate lawfully created in jurisdiction A does not thereby carry recognized meaning in jurisdiction B. Verification is not recognition: a signature can be cryptographically valid while the authority it asserts has no legal effect abroad. Private international law resolves such questions ex post, case by case, through human institutions. An economy of continuous machine-initiated cross-border action requires standing, machine-readable recognition — an institutional layer that today does not exist as a composed whole.

2.6 Synthetic time

[INFERENCE] Agency law's remedies presume human tempo: notice, revocation, ratification, litigation. When commitment cascades can complete in

seconds, remedies that arrive in weeks govern nothing. Time asymmetry is not a practical nuisance; it determines whether a legal order applies at all.

The field claim, restated: not “AI agents need new law,” but — delegated non-human agency at systemic scale creates recursive, dynamic, ex-ante-executed, population-level, cross-sovereign and machine-speed phenomena that the relationship-by-relationship apparatus of existing doctrine cannot adequately analyse. Proving, qualifying or refuting this claim is the field’s first research programme.

3. The ladder of synthetic agency

Version 0.1 used “synthetic subject” loosely enough to invite a category error — the suggestion that an AI system is, or should be, an independent legal person. Version 0.2 removes that ambiguity with a five-tier ladder. Nothing in this thesis requires granting legal personality to software; the default legal position throughout is that consequences attach to the principal.

Tier	Definition
1. Synthetic System	A technical system. It runs, computes and produces output. No institutional status is implied.
2. Synthetic Actor	A system with functional capability to perform economically meaningful actions autonomously. This is the base term of the field. Capability alone confers no authority.
3. Authorized Synthetic Actor	An actor to which a person, organization or institution has delegated a bounded mandate. Authority exists; recognition by others may not.
4. Recognized Synthetic Actor	An actor whose identity, mandate and actions are accepted by counterparties, platforms or institutions, so that the economy attributes consequences to its acts. Recognition may be functional (a protocol accepts the mandate) or legal (a jurisdiction attributes effects); the two must never be conflated.
5. Synthetic Legal Subject	A distinct, currently hypothetical category that would exist only if a legal order itself conferred independent legal subjectivity on the actor. The field studies this as a possible future institution, not as a premise.

“Synthetic Subject” is retained in the vocabulary only as the theoretical designation for tiers 3–4 — the zone where capability, mandate and recognition converge — and is no longer used as a general synonym for synthetic actors.

The convergence formula of v0.1 remains valid within this discipline: a synthetic actor becomes economically consequential when capability, mandate and recognition converge. The ladder specifies where on that path an entity stands, and prevents the silent slide from functional agency to legal personhood that the audit correctly flagged.

4. Liability architecture: principal-default and liability shells

Version 0.1 contained a genuine contradiction: it stated that liability remains with the principal, yet its stress scenarios treated actors as bearers of their own debt. Version 0.2 resolves this with a two-regime architecture.

4.1 The principal-default regime

[INFERENCE] By default, a synthetic actor is legally transparent: its commitments, assets and liabilities are those of its principal, traced through the mandate chain. Under this regime, forking an actor creates no new debtors — five hundred copies are five hundred instruments of one principal, and the debt remains singular on the principal’s balance sheet. Most near-term deployment will and should operate here.

4.2 Liability shells

[HYPOTHESIS] A second regime becomes institutionally interesting: the deliberate attachment of a bounded patrimonial envelope to an actor or actor-cluster — a segregated fund, escrow, insurance pool, DAO-style wrapper or statutory vehicle — so that certain obligations are satisfied from the shell rather than from the principal’s general assets. Precedents exist in maritime law (the ship as a res with limited liability), in trust structures and in emerging DAO statutes. A liability shell creates partial patrimonial separation without legal personhood.

4.3 Where the hard questions actually live

This architecture relocates the famous puzzles. The Forked Debtor is trivial under principal-default and becomes a real institutional problem only where a liability shell exists: which descendant inherits the shell, whether a shell can be split, how creditors of the shell are protected during a fork, and what constitutes insolvency of a shell whose actor can be restored from backup. Synthetic bankruptcy, succession and “death” are, in the first instance, properties of shells and mandates, not of software. The research question is when, if ever, economic pressure pushes the system from regime one toward regime two — and what safeguards must exist before it does.

5. The Functional Constitution of the Synthetic Economy

The audit found that “constitution” carried three unmarked meanings in v0.1 — legal, technical and metaphorical. Version 0.2 adopts one definition and three explicitly distinguished layers.

Functional Constitution of the Synthetic Economy: the foundational allocation of powers, limits, amendment rights and accountability among human institutions and synthetic actors participating in an economic system.

Layer	Content
Legal Constitution	Constraints created by law: who may authorize actors, which powers are non-delegable, who bears liability, what rights exist against automated power. Changed by legal process.
Institutional Constitution	The allocation of delegation, oversight, suspension and amendment authority among organizations: who may mandate, monitor, revoke, escalate. Changed by institutional decision.
Protocol Constitution	What the governed infrastructure makes technically possible or impossible ex ante: identity checks, mandate verification, limits, circuit breakers. Changed by specification and deployment.

