

The Republic of Entrepreneurs: Letters, Science, and the Civic Mechanics of Modern Prosperity

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This paper advances the idea of a republic of entrepreneurs — a spontaneous, rule-governed order in which many people repeatedly propose, test, and diffuse improvements — and argues that it is the main engine of modern prosperity. We braid this republic with the republic of letters and the republic of science, contending that open discourse, self-governed inquiry, and contestable enterprise reinforce one another to convert useful knowledge into useful industry. The analytical backbone integrates Cantillon’s functional entrepreneur, Mises’s economic calculation and residual claimancy, Hayek’s discovery procedure and dispersed knowledge, Kirzner’s alertness and equilibration, Mokyr’s Industrial Enlightenment and “market for ideas,” McCloskey’s rhetoric of bourgeois dignity, and Phelps’s grassroots dynamism. Historical cases — Britain, the United States, France, Germany, and biomedicine — show that breakthrough eras depended less on elite R&D and more on dense portfolios of small, decentralized experiments under general rules that kept feedback honest and imitation lawful. We contrast this republican view with outcome-targeting, elite-centric growth models, derive testable implications (proposal density, feedback speed, diffusion breadth), and sketch a policy stance that privileges general over discretionary rules, interoperability and open standards, reputation systems that make quality legible, and intellectual property that teaches while remaining finite. Reframing innovation as a civic practice explains both the magnitude and inclusiveness of the Great Enrichment and recommends “republic of entrepreneurs” as a term of art for growth and development economics.

Key Words: Republic of entrepreneurs; Republic of letters; Republic of science; Spontaneous order; Dispersed knowledge; Entrepreneurial discovery; Residual claimancy; Lawful imitation; Diffusion; Industrial Enlightenment; Bourgeois dignity; Grassroots dynamism; Open standards; Biomedicine; Institutions and growth.

JEL Classification Numbers: O31, O33, L26, O43, N10.

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1. INTRODUCTION: FROM LETTERS AND SCIENCE TO A REPUBLIC OF ENTREPRENEURS

Across roughly four centuries, modern prosperity has rested on a set of “republics” that coordinate human creativity without a commander: the republic of letters, the republic of science, and — our focus here — the republic of entrepreneurs. In each, dispersed people exchange ideas and experiments under general rules rather than centralized plans. Scholars mapped and debated across borders in the early modern Republic of Letters; scientists advanced knowledge by freely choosing problems while adjusting to one another’s findings; and in markets, ordinary men and women constantly spot opportunities, reorganize resources, and test new ways of doing things. Together these republics formed an ecosystem in which useful knowledge repeatedly became useful industry (Grafton 2009; Polanyi 1962; Hayek 1945, 1960, 1976, 1978; McCloskey 2010, 2016).

The Republic of Letters emerged in the seventeenth and eighteenth centuries as a loose, transnational network of correspondence, journals, and salons. Its distinctive feature was decentralized cooperation: no ministry told Bayle what to publish, no academy assigned Voltaire whom to write, and yet the exchange of letters and pamphlets built a common conversation that crossed confessional and political lines. Modern scholarship emphasizes this community’s rules of civility, criticism, and mutuality rather than hierarchy — a “virtual commonwealth” that persisted precisely because no authority could freeze it in place. Projects such as Stanford’s Mapping the Republic of Letters and surveys by Grafton and Waquet document its scope and self-governance (Grafton 2009; Waquet 2017).

Michael Polanyi later described an analogous order inside science — a “republic of science.” Scientists coordinate by “mutual adjustment of independent initiatives”: each chooses problems and methods, but peer criticism, replication, and professional standards keep inquiry cumulative. Polanyi explicitly compared this process to a market-like order, warning that attempts to direct science from the center would stifle discovery. His *Minerva* essay remains a classic statement of why free institutions are not luxuries but preconditions for progress in complex domains (Polanyi 1962).

Economists have shown that markets share the same logic. Hayek argued that no one can possess the dispersed knowledge needed to allocate resources well; prices compress local information and guide countless small adjustments. In this view, the economy is better seen as a *catallaxy* — a spontaneous order of exchange — than as a household with a singular purpose. General rules (property, contract, no fraud), not outcome targets, enable coordination and learning. The republic of entrepreneurs is the practical face of this epistemic insight: it empowers multitudes to act

on local hunches, then retains what works through profit-and-loss feedback (Hayek 1945, 1960, 1976, 1978).

Recent economic history deepens the picture. Mokyr's work on the Industrial Revolution argues that an ideological and cultural turn — toward the usefulness of knowledge, toleration of dissent, and esteem for tinkers and projectors — linked propositional science to workshop practice. Britain's "Enlightened economy," in his account, flourished because institutions and rhetoric encouraged circulation between savants and fabricants, making invention cumulative and commercialization probable. This is precisely what a republic of entrepreneurs looks like in the wild: porous boundaries between learned societies, shop floors, and investment (Mokyr 2002, 2009, 2016).

McCloskey locates the same inflection in a cultural revaluation of the bourgeoisie — a new dignity and liberty for innovators and merchants. When talk about enterprise turned respectful, people took more chances, formed more firms, and learned faster. Her trilogy documents how ideas about ethics and rhetoric, not only material endowments or state policy, unlocked the "Great Enrichment," a many-fold rise in incomes and capabilities since the nineteenth century. That diagnosis dovetails with a republic of entrepreneurs: widespread permission and honor for creative venture, not the rare genius granted a charter (McCloskey 2006, 2010, 2016; McCloskey 1985).

Phelps complements this with a modern growth lens: grassroots dynamism. In *Mass Flourishing* and later in *Dynamism*, he argues that broad-based innovation springs from ordinary people experimenting on the job — incremental tweaks, new methods, small startups — provided the culture prizes initiative and the legal order secures property and fair play. It is a bottom-up vision: prosperity arises when many are free to try and to err, not when a few are anointed to lead (Phelps 2013, 2020, 2023).

History supplies the texture behind these theses. Early industrial Britain did not innovate only in royal academies; it taught itself. Mechanics' institutes and mutual-improvement societies offered evening lectures, lending libraries, and hands-on science to artisans across Glasgow, Edinburgh, Manchester, and beyond (Inkster 1975; Jacob 1997). The Lunar Society of Birmingham gathered potters, chemists, instrument makers, and natural philosophers — Wedgwood, Priestley, Watt, Boulton, Erasmus Darwin — into a talk-and-tinker circuit that helped push ideas toward engines and processes. These were civic arrangements, not ministerial campaigns: citizens pooling curiosity and shop-floor craft under low formal barriers (Uglow 2002; Mokyr 2009).

The same pattern recurs later. The American "system of manufactures" — interchangeable parts, gauges, and flow — grew from workshops and armories iterating procedures that diffused across firms, not from a single

master plan (Hounshell 1984; Rosenberg 1982). Twentieth-century optics in Jena emerged from the Zeiss–Abbe partnership — science and shop practice entwined, with institutional rules (profit-sharing, a research foundation statute) designed to keep learning cumulative (Abbe 1899; Feldenkirchen 1994). Even the humble shipping container — a logistics revolution — came from a trucking entrepreneur’s gambit, then scaled through standard-setting and lawful imitation (Levinson 2006). These are episodes of a republic, not a court.

This paper develops that argument. We define the republic of entrepreneurs as the decentralized, rule-governed arena in which large numbers of people may spot opportunities, recombine knowledge, and test solutions — much as scholars and scientists do in their own republics. We contrast this with state-guided innovation models that overestimate what planners can know and underestimate the coordinating power of prices, peer scrutiny, and open entry. Following Hayek and Polanyi, we treat freedom not as an adornment but as an epistemic device; following Mokyr, McCloskey, and Phelps, we treat culture and rhetoric not as ornaments but as engines (Hayek 1945; Polanyi 1962; Mokyr 2002, 2016; McCloskey 2016; Phelps 2013).

Two clarifications orient the rest of the paper. First, acknowledging a republic of entrepreneurs does not deny the presence of standout figures — “captains of industry” or star scientists. It reframes them as citizens whose breakthroughs are made possible by shared languages, common tools, contestation, and imitation (Schumpeter 1942; Rosenberg 1982; Mokyr 2009). Second, recognizing the republics’ primacy does not entail a minimalist night-watchman mythology; it entails general, impersonal rules that let people plan, trade, and speak — while resisting outcome-targets that require discretionary control. The test, historically and today, is whether institutions preserve open entry, protect dissent, and keep feedback honest. Where they do, useful knowledge tends to become useful industry. Where they do not, even brilliant discoveries stall (Hayek 1960, 1976; Polanyi 1962; McCloskey 2010).