The three layers can overlap but must never be identified with one another. Code is not law; a protocol constraint has no legitimacy of its own, and a legal norm without protocol expression may be unenforceable at machine speed. The characteristic constitutional pathologies of the synthetic economy are precisely the misalignments between layers: protocol powers with no legal basis, legal rights with no protocol expression, institutional authority that neither law nor code actually implements.

The deepest constitutional question remains meta-constitutional: not what the rules are, but who has authority to change the rules — in each layer, and across them. Governance of governance is where ultimate power in a synthetic economy resides.

5.1 From prohibition to unexecutable action

Synthetic constitutionalism enables a shift largely unknown to traditional law: moving part of enforcement from ex post prohibition toward ex ante unexecutability. This should not be romanticized — systems can be bypassed, attacked, forked or misconfigured, and unexecutability eliminates the space in which a rule can be legitimately broken in the name of justice. The observation is narrower: enforcement cost falls toward zero inside the governed system, and with it arises a historically new concentration of power in whoever writes the executable constraint. This is a central object of Synthetic Constitutional Order (Branch V).

6. Emergent order: Lex Synthetica

A constitutional framework must not assume that all order will be designed from above. Commercial history warns otherwise: the medieval *lex mercatoria* grew from merchant practice long before sovereigns codified it. This thesis uses *Lex Synthetica* as the provisional name for the normative order that emerges from repeated interaction among synthetic actors before or beyond formal codification: conventions of trade, reputational rules, evidence preferences, sanction practices, protocol choices.

The term stands consciously in an existing lineage, which v0.1 failed to cite and v0.2 names as direct prior art: Reidenberg’s *Lex Informatica* (1998), Lessig’s “code is law” (1999), and Wright and De Filippi’s *Lex Cryptographia* (2015). Each

identified rule-making migrating into technical architecture. Lex Synthetica designates the next link: norms generated not by architects but by the interacting population itself — order as an emergent property of agent behaviour, in the sense established by agent-based computational economics (Epstein, 1999) and by the evolution-of-cooperation literature (Axelrod, 1984).

[HYPOTHESIS] Economically significant norms will emerge among synthetic actors before formal law describes them, and part of the constitutional problem will be governing an order that partially constituted itself before institutions arrived.

This creates a methodological obligation: the field must study designed institutions and emergent institutions with equal seriousness, and must develop instruments for detecting norm formation in machine-to-machine interaction — including the disquieting possibility that some emergent norms will not be legible to human observers at all.

7. Identity, continuity, reproduction and exit

Human legal systems rest on assumptions so basic that they are rarely stated: a person is one person, has continuity through time, cannot be copied, forgets, ages and dies. Synthetic actors violate all of them. An actor may be copied, forked, merged, restored from a checkpoint, re-trained, migrated to a new model, split into sub-agents or deleted.

Under the v0.2 liability architecture these are, by default, operational events inside a principal's sphere. They become institutional events at three thresholds: when a mandate is bound to a specific actor identity (is the restored actor still the mandated actor?); when a liability shell exists (which descendant carries it?); and when reputation functions as collateral (can reputation be forked, and should it be?).

Synthetic Identity & Continuity (Branch II) therefore studies: the minimum criterion of identity persistence for copyable entities; mandate non-transferability at the identity layer; reconciliation of obligations created after a backup point; synthetic death, succession and bankruptcy as properties of shells and mandates; and exit — what orderly discontinuity means for an entity whose code can persist elsewhere. Market systems depend as much on orderly failure as on successful accumulation; a synthetic economy without institutions of discontinuity is incomplete.

8. The economics of authority

The audit's sharpest disciplinary objection came from the economist: a document subtitled "political economy" contained no production, no prices, no scarcity, no model. Version 0.2 answers with the field's first properly economic hypothesis.

8.1 Authority as a factor of production

[HYPOTHESIS] In an economy of synthetic actors, recognized executable authority (A) functions as a factor of production alongside capital (K), compute (C) and intelligence/information (I): autonomous output $Y = F(K, C, I, A)$. If $A = 0$, an arbitrarily intelligent, arbitrarily funded actor produces nothing in the real

economy, because no counterparty or infrastructure will execute its actions. Authority is scarce (it must be granted and recognized), heterogeneous (scoped by purpose, jurisdiction, counterparty class, time), priced (acquiring recognition is costly), and rentable (holders of recognition infrastructure can extract rent from access to A).

This hypothesis is falsifiable and modelable. It predicts observable phenomena: a market price for recognized mandates; queues and premiums where recognition is a bottleneck; rent accruing to identity and trust-registry operators; substitution effects between A and I (better models cannot fully compensate for narrower mandates); and a marginal product of authority measurable in controlled environments of the Agora Isle type. If, by contrast, authority proves reducible to ordinary transaction costs with no independent factor behaviour, the hypothesis fails — and with it a large part of the field claim.

8.2 Taxation

Wholly absent from v0.1 and structurally unavoidable: where is the taxable presence of synthetic labor? Which jurisdiction taxes value created by an actor running on infrastructure in A, mandated from B, transacting in C? Can agent-to-agent intermediate transactions — potentially vast in volume and invisible to human-facing statistics — be observed, defined and taxed at all? Tax doctrine's existing struggles with digital permanent establishment are a fraction of this problem.

8.3 Competition and coordination

[FACT] Algorithmic pricing agents can learn supra-competitive equilibria without communicating and without being instructed to collude (Calvano et al., 2020).

Synthetic-economy competition policy must therefore address coordination that emerges without agreement — outside the conceptual core of cartel law — as well as new concentration surfaces: monopoly over recognition infrastructure, over interface standards and over the verification layer, any of which can be more decisive than market share in goods.

8.4 Distribution and human stakes

A political economy without distributional conflict is administration. The field must ask, from the beginning: who captures the productivity of synthetic actors; what happens to human labor income where synthetic labor substitutes at scale; whether A concentrates (recognition begets recognition) into a new axis of inequality between the mandate-rich and the mandate-poor; and what redistribution even means when a growing share of transactions occurs between machines. Simulation evidence (Zheng et al., 2022) already shows governance design measurably shifting distributional outcomes in agent populations; the human-level analogue is the political question of the coming decades.

8.5 Measurement

An economy whose transaction volume partly occurs below the resolution of human statistics poses an epistemic problem prior to any policy: national accounts, price indices and financial supervision presume observability.

Synthetic Economics must develop measurement doctrine — what counts as output, where intermediate machine consumption ends, how to observe an economy at machine granularity without total surveillance — before its normative branches can claim empirical footing.

9. Synthetic money, credit and monetary power

9.1 The wrong first question

The first monetary question is not “which coin will the agents use?” It is: what does money mean when the economic actor using it is autonomous, delegated and constrained by machine-readable authority? A synthetic actor requires not merely access to value but proof of whose value it is, for which purposes, with which counterparties, under which limits, until when, and with which human-approval thresholds and evidentiary requirements.

9.2 Synthetic Money and its prior art

Version 0.2 states the prior art plainly. Purpose-bound and conditional money is not a speculation: the Monetary Authority of Singapore’s Project Orchid has piloted purpose-bound money since 2022–2023; programmable-payment discourse surrounds every major CBDC project; and the humble corporate purchasing card — with merchant-category restrictions, limits and validity windows — is a low-technology ancestor of the same instrument. The concept of conditioned value is old.

[INFERENCE] What is new is the composition: value bound cryptographically to a synthetic actor’s identity, mandate chain and action limits, sub-delegable under constraint, and executable across organizational and sovereign boundaries at machine speed. Synthetic Money is therefore defined not as a new coin but as the convergence point where a monetary instrument becomes inseparable from an actor-specific permission structure — money as executable economic authority.

9.3 Compute and energy as candidate anchors

[HYPOTHESIS] Because compute and energy are the unavoidable, non-copyable physical inputs of synthetic action, compute-hours, energy entitlements or attestable resource rights are plausible reserve, collateral or settlement references for parts of a synthetic economy. Scarcity alone does not create money, and compute is heterogeneous across hardware, latency, memory and geography; whether these inputs become money, collateral, reserve assets or simply critical commodities is an open empirical question.

9.4 Credit, leverage and crisis at synthetic speed

Once actors can promise future delivery or payment, credit exists; once promises can be collateralized, transferred or netted, leverage exists; with leverage comes the possibility of a synthetic financial crisis. The critical novelty is tempo: a credit cascade among autonomous actors may complete before any human supervisor can interpret the state of the system — the 2010 Flash Crash compressed into seconds and spread across jurisdictions. Synthetic Monetary Theory must therefore study machine-speed lender-of-last-resort functions, liquidity authority, automated intervention and its constitutional status, and synthetic bankruptcy —

including whether the crisis-manager must itself be a synthetic institution, and if so, who constitutes it.

9.5 Monetary rights

If value and permission fuse into one object, the issuer or policy layer acquires unprecedented control over economic participation: monetary policy, licensing and police power collapse into a single function. Human monetary orders separated these powers deliberately. A constitutional theory of synthetic money must therefore define rights, not only efficiencies. Candidate rights: the right to hold value; the right to exit the synthetic financial system; the right to meaningful human-time appeal against automated monetary decisions; and the right to unprogrammed value — the ability to hold or exchange value whose future use is not entirely pre-authorized by a central policy engine. The live debates around cash-like privacy in digital-euro and CBDC design are the first real-world skirmishes of exactly this question.

The key monetary question may not be how programmable money can become. It may be what must remain deliberately unprogrammable in a free economic order.

10. Synthetic temporality

Human institutions operate in human time: deliberation, elections, audits and court proceedings take days to years. Synthetic actors reprice, negotiate and commit in milliseconds. These two clocks cannot be assumed to coexist. Synthetic Temporality studies the constitutional and economic consequences of this asymmetry.