Finally, interest in these themes is hardly antiquarian. Contemporary debates about growth, innovation policy, and scientific governance return again and again to the same fundamentals: dispersed knowledge, freedom to try, and institutions that reward learning. It is fitting that leading analytical work has highlighted both cultural–institutional histories of innovation and formal models of creative destruction and endogenous technical change, renewing attention to how knowledge becomes prosperity when many minds and hands are free to participate (Aghion and Howitt 1992; Romer 1990; Aghion, Antonin, and Bunel 2021; Mokyr 2016; McCloskey 2016; Phelps 2020).

2. CANTILLON AND THE EARLY ARCHITECTURE OF A “REPUBLIC OF ENTREPRENEURS” (1755/2010)

Richard Cantillon’s *Essai sur la nature du commerce en général* (1755) is widely regarded as the first systematic treatise to place the entrepreneur at the center of the economic order. In the Saucier–Thornton English edition (2010), Cantillon presents a coherent theory in which market coordination arises from countless agents who commit to (relatively) fixed costs today and sell at uncertain prices tomorrow. This intertemporal exposure to uncertainty defines the entrepreneurial role and propels the entire circular flow — across farms and towns, workshops and trade routes — without recourse to a central chooser. In this sense, Cantillon anticipates later accounts of spontaneous order while supplying a precise micro-foundation: entrepreneurship is a function — bearing uncertainty and adjusting plans — rather than a personality type, and that function pervades production, distribution, and exchange (Cantillon 2010 [1755]).

Cantillon’s method is notable. The *Essai* proceeds by simple cause–effect reasoning (what later economists would call *ceteris paribus* analysis) that builds the economy “from the ground up” — from land and labor to villages and cities, and from barter to money and international trade. He distinguishes analytic “intrinsic value” from observable “market price,” then repeatedly explains how market prices fluctuate above and below intrinsic value as supply and demand vary in particular places at particular times. Far from treating intrinsic value as a policy target, he uses it as a conceptual benchmark to explain why profits attract entry and losses induce exit. Day-to-day coordination is entrusted to entrepreneurial judgment under uncertainty, not to maxims imposed from without (Cantillon 2010 [1755]; Spengler 1954).

2.1 Entrepreneurial function and the circular flow

Cantillon treats nearly every producing agent as entrepreneurial in function. Farmers who lease land at fixed rent and face volatile harvests and prices are entrepreneurs; town provisioners who contract for inputs at given costs and sell to uncertain demand are entrepreneurs; merchants who arbitrate between regions and seasons are entrepreneurs. What unifies them is the bearing of residual uncertainty: they stand last in line to be paid and therefore absorb the difference between realized sales and contracted costs. This conception breaks decisively with mercantilist inventories of “productive” versus “unproductive” occupations; what matters is not social status but whether one accepts the residual when conditions change. The *Essai* thereby sketches a republic peopled by innumerable entrepreneurs whose decentralized adjustments tend to equalize returns across activities and knit local markets into a coherent whole (Cantillon 2010 [1755]; Spengler 1954).

Cantillon's circular-flow chapters also offer a remarkably early general-equilibrium intuition. Landowners (as claimants on rent) set in motion demands that ripple through the system; farmers and town entrepreneurs organize production and provisioning; wage earners supply labor; and relative prices emerge from the interaction of place, time, and expectations. None of these magnitudes is centrally assigned. Instead, entrepreneurial arbitrage — in space (between regions), in time (between planting and harvest), and across qualities (grades of goods) — does the coordinating work. In modern language, profit opportunities signal plan discoordination; entrepreneurial action closes the gaps (Cantillon 2010 [1755]).

2.2 Value, price, and the discipline of competition

Cantillon's distinction between intrinsic value (rooted in land and labor used) and market price (the observed terms of trade) has sometimes been read as a forerunner of the classical "natural price." His text, however, is more supple and modern: market prices are set by the plenty or scarcity of goods in relation to money demand here and now; they oscillate around intrinsic value because entry follows profit and exit follows loss. The point is not that intrinsic value "rules," but that competitive, profit-seeking responses discipline price movements over time. The protagonist of this story is the entrepreneur, because only the entrepreneur accepts the residual that arises when volatile prices confront committed costs (Cantillon 2010 [1755]; Spengler 1954).

2.3 Money, non-neutrality, and the "Cantillon effect"

Cantillon's monetary analysis extends the entrepreneurial lens to money and credit. When the money stock changes, the sequence and location of injection matter: those nearest the new means of payment spend at pre-adjustment prices, while downstream receivers face higher prices before their own incomes have risen. Relative prices change unevenly; resources reallocate transiently; fortunes shift depending on position in the monetary network. This now-famous "Cantillon effect" is thus a general statement that money is non-neutral in the short to medium run because markets adjust through the concrete actions of entrepreneurs responding to local price signals. Even the monetary transmission mechanism is, in Cantillon's hands, an entrepreneurial process (Cantillon 2010 [1755]).

2.4 Space, settlement, and the economics of location

A striking feature of the *Essai* is its geographical realism. Cantillon explains the growth of towns, the pattern of settlement, and wage differentials through transport costs, market access, and risk — parameters that entrepreneurs observe and act upon. Market towns arise where traders can expect sufficient throughput to cover fixed costs; villages attach to estates where provisioning is efficient; wages are higher where the opportunity cost of labor is greater or where risk premia must be paid. Here again, the agent of adjustment is the entrepreneur who compares expected sale pro-

ceeds with known costs, including time and distance. The resulting spatial pattern is a composed order of innumerable private calculations (Cantillon 2010 [1755]).

2.5 Function over personality: entrepreneurship as a general social role

From Jevons onward, interpreters have praised Cantillon for defining entrepreneurship as a function — risk-bearing and plan adjustment — rather than a charismatic personality type. That move universalizes the role: small farmers, shopkeepers, carriers, and wholesalers all execute the same function in different contexts. The *Essai* thus foresees a society in which entrepreneurship is common and contestable: when profits appear, new entrepreneurs enter; when losses persist, they exit; when innovations reduce costs or improve quality, imitators diffuse them. The public consequence — without public design — is a rolling tendency toward better resource use given the information and opportunities at hand (Jevons 1879; Cantillon 2010 [1755]; Spengler 1954).

2.6 Influence and reception

Published posthumously in 1755 and largely neglected in the nineteenth century, the *Essai* was “rediscovered” by William Stanley Jevons, who famously called it “the cradle of political economy,” precisely because of its integrated treatment of value, money, population, and — above all — entrepreneurial coordination. Subsequent scholarship emphasized how Cantillon’s models foreshadow both classical and Austrian themes: cost-based intrinsic value paired with demand-driven market price, systematic partial-equilibrium reasoning, and — most distinctively — entrepreneurial risk-bearing as the pivot of the market process (Jevons 1879; Spengler 1954).

2.7 Why Cantillon belongs at the foundation of a “republic of entrepreneurs”

If the “republic” we defend is a spontaneous order in which many citizens repeatedly make proposals under uncertainty and are disciplined by feedback (profit/loss, entry/exit, imitation), Cantillon is its earliest cartographer. He shows that (i) the entrepreneurial role is ubiquitous wherever costs must be committed before sales are realized; (ii) prices emerge from concrete scarcities at particular times and places and are disciplined by competitive responses; (iii) money transmits information and incentives non-neutrally through the very order he describes; and (iv) space and institutions shape, but do not centrally direct, the pattern of settlements and trades. The *Essai* thus offers an analytical map of a society in which ordinary people — farmers, provisioners, carriers, retailers, exporters — continuously coordinate plans by accepting residual uncertainty. It is exactly the architecture one would expect if modern growth were driven not by a narrow caste but by a populous commonwealth of entrepreneurs (Cantillon 2010 [1755]; Jevons 1879; Spengler 1954).

3. MISES, HAYEK, AND THE EPISTEMIC–INSTITUTIONAL FOUNDATIONS OF A REPUBLIC OF ENTREPRENEURS

Ludwig von Mises and F. A. Hayek provide the two most influential twentieth-century arguments for why entrepreneurship is not a narrow vocation of a caste but a general social function made possible by a specific legal-cultural order. Their emphases differ — Mises’s is praxeological and centers on the preconditions of economic calculation; Hayek’s is epistemic and centers on dispersed, often tacit knowledge — but their conclusions converge: where general rules secure property, contract, and open entry, many people can step into the entrepreneurial role; where rules are absent or privileges dominate, the role thins to a minority sport and coordination falters (Mises 1949; Hayek 1945, 1960, 1976, 1978).