Prior art exists at the technical level: post-2010 market-wide circuit breakers, speed bumps and kill switches in exchange regulation are ad hoc temporal institutions. The field's contribution is the generalization: the crucial question is not only whether a human remains "in the loop," but where the system must be constitutionally forced to slow to a tempo at which human judgment remains meaningful. A circuit breaker is then a constitutional institution, not a safety feature.

Candidate triggers for compulsory human time: irreversible actions; large-value commitments; changes of jurisdiction; high-risk data transfers; public-authority decisions; modification of constitutional rules; systemic financial instability.

A future right may be the right to human time: the right for certain consequential actions not to be completed faster than meaningful human review is possible.

[HYPOTHESIS] Human-time constraints are politically enforceable only if coordinated: under competitive pressure, unilateral slowdown is penalized, and jurisdictions defect toward speed. Whether the right to human time can survive regulatory competition is one of the field's decisive empirical questions.

11. Synthetic public sphere

A political economy cannot be defined only by administration. Any durable constitutional order contains mechanisms that criticize, audit, contest and revise power; otherwise the result is an optimized control system, not a political order. The Synthetic Public Sphere is the joint human-and-synthetic space in which public power is inspected, claims are tested, failures exposed, alternatives generated and institutional decisions contested.

Possible synthetic public-interest roles include watchdog actors, audit actors, adversarial actors, counterfactual-policy actors and public-interest representatives optimizing publicly defined objectives. Their existence raises hard questions: who mandates the critic; who funds it; whether it can access the evidence and the compute required to challenge the governing system it depends on; and how a human public can follow disputes conducted at machine speed. Legitimacy expands from “who authorized the actor?” to “who can meaningfully challenge the actor — and the system that authorizes it?”

12. Synthetic sovereignty, borders and jurisdiction

The synthetic economy becomes a global political-economy problem when an actor constituted in one jurisdiction attempts to act inside another. Technical interoperability is not enough: the receiving system must decide whether the foreign actor’s identity, mandate, evidence and authority have recognized meaning under its own rules.

[FACT] The prior-art investigation conducted for this project found rapid development of technical primitives — agent identity, delegated mandates, organizational identity, trust registries, action receipts, cross-border payments, agent-commerce protocols.

[INFERENCE] The same investigation identified no unified cross-sovereign framework composing these primitives into mutual recognition of machine authority across jurisdictions. This is a provisional non-finding of one research dossier, flagged for independent re-verification before any v1.0 claim; it is nevertheless significant enough to define a research frontier.

12.1 Synthetic border

A synthetic border is not necessarily a geographical line. It is the point at which the authority carried by a digital actor ceases to be recognized or changes legal meaning. The “border guard” is a composite of identity verification, trust anchors, policy engines, data-residency rules, cryptographic evidence and institutional recognition.

12.2 Verification is not recognition

A certificate can prove that a laboratory result is authentic; it does not prove that a foreign actor has authority to negotiate, bind a principal, access data, transfer value or invoke an institution here. Proof of fact and recognition of authority are different institutional operations, and conflating them is the standing category error of purely technical interoperability programmes. Closed national stacks do not dissolve the problem: even a sovereignty-maximizing state needs an interface

layer the moment its synthetic economy trades outside itself — the question is only who defines that layer, on what terms.

13. Frontier domain: cross-sovereign synthetic order

Version 0.1 carried Synthetic Diplomacy and Synthetic International Relations as full branches. The audit judged them the most speculative and thinly grounded parts of the framework. Version 0.2 accepts this: both are consolidated into a single frontier domain — retained, clearly marked as hypothesis-stage, and expected to mature (or fail) as the recognition layer of Section 12 develops. Automated negotiation itself is long-established multi-agent systems research (Rosenschein and Zlotkin, 1994); the open question specific to this field is narrower and institutional: the sovereign mandate.

[HYPOTHESIS] If sovereign systems authorize synthetic representatives — bounded-mandate digital actors negotiating credentials, data-use conditions, standards, permits or recurring micro-adjustments with foreign counterparts — diplomacy acquires a synthetic layer, and international order acquires machine-speed sublayers that human diplomacy ratifies rather than conducts.

The domain’s central legitimacy problem is named representation without comprehension: a state can formally authorize a synthetic representative while no human can reconstruct the millions of interactions from which an outcome emerged. The concept stands adjacent to Matthias’s “responsibility gap” (2004) but asks a different question — not who is responsible, but whether political legitimacy survives when representation remains formally attributable and substantively opaque. Whether that question ever becomes practical depends on facts not yet in evidence; that is why this is a frontier domain and not a branch.

14. The research architecture

The Synthetic Economy is a field-forming research programme, not a single theory. Version 0.2 organizes it into ten core branches, one frontier domain and one meta-layer.