3.1 Mises: Entrepreneurship as the Universal Residual Function under Uncertainty

In *Human Action*, Mises places entrepreneurship at the heart of the market process via three linked claims. First, in a world of genuine (Knightian) uncertainty, all purposive action has an entrepreneurial aspect: actors form expectations about uncertain futures and choose means accordingly (Mises 1949). Second, in a private-property monetary economy, these expectations become commensurable through money prices, which make it possible to compare alternative production plans “in a common denominator” and thus to perform economic calculation (Mises 1949). Third, calculation hinges on residual claimancy: those who direct resources stand last in line to be paid; profits and losses accrue to them and thereby discipline their conjectures (Mises 1949).

On this account, “the entrepreneur” is not a sociological type but a functional role that anyone may occupy when bearing the residual — a shopkeeper ordering inventory, a farmer choosing crop rotations, a product manager allocating engineering time, a buyer contracting for inputs, or a founder assembling a new venture (Mises 1949). Mises’s analytical foil, the “evenly rotating economy,” clarifies the point: with uncertainty exhausted, profit and loss vanish and so does the entrepreneurial function; in the actual world, incessant change restores uncertainty, and profit and loss become indispensable report cards of plan validity (Mises 1949).

This logic underwrites Mises’s critique in the socialist calculation debate. Without private ownership of producer goods, there can be no market prices for them; without those prices, there is no way to express opportunity cost; without commensurability, planners cannot compare alternatives rationally. Calculation is not a computational hurdle to be leapt with more statistics; it is conceptually impossible absent the institutions that generate genuine market prices (Mises 1935). Crucially, this is not an argument for

the wisdom of a talented few but for open institutions that allow many to propose plans, observe price feedback, and reallocate resources — the unintended constitution of a “republic” of entrepreneurs (Mises 1935, 1949).

Mises also embeds entrepreneurship within “consumer sovereignty.” Producers conjecture; consumers accept or reject through purchases. Entrepreneurial authority is provisional: losses expel the plan; profits invite entry and imitation, which erode “innovation rents” over time. In our terms, the republic discriminates procedurally, not personally: it rewards plans that improve the satisfaction of strangers, not identities that hold titles (Mises 1949).

3.2 Hayek: Knowledge, Discovery, and the Case for General Rules

Where Mises stresses the necessity of monetary calculation, Hayek stresses the structure of knowledge. The facts relevant to resource allocation are dispersed across millions of minds, much of it tacit and context-bound — local scarcities, specific skills, fleeting opportunities, idiosyncratic valuations. The coordination problem is therefore not to solve a given set of equations but to mobilize information no single mind can possess (Hayek 1945). Market prices are indispensable not because they perfectly forecast the future but because they compress and communicate marginal information in a form actors can use without knowing its source, enabling the mutual adjustment of independent plans (Hayek 1945).

From this epistemic view, competition is best understood as a discovery procedure: rival plans are proposed, tested, and revised in light of price movements and profit-loss signals (Hayek 1978). The entrepreneur is paradigmatically the agent who advances a conjecture about an as-yet unexploited arrangement — new product attributes, a different bundling of inputs, a novel channel, a process tweak — and then learns from market feedback. Learning is not merely about demand size; it concerns which margins matter, which complementarities exist, and which bottlenecks bind. Discovery is local and sequential: one plan’s partial success opens or closes paths for others (Hayek 1978).

Hayek derives from this an associated jurisprudence. Only general, abstract, predictable rules — the rule of law — can support a high-energy discovery process, because only such rules let actors form plans without expecting discretionary interference. By contrast, outcome targeting (“sector X must have Y share,” “group A must receive Z percent of income”) implies continuous discretion and rule-by-men, which blunts initiative and politicizes payoffs (Hayek 1960, 1976). To preserve discovery, a polity must protect open entry (so new conjectures can be advanced), free exit (so failed conjectures are liquidated), and freedoms of speech and association (so criticism and imitation can diffuse what is learned) (Hayek 1960, 1976).

Although he does not use the phrase “republic of entrepreneurs,” Hayek’s term *catallaxy* — the order emerging from voluntary exchange under gen-

eral rules — captures the same idea: a spontaneous order, the product of human action but not of human design, coordinated by a dense mesh of local tests rather than by a single will (Hayek 1960).

3.3 Convergences and Differences: From Calculation to Discovery

The Mises–Hayek synthesis illuminates the constitution of an entrepreneurial republic along two complementary dimensions. Mises clarifies the logical preconditions of rational allocation — private ownership of producer goods, money prices, and residual claimancy — without which purposeful coordination of complex production is impossible (Mises 1935, 1949). Hayek clarifies the epistemic preconditions — general rules that allow decentralized discovery and bidirectional learning via prices and reputations (Hayek 1945, 1960, 1978). Together they explain why entrepreneurship is ubiquitous in well-ordered markets and rare where privileges, administered prices, or opaque discretion dominate.

There are instructive differences. Mises’s analysis is aprioristic and structural: without prices for capital goods, calculation is impossible regardless of computational prowess (Mises 1935). Hayek’s is evolutionary and processual: even in principle, the requisite information does not exist “in one place” to feed a planner’s algorithm; it is created by the very process of market experimentation (Hayek 1945, 1978). For Mises, prices make calculation possible; for Hayek, prices also generate knowledge by eliciting and aggregating responses. The upshot is a thicker sense of entrepreneurship: not only bearing uncertainty (Mises), but also creating and revealing facts (Hayek) that did not exist prior to the attempt.

3.4 Entrepreneurship, Imitation, and the Dissipation of Rents

Both frameworks imply a life cycle of entrepreneurial gain. A new combination that better serves consumers earns transient profit. That profit performs two social functions: it rewards correct conjecture and signals rivals to imitate or improve the plan. Because entry is lawful and capital is mobile under general rules, rivalry typically erodes the initial rent. In a republic, “captains of industry” are best seen as citizens with moments in the spotlight rather than as an elite caste: their status is conditional on continuing to make correct conjectures and is always contestable by others (Mises 1949; Hayek 1978).

This erosion is not a flaw; it is the mechanism by which private discovery becomes public wealth. In Misesian terms, profit performs its allocative function without becoming a permanent privilege (Mises 1949). In Hayekian terms, the discovery procedure avoids stagnation because the copying machine remains on, enabling diffusion and cumulative improvement (Hayek 1978). Policy that unduly protects incumbents — non-general exemptions, discretionary procurement, perpetual rights — converts a republic into a court, dampening proposal rates and slowing learning (Hayek 1960, 1976).

3.5 Rules, Not Blueprints: The Minimal Legal–Cultural Core

The institutional design implication is to specify rules of the game, not targets for the game. Mises's calculation argument implies secure property, alienability, and credible contract enforcement so that residual claimancy can be assigned and priced (Mises 1949). Hayek's discovery argument implies general, abstract, prospective law that curtails discretionary interference and leaves room for criticism, experimentation, and imitation (Hayek 1960, 1976). Public authority should not orchestrate outcomes; it should maintain the commons of legality in which private actors propose and learn. When this commons is intact, entrepreneurship scales socially: beyond occasional "founding leaps," a thick ecology of incremental proposals by employees, suppliers, retailers, clinicians, and coders aggregates into most productivity growth (Hayek 1960; Mises 1949).

3.6 The Republic Across Sectors: Beyond the Firm and the "Hero"

Because "entrepreneurship" is a functional role defined by residual claimancy (Mises) and conjectural discovery (Hayek), the republic extends inside organizations (intrapreneurship), between firms (supply-chain innovation), and across sectors (clinical protocols, process improvements, workflow redesign). What varies is not the logic but the cost of conjecture and the speed of feedback. Digital instrumentation, open standards, and modular contracting lower both, democratizing the role further. The more these costs fall, the more the system resembles a "grown order," rich in local experiments and rapid imitation (Hayek 1960, 1978).

This generality clarifies why hero-worship under-explains enrichment. Mises's residual-function and Hayek's discovery-procedure imply that most advances come from repeated, distributed, comparatively small conjectures that are easy to imitate and combine. The celebrated "captain of industry" is a vivid instance of a general rule, not its negation (Mises 1949; Hayek 1978).

3.7 Boundary Conditions and Failure Modes

The framework specifies failure modes. If property is insecure or contract enforcement erratic, residual claimancy is attenuated; entrepreneurial conjecture shrinks because the mapping from action to payoff is noisy (Mises 1949). If speech and association are chilled, criticism slows and imitation jams; discovery attenuates (Hayek 1960). If entry is blocked by privilege (licensing cartels, discretionary procurement), prices cease to communicate genuine alternatives; the discovery procedure degenerates into rent hunting (Hayek 1976, 1978). If policy shifts from rules to outcomes, the discretion needed to hit targets politicizes payoffs and reduces plan diversity — the fuel of discovery (Hayek 1976). In each case, the entrepreneurial role narrows to a few protected actors, reversing precisely the broad citizenship a republic seeks to cultivate.

3.8 Synthesis for the Present Argument

For the long-run narrative of 1600–2025, Mises and Hayek supply the foundational grammar of a “republic of entrepreneurs.” Mises explains why calculation requires private property, money prices, and residual claimancy, and why profit/loss are non-optional tests of plan validity (Mises 1935, 1949). Hayek explains why dispersed knowledge makes centralized guidance infeasible, why prices and reputations carry local information, and why only general rules keep discovery energetic and fair (Hayek 1945, 1960, 1978). Read together, they transform “entrepreneurship” from a mystique surrounding a handful of founders into a civic role that many people can — and do — occupy episodically throughout their lives. In this light, the “republic of entrepreneurs” is neither metaphor nor slogan; it names a spontaneous order in which residual bearing and conjectural discovery are widely distributed because law and culture make them safe enough to try and imitable enough to matter.

4. KIRZNER AND ENTREPRENEURIAL DISCOVERY: COMPETITION AS A CIVIC PROCESS

Israel M. Kirzner reframes entrepreneurship as a distinct coordinating function within the market process — neither routine management nor heroic disruption, but the alert discovery of previously overlooked opportunities (Kirzner 1973, 1979, 1985, 1989). In *Competition and Entrepreneurship* (1973) and *Perception, Opportunity, and Profit* (1979), he argues that the essential market dynamic is not optimization subject to known constraints but a rolling sequence of plan revisions prompted by profit-and-loss signals. The entrepreneur’s characteristic faculty is alertness — a praxic, non-ownable capacity to notice price–quality–place discrepancies and then act to exploit them. Because such opportunities arise from ignorance (unknown unknowns) rather than calculable risk, they cannot be generated by maximizing over a fixed opportunity set; they are found, not deduced (Kirzner 1979). This discovery picture turns “competition” from a comparative-statics condition (many price-takers) into a rivalrous learning process in which successive acts of discovery narrow the gaps between what is and what could be arranged to mutual benefit (Kirzner 1973, 1985).

Kirzner’s starting point is plan discoordination. At any moment, participants hold inconsistent expectations about future prices, qualities, and availabilities; some buy too little here despite low prices, others fail to sell there despite high valuations; complements remain idle because no one sees how to assemble them profitably. These errors reflect the dispersed and tacit nature of knowledge — a Hayekian theme that Kirzner internalizes by making ignorance constitutive of the initial condition (Hayek 1945; Kirzner 1973). The entrepreneur, on this view, notices that goods command a higher price across town than here, or that buyers care about an

attribute sellers neglect, or that two underutilized assets can be recombined into a saleable bundle. By acting — buying low/selling high, repackaging, repositioning, rebundling — the entrepreneur arbitrages discoordination away. The immediate private consequence is pure profit (a residual not attributable to additional factor inputs); the social consequence is an equilibrating movement: plans that were mutually inconsistent become more nearly compatible as prices, quantities, and product characteristics adjust (Kirzner 1973, 1979).

Two features of Kirzner's account are central to our "republic of entrepreneurs." First, entrepreneurship is a role, not a rank. Alertness is episodic and widely distributed: a shop clerk who relays a shelf to match traffic patterns, a buyer who spots a quality-adjusted bargain, a coder who rebundles open-source modules for a niche user, a clinician who repurposes a drug off-label after observing outcomes — all are entrepreneurial in Kirzner's functional sense. The threshold for citizenship in the market process is therefore low: one need only be free to try and to learn from feedback (Kirzner 1973, 1989). Second, profit has a justificatory meaning distinct from moral desert. In *Discovery, Capitalism, and Distributive Justice* (1989), Kirzner defends profit as a morally innocent — and socially useful — indicator that someone has corrected an error others held. Because the gain came from enabling trades that would otherwise not have occurred (or would have occurred on worse terms), it carries a public-good aspect even if privately pocketed and even if imitation later dissipates it (Kirzner 1989).

Kirzner's emphasis on equilibration addresses lacunae in both neoclassical and Schumpeterian narratives. Against the former, he rejects the picture of competition as already-satisfied first-order conditions around a known equilibrium; if opportunities are common knowledge, there is nothing to discover (Kirzner 1973). Against the latter, he does not deny novelty or "new combinations," but resists making disruptive innovation the sole locus of entrepreneurship (Schumpeter 1934, 1942). Much of what moves the productivity needle consists of mundane discoveries: noticing mispricings, eliminating bottlenecks, bundling complements, entering overlooked niches, translating dispersed signals across organizational boundaries (Rosenberg 1982; Kirzner 1985). In this respect, Kirzner's entrepreneur is the paradigmatic citizen of a spontaneous order: not necessarily an inventor or a top manager, but a noticer whose actions transmit information through prices and availability. Each discovery is often small; its social power comes from replicability and imitation (Hayek 1978; Kirzner 1985).

Alertness is not mystical. It is cost-conditioned and institution-dependent. Legal freedom of entry, credible contract, and reliable property delineations lower the cost of "peeking" into adjacent opportunity sets; prices and reputations supply the very clues that make noticing plausible ("why is the same

good dear there and cheap here?”). Advertising, far from being a social waste, reduces ignorance by making latent consumer interests and product attributes mutually visible; middlemen are not parasites but specialists in alertness, shrinking spatial and temporal gaps others do not perceive or cannot cheaply bridge (Kirzner 1973, 1979). Even the much-maligned copycat is, in this framework, socially valuable: imitation is the mechanism by which private discovery becomes public gain, diffusing the improvement and narrowing the profit wedge that originally signaled error (Hayek 1978; Kirzner 1989).

A distinctive epistemic claim follows: opportunities are not “objective lumps” lying on the ground awaiting pickup by any rational maximizer. They are intersubjectively emergent from the pattern of plans, institutions, and signals at a given moment. Before a discovery, there is no determinate fact that a specific recombination will be profitable; after the act, the market reveals that the agent’s hunch connected overlooked willingness-to-pay with overlooked capability-to-supply. In this sense, entrepreneurial discovery is constitutive of market knowledge (Kirzner 1979; Hayek 1945, 1978). That is why attempts to model entrepreneurship as choice among known lotteries miss the category: Knightian uncertainty is not poor risk measurement but the absence of a distribution altogether (Knight 1921; Kirzner 1979). What only action can reveal, calculus cannot supply.

Critiques press on two margins. Some Schumpeterians argue that Kirznerian discovery is too incremental to account for long-run growth, which they ascribe to creative destruction rather than arbitrage (Schumpeter 1942). Kirzner’s reply is not to deny disruptions but to insist that most welfare gains arise from the cleanup crew: cascading, decentralized adjustments that make breakthroughs affordable, reliable, and ubiquitous — the “republic layer” of millions of small corrections that does most of the compounding (Kirzner 1985). Others, from rational-expectations traditions, object that systematic profit from “noticing” should be quickly arbitrated away by Bayesian learners. Kirzner answers that ignorance is ineliminable and that “costly search” models miss the category: alertness is not search intensity but openness to surprise — a structure of attention shaped by institutions, culture, and experience (Kirzner 1979, 1985).

The policy implications reinforce a spontaneous-order constitution. Because discovery is fragile to discretion, regimes of outcome targeting and privilege (protected cartels, opaque licensing, discretionary procurement) raise the cost of noticing and lower the payoff to acting. Conversely, general rules — secure property, simple and predictable contract enforcement, open entry and exit, evenhanded bankruptcy — encourage alertness by tightening the link between action and residual (Hayek 1960, 1976; Kirzner 1973, 1989). Information infrastructures that increase visibility (public price quotes, quality registries, interoperable standards, truthful advertis-

ing) expand the surface area of discoverable discrepancies (Rosenberg 1982; Kirzner 1979). In Kirzner's idiom, good institutions maximize the volume of entrepreneurial "peeking" while minimizing the deadweight cost of error — precisely what a republic does.

Kirzner also clarifies the moral phenomenology of market success. Because pure profit originates in the removal of other people's errors rather than in exploitation, its ethical status is connected to voluntariness and openness. Where entry is open and prices are formed competitively, profit points to service rendered — to the discovery of a configuration others value but did not previously coordinate upon. Where privilege blocks entry or information is falsified, profit loses its justificatory link to discovery and becomes suspect. This contrast maps neatly onto our republic/court distinction: republic profits (earned under contestable rules) are *prima facie* socially informative; court profits (earned under favoritism) are not (Kirzner 1989; Hayek 1976).