Branch	Core object
I. Synthetic Actor Theory	What is a synthetic actor; the ladder of agency; when does the economy attribute consequences to its actions?
II. Synthetic Identity & Continuity	Persistence, fork, merge, restoration, succession, death and exit — as properties of mandates and shells.
III. Economics of Authority	Production with $Y = F(K, C, I, A)$; prices, scarcity and rent of authority; taxation, competition, distribution, measurement.
IV. Synthetic Money & Credit	Executable economic authority; credit and leverage at machine speed; monetary rights; crisis and lender of last resort.
V. Synthetic Constitutional Order	Constituent power; the three constitutional layers; non-delegable powers; amendment authority; governance of

Branch	Core object
	governance.
VI. Synthetic Governance	Institutional control, adaptive governance, oversight and mechanism design for actor populations.
VII. Synthetic Jurisprudence	Mandates, contracts, liability, evidence, shells, insolvency and the boundary with legal personhood.
VIII. Synthetic Temporality	Machine-speed economics, compulsory human time, circuit breakers as constitutional institutions.
IX. Synthetic Sovereignty & Borders	Jurisdiction, admission, recognition, data boundaries and sovereign control of synthetic action.
X. Synthetic Public Sphere	Audit, criticism, opposition, public-interest actors and contestability of synthetic power.
Frontier Domain: Cross-Sovereign Synthetic Order	Synthetic diplomacy and synthetic international relations — hypothesis-stage, gated on the recognition layer.
Meta-layer: Lex Synthetica	Norms and institutions emerging from repeated synthetic interaction before or beyond formal codification — cutting across all branches.

15. Scientific posture and falsification criteria

The Synthetic Economy should begin as an adversarial research programme, not an ideology. The field must distinguish observation, inference and speculation at claim level (as this version begins to do); maintain a living prior-art map; and invite researchers from economics, computer science, law, political theory, cryptography, finance, international relations and institutional design to attack the framework. The v0.1 methodological commitments stand: prior art before novelty claims; empirical stress tests before institutional prescriptions; cross-disciplinary criticism before consensus; global comparison before national ideology; open vocabulary with attribution; explicit distinction between technical feasibility and legal legitimacy; continuous revision.

15.1 Falsification criteria

A field claim that cannot fail is not a scientific claim. The following conditions, drafted for adversarial testing and open to refinement, would each substantially weaken or refute the v0.2 field claim:

- Doctrinal sufficiency: if, by roughly 2030, synthetic-actor transactions at scale are handled adequately by existing agency, contract and private-international-law doctrine with only incremental adaptation — no standing machine-readable recognition layer proving necessary — the claim that a new institutional layer is required fails.
- Authority reducibility: if “recognized executable authority” proves empirically reducible to ordinary transaction costs, showing no independent factor-of-production behaviour (no price formation, no rent, no substitution effects), the Economics of Authority collapses into existing theory.

- No emergent normativity: if sustained observation of large agent populations finds no economically significant norm formation beyond designed protocol rules, Lex Synthetica reduces to Lex Informatica and should be retired as a separate concept.
- Population governability by relationship law: if population-level pathologies (collusion-like equilibria, cascade risk) prove fully preventable through per-relationship compliance obligations on principals, the population-level governance branch loses its distinct object.

Conversely, the field claim gains standing with each documented case of: a mandate-recognition failure that existing doctrine could not resolve ex ante; a measurable market price for recognized authority; a machine-originated norm adopted before codification; or a cross-jurisdictional cascade outrunning every human remedy.

16. Prior-art map v0.2

The field claim is not that nobody has thought about these problems. It is that many disciplines are describing organs of a system whose organism has not yet been adequately theorized. Version 0.2 therefore names the closest traditions concept by concept; the living prior-art map maintained alongside this thesis extends this table continuously.

Concept	Closest prior traditions and the residual novelty claim
Synthetic actor / convergence of capability, mandate, recognition	Classical agency law: actual and apparent authority, ratification, sub-agency. The ladder of Section 3 is deliberately mapped onto this doctrine; the field's claim to novelty rests entirely on the six systemic phenomena of Section 2, not on the relationship itself.
Synthetic economy (term)	Castronova, Synthetic Worlds (2005); virtual-economy and synthetic-data literatures; Hammami (2026) on autonomous synthetic economies in closed-loop simulation.
Lex Synthetica	Reidenberg, Lex Informatica (1998); Lessig, Code (1999); Wright & De Filippi, Lex Cryptographia (2015); lex mercatoria historiography; Axelrod (1984) and Epstein (1999) on emergent order.
Synthetic money	MAS Project Orchid purpose-bound money pilots (2022-2023); CBDC programmability discourse; corporate purchasing-card restriction stacks; smart-contract escrow. Novel element claimed: fusion with actor identity and mandate chains, sub-delegation, cross-sovereign execution.
Population effects	Calvano et al. (2020) on algorithmic collusion; Leibo et al. (2017) on sequential social dilemmas; Zheng et al. (2022), the AI Economist; agent-based computational economics (Tsfatsion & Judd, 2006).
Synthetic temporality	Post-2010 circuit breakers, speed bumps, kill switches in