Finally, Kirzner's framework illuminates why the line between "innovation" and "arbitrage" is often analytically thin. A new distribution channel, a different contractual form, a bundling of existing components — these are organizational "new combinations" that obey Kirznerian logic even as they resemble Schumpeterian novelty (Schumpeter 1934; Kirzner 1985). What matters for the civic story is that the barrier to participation is low. Because discovery is not predicated on laboratory science or large fixed capital alone, ordinary actors can repeatedly occupy the entrepreneurial role. A nurse who fixes a handoff failure, a machinist who redesigns a jig, a maintainer who refactors an open-source module — each narrows ignorance and aligns plans. In accumulation, such acts produce the mass flourishing emphasized by Phelps and the bourgeois dignity emphasized by McCloskey (McCloskey 2010, 2016; Phelps 2013, 2020). Kirzner supplies the micro-mechanism tying their cultural theses to everyday market operations: dignity and liberty shift attention, making alertness more common; institutions anchor feedback, making discovery more rewarding.

Thus Kirzner turns competition into a civic epistemology. Markets work because many people are free to notice, to propose, and to be copied. Profit and loss are not mere transfers but learning statistics — reports about where ignorance has been narrowed (Kirzner 1973, 1985). The figure we call a "captain of industry" is a vivid, but not unique, citizen of this order. In the long run, the republic accomplishes its work not through isolated leaps but through the ceaseless, decentralized correction of error — the everyday entrepreneurship Kirzner placed at the very center of economic life.

5. JOEL MOKYR: USEFUL KNOWLEDGE, INDUSTRIAL ENLIGHTENMENT, AND THE CIVIC ECOLOGY OF IMPROVEMENT

Joel Mokyr's scholarship supplies the historical backbone for a "republic of entrepreneurs" by showing that modern growth emerged where societies built institutions and cultures that made useful knowledge abundant, testable, and tradable — and where thousands of non-elite actors could apply that knowledge in workshop-scale experiments. In *The Lever of Riches* and especially *The Gifts of Athena*, Mokyr distinguishes between propositional knowledge (general statements about how nature works) and prescriptive knowledge (practical, recipe-like instructions). Sustained growth, in his account, arose when these two knowledge types were braided: propositional advances framed more powerful and reliable prescriptions, while the problems and failures of practice fed back into inquiry (Mokyr 1990, 2002). This reciprocal traffic — rather than a one-way pipeline from "scientist" to "inventor" — is precisely what a republic of entrepreneurs requires: a dense, open arena in which many actors can propose, test, criticize, and copy.

Mokyr's distinctive contribution is to relocate the "industrial revolution" from machines and factories to an epistemic revolution — what he calls the Industrial Enlightenment (Mokyr 2009). Baconian experimentalism, quantification, and a new esteem for "useful" truth created an environment in which projectors, artisans, instrument-makers, and natural philosophers interacted through learned societies, correspondence, prize essays, manuals, and exhibitions (Jacob 1997; Grafton 2009). The Royal Society's culture of public demonstration and replication; provincial clubs and coffeehouses; the Birmingham Lunar circle's talk-and-tinker exchanges; mechanics' institutes and cheap technical presses — these were not colorful backdrops but the infrastructure of improvement, lowering the cost of learning, widening the circle of competent proposers, and normalizing the publicness of method and result (Uglow 2002; Inkster 1976; Mokyr 2009). Put differently, the Industrial Enlightenment institutionalized the same sequence that defines a market order: propose → test → publish → imitate (Mokyr 2002, 2009).

Against explanations that lean heavily on relative prices (high British wages, cheap coal) or on singular "great men," Mokyr insists on a supply side of invention rooted in this cultural-institutional ecology. Relative prices mattered because they nudged choice among techniques; but without the epistemic base and the public machinery for search and error correction, inducements alone could not have yielded cascading improvements (Allen 2009; Mokyr 2009). His granular histories of steam, cotton, iron, and chemicals emphasize micro-inventions — innumerable small, often anonymous modifications that raised reliability, cut waste, eased maintenance, and

adapted devices to new contexts (Mokyr 1990; Rosenberg 1982). The star artifacts (the separate condenser, the mule, the puddling furnace) loom large in memory; yet their social payoff depended on a long tail of micro-improvements generated by foremen, millwrights, and instrument makers who could read a pamphlet, copy a fixture, or write to a correspondent for advice (Mokyr 2002, 2009). That is the empirical signature of a republic rather than a court: many hands, many small bets, coordinated by open criticism and lawful imitation.

Mokyr sharpens the analogy by describing a market for ideas. In *A Culture of Growth*, he argues that the early modern Republic of Letters exhibited competitive selection among explanatory programs: prestige, priority, and persuasion rewarded claims that withstood scrutiny and yielded useful predictions or tools (Mokyr 2016; Grafton 2009). Crucially, this market was transnational and only weakly policed by states; censorship and privilege could distort it, but no single authority could monopolize it (Jacob 1997). By linking this market for ideas to the market for techniques — through handbooks, prize questions, exhibitions, and the circulation of instruments — Europe generated a double selection: theories were selected for explanatory and instrumental power; techniques were selected for cost and performance. The two markets cross-validated one another's results and directed attention to bottlenecks worth attacking (Mokyr 2002, 2016). Such cross-validation presupposes republican conditions: freedom of entry into debate and enterprise, social respect for criticism, and institutions that pay for disclosure (priority rules, prizes, temporary patents) while leaving room for imitation and recombination (Mokyr 2009; Khan 2005, 2020).

On the demand side, Mokyr treats inventors' and entrepreneurs' upper-tail human capital not as formal schooling alone but as a composite of numeracy, instrument competence, and experimental habit. That composite was produced by heterogeneous channels — apprenticeship, self-study, evening lectures, and practical mathematics in Scottish and Dutch curricula — yielding a thick margin of capable tinkerers who could translate a chemical explanation into a dye-house protocol, a calorimetric estimate into boiler practice, or a geometrical insight into gear design (Mokyr 2002, 2009). The republic of entrepreneurs relies on that thickness: when the population of potential proposers is large and geographically diffuse, the probability that someone somewhere will try the next minor improvement rises sharply, and the learning curve steepens through parallel experimentation (Mokyr 1990, 2002).

Institutionally, Mokyr is neither naïvely minimalist nor dirigiste. He observes that general rules — secure property, credible contract, low barriers to entry, and freedom of movement and publication — were the essential safeguards for this ecology (Mokyr 2009, 2016). He is skeptical that targeted state direction can substitute for open search, because choice among

unknown techniques requires the very feedback mechanisms (prices, reputations, peer review) that republican orders provide (Polanyi 1962; Hayek 1945). Where governments did help — as with prize systems, standardization, or postal reforms — they did so by fortifying the commons on which voluntary exchange in ideas and artifacts depended (Jacob 1997; Mokyr 2009). Conversely, where privilege and censorship throttled criticism, or where guilds and mercantilist charters narrowed lawful imitation, the same scientific brilliance failed to translate into broad enrichment; the pipeline from propositional to prescriptive knowledge narrowed (Mokyr 2002, 2009; Picon 2004).

Mokyr's treatment of diffusion further aligns with a republican view. British and continental manufacturers learned by watching and copying, often via labor mobility, visiting tours, patent disclosures, and published specifications; far from lamenting imitation as theft, the Industrial Enlightenment normalized it as the last stage of invention (Mokyr 2009; Khan 2005, 2020). Temporary rights (patents) bought a window for first movers; the broader system relied on eventual public domain and on reputational gains from priority and disclosure (Khan 2005). This pattern made innovation contestable: rents from correct conjectures drew in rivals and suppliers, driving costs down and quality up (Hounshell 1984; Thomson 2009). Diffusion was not background noise; it was the social multiplication of insight — the way private discovery becomes public wealth. That multiplication works best when interfaces are simple and open (thread standards, interchangeable parts), so adopters can recombine modules without permission — another constitutional device that keeps proposal costs low and imitation legal (Hounshell 1984; Rosenberg 1982).

Finally, Mokyr's historiography helps discipline contemporary growth debates. Endogenous-growth models rightly capture purposeful investment in knowledge, but they underweight the civic metabolism — the millions of micro-trials through which techniques are adapted, complemented, and routinized (Rosenberg 1982; Mokyr 1990, 2002). The welfare gains of iconic breakthroughs arrive through this metabolism: the steam engine mattered because engine men, colliers, and machinists discovered how to cut coal per horsepower-hour; the factory mattered because supervisors and workers discovered flows, gauges, and tolerances; chemical dyes mattered because process engineers domesticated laboratory reactions at scale (Mokyr 2002, 2009). These are entrepreneurial acts in the functional sense — bearing uncertainty about a new arrangement, committing resources ahead of sales, accepting the verdict of profit and loss — and also republican acts: widely distributed, publicly discussable, and imitable (McCloskey 2010, 2016).

Hence, Mokyr justifies centering the republic of entrepreneurs by showing that modern growth is the emergent property of an open epistemic constitution joined to an open commercial constitution. The Republic of Let-

ters selected and publicized claims about nature; the Republic of Science validated methods and instruments; and the Republic of Entrepreneurs translated both into processes and products through decentralized conjecture, feedback, and copying (Polanyi 1962; Mokyr 2002, 2016). Where those republics coexisted and overlapped, useful knowledge repeatedly became useful industry; where they were severed or stifled, even first-rate ideas stalled (Mokyr 2009, 2016). The historical record, in Mokyr's telling, therefore vindicates a civic, non-elitist theory of enrichment: prosperity has been made, and is best preserved, by rules that let many propose and norms that honor useful talk and lawful imitation (McCloskey 2010; Phelps 2013, 2020; Mokyr 2016).

6. MCCLOSKEY'S RHETORIC, BOURGEOIS VALUES, AND THE GREAT ENRICHMENT

Deirdre Nansen McCloskey's project — stretching from *The Rhetoric of Economics* to the *Bourgeois* trilogy — offers perhaps the most sustained cultural-intellectual account of modern growth in economics and economic history. Two theses anchor the edifice. First, economics is not a purely deductive-statistical machine but a persuasive, argumentative practice whose claims stand or fall by the quality of their rhetoric — by analogy, narrative, and evidential judgment as well as by formal proof (McCloskey 1985). Second, the material ascent of the past two centuries — the “Great Enrichment” — was caused not mainly by capital accumulation, trade, geography, or even “institutions” narrowly conceived, but by a change in ideas: a mid- to late-eighteenth-century elevation of the dignity and liberty of “bourgeois” careers (trading, inventing, improving) that licensed ordinary people to “have a go” (McCloskey 2006, 2010, 2016). In short, the modern world arose from a shift in social valuation — a revolution in talk — that made innovation honorable, imitable, and therefore common (McCloskey 2016).

The rhetorical turn is programmatic. McCloskey argues that economists persuade one another with metaphors, exempla, appeals to authority, and judgments about plausibility; econometrics does not replace such devices, it cohabits with them (McCloskey 1985). The point is not to relativize truth but to humanize method: our inferences depend on tacit premises and linguistic craft, and the discipline's self-image should acknowledge this. That methodological humanism underwrites the trilogy's historical claims; because growth is a cultural achievement, the tools of culture — rhetoric, ethics, persuasion — belong at the center of explanation (McCloskey 2006).

Against standard materialist accounts of the Industrial Revolution, *Bourgeois Dignity* advances an explicit “method of residues”: lay out the candidates — high wages, coal, thrift, empire, property rights, science — and

show that each, important as it is, either predates the modern break or occurs elsewhere without comparable enrichment; what is left, on the evidence, is a change in ideas about betterment and, crucially, ideas about the people who better (McCloskey 2010). North Sea coal existed in China in different guise; thrift is widely practiced; property rights in land and craft are old; long-distance trade and empire are ancient. What was novel in northwestern Europe, she contends, was an egalitarian rhetoric of bourgeois dignity and liberty — “Scottish equality,” as she calls it — that made respectable the very activities generating continuous novelty and diffusion (McCloskey 2016). The trilogy’s capstone, *Bourgeois Equality*, presses the point: “ideas, not capital or institutions” in the usual narrow sense, enriched the world (McCloskey 2016).

The causal mechanism is both ethical and sociological. The *Bourgeois Virtues* argues that commercial society does not corrode the virtues so much as rehouse them: prudence becomes calculative foresight; justice becomes promise-keeping and contract; temperance becomes self-discipline in enterprise; courage becomes the willingness to bear commercial uncertainty; and even hope and love take civic forms in projects that serve anonymous others through exchange (McCloskey 2006). The bourgeois life, once despised by aristocratic or clerical elites, acquires public honor. This revaluation reduces the social and psychic cost of entry into innovative activity — not only for “captains” but for clerks, artisans, shopkeepers, and mechanics — so that small, imitable improvements rise in frequency. McCloskey’s label for the massed outcome is “trade-tested betterment”: the stream of novelties validated by voluntary uptake, sustainable only when talk about enterprise turns respectful enough to attract talent and to legitimate copying (McCloskey 2010).

Bourgeois Dignity and McCloskey’s essays on the Great Enrichment marshal quantitative and comparative evidence to establish the magnitude and timing of the break — on the order of a sixteen- to one-hundred-fold increase in real incomes since 1800, with cultural and scientific flourishing to match — and then to test rival hypotheses against that chronology (McCloskey 2010, 2016). “Coal and colonies” do not predict the Dutch Republic; high wages do not predict southern Europe; “good institutions” understood as low predation are necessary but not sufficient because they long predate the hockey-stick (Allen 2009; McCloskey 2010). What changed is the social permission structure around improvement: rhetoric and ideology that encouraged entry into the innovative vocation and protected dissent, criticism, and imitation. The argument is not anti-institutional; rather, it enlarges the institutional category to include a society’s rhetorical constitution — the status of merchants and mechanics, the esteem granted to tinkerers and projectors, the public scripts that praise or shame enterprise (McCloskey 2016).

A key implication concerns diffusion. Once dignity and liberty for innovators take rhetorical root, the supply of small, testable proposals increases and the copying machine switches on: competitors imitate what works; customers spread reputations; voluntary associations and the press publicize methods; the “republic of letters” and the “republic of science” furnish open exemplars and instruments (Polanyi 1962; Grafton 2009; Mokyr 2002, 2009, 2016). The result is a republic of entrepreneurs in our sense: a spontaneous order in which many agents propose, market feedback selects, and imitation turns private discovery into public productivity. McCloskey’s language is emphatic: what rose in the nineteenth century was not “trade itself” but trade-tested betterment, once the mass of people could have a go (McCloskey 2010, 2016). That formulation captures the civic, non-elitist character of modern growth and explains why the most visible “captains of industry” are best read as citizens who, for a time, assemble combinations that others soon normalize.

The trilogy’s cultural thesis connects tightly to McCloskey’s critique of empirical practice. With Stephen T. Ziliak, she argues that the dominance of null-hypothesis significance testing has led economists and allied fields to confuse statistical significance with economic significance, stifling substantive judgment about magnitudes, mechanisms, and context (Ziliak and McCloskey 2008). The “cult of $p < 0.05$,” by narrowing admissible argument, inadvertently sidelines the very kinds of historical and rhetorical evidence needed to evaluate long-run causal stories about innovation. Their remedy — estimate oomph, not merely p-values; integrate qualitative knowledge; attend to design and effect sizes — harmonizes with the trilogy’s insistence that culture and rhetoric are legitimate evidence when properly marshaled (Ziliak and McCloskey 2008; McCloskey 2010).

McCloskey has faced pointed criticism — from materialist economic historians who emphasize coal, wages, or imperial rents; from institutionalists who argue that formal constraints do the heavy lifting; and from political theorists who accuse her of underplaying power and distribution. The response, scattered across the trilogy and shorter essays, is twofold. Empirically, none of the rival variables displays the chronological exclusivity or cross-sectional reach required of a principal cause, whereas the timing of rhetorical liberalization does (McCloskey 2010, 2016). Analytically, the rivals are not rejected so much as subordinated: property rights, trade, and science are channels through which the rhetorical revolution flowed, not independent drivers of the torrent (Mokyr 2009, 2016). Ideas organized the selection environment — what counted as honorable, imitable, and fundable — and thus governed which material opportunities were taken up. On a historiographic standard of plausibility under multiple constraints, an ideational shock that legitimized bourgeois innovation remains a powerful, integrative hypothesis (McCloskey 2016).

For the purposes of this paper, the alignment with a republic of entrepreneurs is exact. The trilogy provides the cultural precondition — dignity and liberty for improvers — that turns entrepreneurship from a caste activity into a mass vocation (McCloskey 2006, 2010, 2016). The rhetorical lens shows why permissive talk and esteem for trade matter as much as formal law: the cost of entry into proposing falls; the psychic reward to experimentation rises; imitation becomes honorable rather than shameful; and criticism circulates in the public sphere to correct error (Polanyi 1962; Hayek 1945). Combined with the epistemic-institutional foundations described by Mises and Hayek, McCloskey's account explains not only why the modern world began when and where it did, but also why it has been self-replicating: once a society learns to praise shopkeeping and tinkering, it manufactures its own entrepreneurs (Mises 1949; Hayek 1945; McCloskey 2016). In this sense, the Great Enrichment is the long-run signature of a liberal rhetoric made operative — the cultural constitution of a republic in which everyone, at many points in life, is entitled and encouraged to try (McCloskey 2016).