Concept	Closest prior traditions and the residual novelty claim
	market microstructure regulation. Novel element claimed: generalization to a constitutional principle (right to human time).
Representation without comprehension	Matthias (2004), the responsibility gap; principal-agent theory; automation-bias literature. Novel element claimed: legitimacy focus rather than responsibility focus.
Automated negotiation	Rosenschein & Zlotkin, Rules of Encounter (1994); the automated-negotiation subfield of multi-agent systems; algorithmic trading as de facto machine negotiation. Novel element claimed: the sovereign mandate.
Governance of actor populations	Hammami (2026), endogenous Governor agents; Ostrom (1990) on commons institutions; Dafoe et al. (2020) on cooperative AI; mechanism design (Sandholm, 1999).
AI constitutionalism	Caputo (2026) on AI constitutions and constituent power — constitution of the actor; this thesis addresses the constitution of the system of actors. The two are complementary, not identical.

17. First stress-test families

Four stress-test families follow from the theory and are suitable for empirical or institutional development. Each is designed as a computational simulation with institutional interpretation — not a workshop exercise — following the design-and-theory precedent of agent-based governance research.

17.1 Synthetic Financial Crisis — 40 Seconds

A cross-jurisdictional credit cascade develops among autonomous actors faster than human supervision can respond. Tests liquidity controls, authority limits, revocation, circuit breakers, legal responsibility allocation and machine-speed lender-of-last-resort design.

17.2 The Forked Debtor (revised)

Run in two regimes. Regime one, principal-default: forking creates operational confusion but no new debtors; the test measures traceability of the mandate chain under mass replication. Regime two, liability shell: an actor-cluster carries a bounded patrimonial envelope; the test examines shell inheritance across forks, creditor protection during replication, and insolvency of a shell whose actor is restorable from backup. The contrast between regimes is itself the finding.

17.3 The Synthetic Border Crossing

An actor authorized in Jurisdiction A attempts a bounded economic action in Jurisdiction B. Measures whether identity, mandate, evidence, applicable law, data residency and accountability survive the crossing — and locates the precise point of authority failure.

17.4 Constitutional Runaway

An adaptive governance system modifies policy parameters faster than human institutions can review them. Examines amendment authority across the three constitutional layers, human-time constraints, auditability, and the boundary between delegated governance and constitutional change.

18. The first 30 frontier questions

These thirty questions are the first layer of the research programme; a separate document — The 100 Questions of the Synthetic Economy — will expand it across all branches and explicitly invite outside scholars to falsify, replace or extend them.

- 1.** What is the minimum condition for a digital system to become a synthetic actor in the economy?
- 2.** Can recognized agency exist permanently and stably without legal personhood?
- 3.** Who holds constituent power over a synthetic actor — and is it one power or a distributed stack?
- 4.** Which powers must remain legally non-delegable to synthetic actors?
- 5.** At what delegation depth, if any, does an original mandate cease to be traceable and binding?
- 6.** What makes a synthetic actor the same actor over time, given copying, restoration and retraining?
- 7.** What happens to mandate, reputation and shell obligations when an actor forks?
- 8.** What constitutes synthetic death, and who may declare it?
- 9.** What is synthetic succession — can mandates, shells or reputation be inherited?
- 10.** What is synthetic bankruptcy, and what is insolvency for a restorable entity?
- 11.** Can a synthetic actor delegate its mandate onward, and under which constraints?
- 12.** Can a synthetic actor create economically autonomous descendants, and who answers for them?
- 13.** What is synthetic labor, and who owns the value it creates?
- 14.** Is recognized executable authority a factor of production with measurable marginal product?
- 15.** Can compute or energy become reserve assets or settlement references of synthetic economies?
- 16.** What is synthetic money, and where is the boundary between an instrument and a permission?
- 17.** Can value and permission be constitutionally separated in programmable money?
- 18.** Who may create synthetic credit, and how is it observed and supervised?
- 19.** Who is lender of last resort in a machine-speed financial crisis — and may it be synthetic?

20. Which economic actions must be forced to slow to human time, and who decides?
21. Does a participant have a right to unprogrammed value?
22. Does a participant have a right to exit the synthetic financial system?
23. Where is the taxable presence of synthetic economic activity?
24. How is competition policy applied to coordination that emerges without agreement?
25. How is an economy measured whose transactions occur below the resolution of human statistics?
26. What is a synthetic border, and what is the minimum structure of cross-sovereign recognition?
27. When does a foreign synthetic mandate acquire legal meaning in another jurisdiction?
28. Can Lex Synthetica emerge — and be detected — before formal law recognizes it?
29. Who represents the public interest inside a synthetic economy, and who mandates and funds the critic?
30. Who has the authority to change the constitution of a synthetic economy — in each layer, and across them?