7. PHELPS ON GRASSROOTS INNOVATION, DYNAMISM, AND THE LIMITS OF ELITE-R&D GROWTH MODELS

Edmund S. Phelps's recent trilogy — *Mass Flourishing* (2013), *Dynamism: The Values That Drive Innovation, Job Satisfaction, and Economic Growth* (with Bojilov, Hoon, and Zoega, 2020), and the intellectual memoir *My Journeys in Economic Theory* (2023) — argues that modern prosperity is propelled not by the stratagems of a scientific elite or a handful of corporate labs but by a broad social capacity for indigenous, everyday innovation. In Phelps's view, the decisive source of growth is a culture and set of institutions that enable ordinary people — workers, shopkeepers, engineers, clinicians, coders, and tinkerers — to form conjectures, try new methods, and receive quick, honest feedback (Phelps 2013, 2020, 2023). *Mass Flourishing* crystallizes the thesis: the countries that raced ahead did so because grassroots innovation became common — an outcome inseparable from values such as self-expression, individual initiative, and a taste for the new (Phelps 2013). *Dynamism* deepens the mechanism by linking such values to measurable differences in job satisfaction, innovation incidence, and economic performance across countries (Phelps et al. 2020). *My Journeys* situates this program in Phelps's long career, connecting early work on expectations and employment to a late emphasis on dispersed creativity and the good life at work (Phelps 2023). Together, these books supply the cultural-behavioral microfoundations of what we call a republic of entrepreneurs.

Two claims are central. First, innovation is endemically local, springing from felt problems and opportunities inside production and consumption rather than being handed down by a vanguard of PhDs (Phelps 2013). Hence the intensity of innovation covaries with “value climates” — norms of individualism, self-realization, and openness to novelty — that invite people to “have a go.” Dynamism advances this by assembling cross-national evidence tying such value patterns to indicators of innovative activity and to reported meaning at work, and by framing policy as reviving dynamism rather than subsidizing a few centers of excellence (Phelps et al. 2020). Second, the payoff to this cultural configuration is not only higher productivity but a richer experience of work — challenge, engagement, self-discovery — making dynamism both an economic and a humanistic good (Phelps 2013; Phelps et al. 2020). The portrait is explicitly anti-Schumpeterian in sociology: it is mass innovating, not elite disruption, that explains the long ascent of modern economies (contra Schumpeter 1934, 1942).

The intellectual stakes sharpen when Phelps is set against standard R&D-based endogenous-growth models. Romer (1990) and Aghion–Howitt (1992) capture an essential Schumpeterian truth — purposeful investment in ideas can drive growth — but operationalize innovation as the output of identifiable R&D “sectors” or frontier firms, often with patent-like rents and strong scale predictions. Phelps does not deny the importance of formal R&D; rather, he argues that such formalisms systematically underrepresent the texture of distributed trial-and-error by non-elite actors and the value climates that induce it (Phelps 2013, 2020). He reads “creative destruction” as a sectoral slice of a much thicker social process in which small improvements in methods, designs, organization, and adoption accumulate across millions of sites. Even within high-tech waves, many gains come from recombination, process refinement, and entrepreneurial “noticing” far from the research frontier — adjustments that often never pass through R&D budgets at all (Phelps 2013).

A second contrast is methodological. The objects Phelps seeks to explain — initiative, imagination, appetite for novelty — are shaped by rhetoric and norms as well as by pecuniary incentives. Dynamism therefore pairs economic indicators with measures of values and culture, arguing that high-dynamism societies display distinctive signatures of self-expression and individualism (Phelps et al. 2020). This is not cultural determinism but a claim about complementarities between values and institutions — property, contract, open entry, free association — that keep proposal costs low and feedback reliable (Phelps 2013, 2020). Where these complementarities are present, innovation rates are thick even outside formal labs; where they are absent, the state can pour funds into elite research with disappointing effects on broad prosperity or work satisfaction (Phelps et al. 2020).

Phelps has extended the program in essays and working papers on Europe's loss of innovation appetite, corporatist drifts that shield insiders from rivalry, and the ethics of work, reiterating that dynamism decays when discretion, privilege, or cartel-like arrangements blunt the link from local conjecture to personal and social reward (Phelps 2013, 2020). The through-line is consistent: policy can preserve the commons of legality, but only values and expectations generate the countless micro-proposals a flourishing economy needs.

Notably, Phelps's critique draws indirect support from anomalies in the growth literature itself. Early R&D models' "scale effects" implications — mechanically faster growth with larger populations or research staffs — prompted later revisions that reintroduced diffusion, adoption, and variety as constraints on productivity. For Phelps, these repairs underscore that knowledge production alone does not carry the growth burden; what matters at least as much is the social metabolism that tests and spreads ideas — an activity conducted by millions beyond the lab (Phelps 2013, 2020).

Economic historians have offered sympathetic readings. Joel Mokyr's review of *Mass Flourishing* in the *Journal of Economic Literature* interprets Phelps as recovering the humanistic and decentralized roots of modern growth: ordinary people came to view work as a domain for problem-solving and self-realization, and societies that dignified such striving reaped both material and experiential gains (Mokyr 2014). Even critics who prefer materialist accounts concede that Phelps widens the explanandum: if the aim is not merely income but meaningful work and widely distributed opportunity to innovate, elite-R&D models do not suffice (Mokyr 2014).

The policy corollaries are deliberately non-technocratic. In place of sectoral targeting or anointing "national champions," Phelps recommends renewing the enabling environment for mass experimentation: predictable general rules; contestable markets; low barriers to entry and exit; open standards and reputation systems that make quality legible to outsiders; civic education that cultivates imagination and responsibility at work; and cultural narratives that esteem discovery as a common vocation rather than a priesthood (Phelps 2013; Phelps et al. 2020). The challenge, in his telling, is to restore dynamism where it has ebbed — not by subsidizing a few research islands but by thickening the mainland of everyday initiative (Phelps 2020).

Thus Phelps supplies the cultural and experiential layer that our institutional analysis requires. If Mises and Hayek explain why general rules and price signals make a republic of entrepreneurs possible, Phelps explains why people want to inhabit that republic — why they step forward with proposals, accept the sting of loss when wrong, and savor the dignity of making useful novelties when right (Mises 1949; Hayek 1945; Phelps 2013). On this account, prosperity is not a trickle from a summit of research

labs; it is the compound return on millions of small acts of curiosity and initiative, undertaken because a society's values esteem such acts and its institutions keep the path open. That is why Phelps's trilogy matters: it turns "innovation policy" from a hunt for winners into a civic project — to protect and promote the mass, everyday creativity that makes a modern economy both productive and worth living in (Phelps 2013, 2020, 2023).

8. HISTORICAL CASE STUDIES — BRITAIN, THE UNITED STATES, FRANCE, GERMANY, AND BIOMEDICINE — SHOWING HOW THE REPUBLICS OF ENTREPRENEURS, LETTERS, AND SCIENCE REINFORCED ONE ANOTHER

Across roughly two and a half centuries, the engine of modern growth has rarely been a single inventor, a single ministry, or a single "mission." It has been the interplay of three open, overlapping republics: a republic of letters (epistolary and associational networks that diffused ideas across borders), a republic of science (self-governed communities of inquiry coordinated by priority, persuasion, and peer criticism), and a republic of entrepreneurs (decentralized tinkers, shops, and firms alert to opportunities). When these three republics coexisted and overlapped, discovery flowed into experiment, experiment into technique, and technique into scalable industry; where one or more were missing, first-rate knowledge often failed to translate into broad enrichment (Polanyi 1962; Goodman 1994; Grafton 2009; McCloskey 2016; Mokyr 2002, 2009).

In eighteenth- and nineteenth-century Britain, the braid is especially visible. Learned correspondence and priority contests in the Royal Society's *Philosophical Transactions* interacted with provincial clubs, coffeehouses, and instrument makers to produce what Mokyr terms the Industrial Enlightenment — a culture that prized useful knowledge and public demonstration, and that linked propositional claims about nature to prescriptive recipes on the shop floor (Jacob 1997; Mokyr 2002, 2009). The Birmingham Lunar circle — James Watt, Matthew Boulton, Joseph Priestley, Erasmus Darwin, Josiah Wedgwood — epitomized this crossing of domains: natural philosophers and mechanics met as equals, exchanging letters, specimens, trials, and puzzles that moved problems from principle to practice (Uglow 2002; Mokyr 2009). The same associational energy spread through mechanics' institutes and libraries in industrial towns, lowering the cost of technical literacy for artisans and apprentices (Inkster 1976). In that ecology it was "natural" for an ironmaster like John Wilkinson to apply precision boring to cylinders, making Watt's separate condenser commercially reliable; for Watt to consult Joseph Black on heat; and for improvements in instruments, fuelling, and materials to be disciplined rapidly by prices and reputations in competitive markets for engines, metals, ceramics, and

machine tools (Allen 2009; Rosenberg 1982; Mokyr 2009). The republic of letters (clubs, epistles, periodicals), the republic of science (open, priority-driven inquiry), and the republic of entrepreneurs (workshops and firms) thus formed a self-reinforcing ecology: adoption was rewarded by profit, disclosure by esteem and priority, and criticism by improved technique (Jacob 1997; Mokyr 2002, 2009; McCloskey 2010, 2016).