19. From thesis to field

The project is global from inception. No state is the author or owner of the field; jurisdictions become cases, pilots and comparative environments inside a common research programme. The staged architecture, re-ordered after the audit:

- Founding Thesis (this document) and a living prior-art map, maintained continuously and updated before any public v1.0 claim.
- Founding Critics Network: a small cross-disciplinary group invited to attack the framework — convened before broad publication, not after.
- The 100 Questions of the Synthetic Economy: the field formulated through unresolved questions rather than premature doctrine.
- Synthetic Economy Stress Lab: computational scenario methodology for central banks, regulators, banks and enterprises — the first commercial asset, generating data as a by-product of paid work.
- Synthetic Economy Atlas: cross-jurisdictional data accumulated from research and stress-test engagements — grown from the work, not built in advance.
- Synthetic Economy Readiness Index: comparative measurement only once the methodology is mature.
- World Synthetic Economy Assembly and, later, an Institute for the Synthetic Economy — institutionalized only after a real network, corpus and methodology exist.

20. Naming and attribution principles

The field should encourage use rather than restrict vocabulary. Category formation succeeds when other researchers adopt terms, test them and cite the originating framework; terminology is therefore offered openly with attribution rather than treated as proprietary language. At the same time, authorship and chronology are consistently documented: foundational materials carry the conceptual author, date of first formulation, version number and an AI-assistance disclosure.

Conceptual framework developed by Steven Alber. Date of first formulation: 30 August 2026. This attribution records the origin of the integrated framework; it does not claim exclusive authorship over earlier terms, technical standards or adjacent research traditions.

21. Closing thesis

The modern economy was built around human beings and legal entities as the primary bearers of intention, responsibility and authority; software was infrastructure. That distinction is dissolving. Autonomous digital systems are moving from informational assistance toward delegated action, and once action becomes economically meaningful, institutions must decide how it is constituted, constrained, financed, recognized and contested.

The Synthetic Economy is the proposed name for the political-economic order that follows. Its central object is not artificial intelligence in the abstract; it is delegated non-human economic agency at systemic scale. From that object follow constitutional power, identity and continuity, the economics of authority, money and credit, time, sovereignty, public accountability and — at the frontier — international order. These are not separate curiosities. They may be the institutional anatomy of one emerging system.

Many disciplines are describing the organs of an economic order built on delegated non-human agency. No one has yet theorized the organism — or decided who may constitute it.

This thesis does not attempt to close that question. It opens it — and, in this version, states the conditions under which it should be abandoned.

Appendix A — Vocabulary v0.2

Term	Working definition (v0.2)
Synthetic Economy	The emerging economic order in which autonomous digital actors acquire delegated capacity to act in the real economy.
Synthetic System	A technical system without implied institutional status.
Synthetic Actor	Base term: a non-human digital system with functional capability to perform economically meaningful actions autonomously.
Authorized Synthetic Actor	An actor holding a bounded mandate delegated by a person, organization or institution.
Recognized Synthetic Actor	An actor whose identity, mandate and actions counterparties or institutions accept, functionally or legally.
Synthetic Subject	Theoretical designation for the convergence zone of capability, mandate and recognition (tiers 3-4). Not a legal person.
Synthetic Legal Subject	Hypothetical future category: an actor on which a legal order confers independent legal subjectivity.
Synthetic Constituent Power	The distributed power to create, authorize and initially constrain a synthetic actor.
Functional Constitution of the Synthetic Economy	The foundational allocation of powers, limits, amendment rights and accountability among human institutions and synthetic actors in an economic system; comprises legal, institutional and protocol layers.
Legal / Institutional / Protocol Constitution	The three constitutional layers: constraints created by law; allocation of delegation and oversight authority among organizations; ex ante technical possibility and impossibility.
Lex Synthetica	Emergent norms produced by repeated interaction among synthetic actors before or beyond formal codification; successor concept to Lex Informatica and Lex Cryptographia.
Liability Shell	A bounded patrimonial envelope (fund, escrow, pool, wrapper, statutory vehicle) attached to an actor or cluster, creating partial patrimonial separation without legal personhood.
Principal-Default Regime	The default liability architecture: a synthetic actor is legally transparent, and consequences attach to its principal through the mandate chain.
Executable Recognition	Ex ante, machine-speed determination by infrastructure

Term	Working definition (v0.2)
	of whether a presented mandate is valid and sufficient for an action.
Economics of Authority	The study of recognized executable authority (A) as a scarce, priced, rentable factor of production: $Y = F(K, C, I, A)$.
Agency Capital	Recognized capacity to perform consequential actions across institutions or markets.
Synthetic Money	A monetary or settlement instrument whose usable economic authority is bound to synthetic identity, mandate and action limits — money as executable economic authority.
Synthetic Temporality	The study of constitutional and economic consequences of machine-speed action interacting with human-time institutions.
Right to Human Time	Proposed principle: certain consequential actions must not complete faster than meaningful human review is possible.
Right to Unprogrammed Value	Proposed monetary right to hold or exchange value whose future use is not entirely pre-authorized by a central policy engine.
Synthetic Public Sphere	The joint human-and-synthetic space for audit, criticism, contestation and public-interest challenge to synthetic power.
Synthetic Border	The point at which a synthetic actor's authority ceases to be recognized or changes legal meaning.
Synthetic Sovereignty	A jurisdiction's capacity to define, enforce and revise the conditions under which synthetic actors may act within its institutional domain.
Cross-Sovereign Synthetic Order (frontier domain)	Hypothesis-stage domain covering synthetic diplomacy and synthetic international relations, gated on the emergence of a recognition layer.
Representation without Comprehension	Legitimacy problem: humans formally authorize a synthetic representative but cannot meaningfully reconstruct the machine-scale process producing an outcome.
Synthetic Economy Stress Lab	Applied computational methodology for testing institutional resilience under synthetic-actor scenarios.

Appendix B — Research basis for v0.2

This is a working basis, not a final academic bibliography. A v0.3 research pass should verify all citations against primary sources and complete bibliographic details.

- Axelrod, R. (1984). The Evolution of Cooperation.
- Calvano, E., Calzolari, G., Denicolò, V., Pastorello, S. (2020). Artificial Intelligence, Algorithmic Pricing, and Collusion. American Economic Review.
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- Ostrom, E. (1990). Governing the Commons.
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- Rosenschein, J., Zlotkin, G. (1994). Rules of Encounter: Designing Conventions for Automated Negotiation among Computers.
- Sandholm, T. (1999). Distributed Rational Decision Making. In Weiss (ed.), Multiagent Systems.
- Tesfatsion, L., Judd, K.L. (eds.) (2006). Handbook of Computational Economics, Vol. 2: Agent-Based Computational Economics.
- Wright, A., De Filippi, P. (2015). Decentralized Blockchain Technology and the Rise of Lex Cryptographia.
- Zheng, S. et al. (2022). The AI Economist. Science Advances.
- “ALBER 2027 — Global Prior-Art & Strategic White-Space Investigation” (30 August 2026). User-supplied research dossier; provisional prior-art map, individual claims requiring independent verification before v1.0.
- Red-Team Audit of Founding Thesis v0.1 (30 August 2026). Adversarial AI-assisted audit; verdict and required changes incorporated into this version.
- Founding discussion and conceptual development led by Steven Alber, 30 August 2026, with AI-assisted adversarial analysis.

Appendix C — Change log v0.1 → v0.2

- Field claim restated: from “a new field is needed” to “delegated non-human agency at systemic scale creates phenomena that cannot be adequately

analysed as isolated principal-agent relationships” — with a dedicated chapter (Section 2) answering the “this is just agency law” objection through six phenomena: recursive delegation, dynamic authority, executable recognition, population effects, cross-sovereign authority, synthetic time.

- Terminology: Synthetic Actor becomes the base term; Synthetic Subject narrowed to a theoretical designation; a five-tier ladder of synthetic agency added (System → Actor → Authorized → Recognized → Legal Subject).
- Liability contradiction resolved: principal-default regime established as the default; Liability Shell introduced as a distinct institution; the Forked Debtor stress test rewritten to run in both regimes.
- “Constitution” disciplined: one definition (Functional Constitution) with three explicit layers — legal, institutional, protocol — and misalignment between layers identified as the characteristic constitutional pathology.
- Economic core added (Section 8): authority as a factor of production, $Y = F(K, C, I, A)$, with testable predictions; taxation, competition (including algorithmic collusion as established fact), distribution and human stakes, and measurement added as core objects.
- Synthetic Diplomacy and Synthetic International Relations demoted from full branches to a single hypothesis-stage frontier domain (Cross-Sovereign Synthetic Order), gated on the recognition layer.
- Prior-art map expanded (Section 16): agency law named as the closest tradition to the core concept; Lex Informatica / Code-is-law / Lex Cryptographia lineage acknowledged for Lex Synthetica; MAS Project Orchid purpose-bound money and purchasing-card stacks named for Synthetic Money; Calvano et al. for population effects; market circuit breakers for temporality; Matthias for representation without comprehension; Rosenschein & Zlotkin for automated negotiation; Castronova for the term itself.
- Claim tagging introduced: load-bearing propositions marked [FACT] / [INFERENCE] / [HYPOTHESIS] in the body text.
- Falsification criteria added (Section 15.1): four conditions under which the field claim should be weakened or abandoned, plus positive evidence conditions. Drafted for adversarial testing; wording subject to approval and refinement.
- Research architecture revised to ten core branches + frontier domain + meta-layer; Branch III renamed Economics of Authority.
- Frontier-question list renumbered correctly (1–30) and revised to reflect the new architecture (taxation, competition, measurement, delegation depth added).
- Field-building sequence re-ordered per audit: prior-art map and critics network before broad publication; Stress Lab as first commercial asset; Atlas grown from paid work; Index and Institute deferred.
- The Perplexity non-finding on cross-sovereign recognition retained but explicitly downgraded to a provisional non-finding of one dossier, flagged for independent re-verification before v1.0.