From the early republic to the Second Industrial Revolution, the United States adapted and extended this British ecology. Voluntary learned societies — Benjamin Franklin’s American Philosophical Society (1743) and, later, the Franklin Institute (1824) — explicitly aimed to promote “useful knowledge,” connecting literate inquiry to shop-floor problem-solving via exhibitions, lectures, and prizes (Grafton 2009; Hounshell 1984). Lyceum lectures, expanding public libraries, and inexpensive handbooks widened access to methods; and crucially, institutional rules lowered barriers to proposing: a liberal, relatively low-cost, examination-based patent system and thick markets for technology enabled “democratic invention,” allowing people of modest schooling to patent, sell, or license improvements and to finance further tinkering (Khan 2005, 2020). The same structure amplified telegraphy (organizational and coding choices around Morse), sewing-machine mass production and consumer-finance innovation (Singer’s installment plans and legal pooling), and the interchangeable-parts “American system” that migrated from armories to bicycles and automobiles (Hounshell 1984; Rosenberg 1982; Thomson 2009). The U.S. republic of entrepreneurs, then, was not a narrow club of “captains,” but a broad base of shopkeepers, machinists, millwrights, and specialists whose efforts were discoverable (journals, fairs), tradable (patents, licenses), and testable (competitive markets) (Hounshell 1984; Khan 2005, 2020; Thomson 2009). The same voluntary and legal infrastructures that sustained a republic of letters — cheap print, postal reach, associational life — also sustained a republic of science oriented to instrumentation and measurement, while the market’s openness kept entrepreneurial rents contestable, accelerating diffusion (Grafton 2009; Rosenberg 1982).

France highlights both the strength of elite science and the limits of progress when decentralized enterprise is thin — and the brisk gains when the two meet. The *république des lettres* in France was rich and cosmopolitan, and the *république des sciences* produced world-class theory, instrumentation, and technical elites through the *grandes écoles* and the engineering corps (Goodman 1994; Picon 2004). Yet the most catalytic episodes came when associational science reached artisans and manufacturers. The *Société d’Encouragement pour l’Industrie Nationale* (1801) deliberately diffused “useful arts” through prizes, exhibitions, and printed methods; Joseph-Marie Jacquard’s punched-card loom mechanized intricate weaving, a practical proto-programming that later inspired discussions

of automation; Nicolas Appert's canning stabilized the food supply for civilian and military uses; Claude Chappe's optical telegraph knit markets and administration before electromagnetism; and Jacques de Vaucanson's automata and tooling straddled entertainment, demonstration, and process innovation (Appert 1810; Bertho 1997; Essinger 2004; Wood 2002). In each episode, letters, journals, and societies supplied the public venue; experimental science supplied generalized principles; and entrepreneurs translated both into robust artifacts and routines on the workshop floor. The recurrent pattern is consistent with our thesis: where public channels for publication and imitation were open and respected, French science and engineering fed industry quickly; where privilege and centralized discretion dominated, the pipeline narrowed (Jacob 1997; Mokyr 2002; McCloskey 2010).

Germany presents a third pattern: the fusion of university science with firm-based research and craft competence, often institutionalized in place. The Jena triangle — Carl Zeiss (precision mechanics), Ernst Abbe (optical physics), and Otto Schott (glass chemistry) — created a model in which theory guided instrument design, while a foundation statute anchored the firm's obligations to research, workers, and the university, institutionalizing feedback loops from laboratory to market and back (Abbe 1899; Feldenkirchen 1994). In parallel, Werner von Siemens leveraged incremental improvements in telegraphy, insulation, and materials to scale an integrated electrical firm, blending scientific principles with system-building and manufacturing discipline (Feldenkirchen 1994; Bähr and Erker 2016). Germany's industrial chemistry illustrates how laboratory style supported systematic product innovation: the migration from coal-tar dyes to pharmaceuticals — culminating in aspirin (1899) — rode a research culture that connected bench work to plant-scale protocols, with patent and standards regimes that rewarded disclosure yet kept imitation ultimately lawful (Jeffreys 2004; Rosenberg 1982). German research towns, technical societies, and laboratory-based curricula thus linked the republic of science and the republic of entrepreneurs unusually tightly, with learned papers and patents often "living in the same buildings" (Abbe 1899; Feldenkirchen 1994; Bähr and Erker 2016).

Modern biomedicine makes the complementarity of the three republics especially clear. Insulin moved from discovery to mass therapy only through a braid of open science, voluntary disclosure, and entrepreneurial scaling: Banting, Best, Collip, and Macleod's Toronto work (1921–22) was rapidly industrialized when a private firm (Eli Lilly) and academic labs co-engineered process controls and quality standards, with priority, prizes, and publication rewarding disclosure and manufacturing know-how and capital rewarding execution (Bliss 1982). Penicillin followed the same pattern but at larger scale: Fleming's observation languished until Florey and Chain's

team turned lab yields into clinical quantities, while U.S. entrepreneurs, mobilizing deep-tank fermentation and process engineering, pushed output up and costs down by orders of magnitude during WWII — again a joint production of journals and conferences (letters and science) with disciplined plant innovation (entrepreneurs) (Bud 2007; Lax 2004). In medical devices, Earl Bakken (a local entrepreneur servicing hospital equipment) met a surgeon's practical demand and, with transistors and a craftsman's sensibility, built the first wearable pacemaker — a loop from bedside observation to bench circuitry to shop fabrication (Jeffrey 2001). Dialysis evolved from Kolff's wartime "washing-machine kidney" to routine therapy through an open, cumulative stream of improvements by clinicians, engineers, and small manufacturers, coordinated by journals and clinical societies (Blagg 2007). The recent Nobel recognition for mRNA-based vaccines crowned decades of laboratory science (e.g., nucleoside modification to reduce innate immune activation) that translated into population-scale impact only via entrepreneurial platforms capable of rapid trials and precision biomanufacturing (Weissman and Karikó 2005). Finally, oral rehydration therapy (ORT) — a glucose-salt mixture whose physiologic logic was refined in field trials in South Asia — diffused through journals, WHO programs, and community training to save tens of millions of lives: a paradigmatic low-cost, high-diffusion innovation carried by open science and local initiative rather than centralized direction (Nalin and Cash 1970; Waterlow and Gill 1991). In all these biomedical episodes, the republic of science (priority, peer criticism), the republic of letters (journals, guidelines, conferences), and the republic of entrepreneurs (labs, startups, clinics, manufacturers) were complements, not substitutes (Bliss 1982; Bud 2007; Jeffrey 2001; Nalin and Cash 1970; Waterlow and Gill 1991).

The synthesis across cases suggests a general lawlike regularity. When ideas move freely through letters and print; when inquiry is self-governed by professional norms rather than central dictates; and when entry is open so that anyone attentive to signals can try, err, and scale, societies repeatedly convert useful knowledge into useful industry (Polanyi 1962; Mokyr 2002, 2009; McCloskey 2010, 2016). Britain's voluntary institutions tied philosophers to fabricators; America's associational life and liberal patent rules widened the circle of effective tinkers; France's learned societies and prize systems made artisans conversant with cutting-edge principles; Germany's lab-workshop fusion institutionalized the science-shop loop; and biomedicine's century of lifesaving confirms that even esoteric breakthroughs depend on open diffusion and decentralized execution to change the world (Jacob 1997; Hounshell 1984; Essinger 2004; Feldenkirchen 1994; Bliss 1982). The republics thrive together — or stagnate apart. Where censorship, privilege, or discretionary control narrows publication or entry, knowledge fails to compound into broadly shared prosperity; where

rules and rhetoric protect open criticism, lawful imitation, and contestable rents, a populous republic of entrepreneurs turns local insight into general enrichment (Mokyr 2016; McCloskey 2016; Phelps 2013, 2020).

9. CONCLUSION: WHY THE “REPUBLIC OF ENTREPRENEURS” BELONGS AT THE CENTER OF GROWTH AND DEVELOPMENT

This study has argued that modern prosperity is best explained not by a court of heroes or a clerisy of laboratories but by a republic of entrepreneurs — a spontaneous order in which many people, under general rules, are free to propose better ways of doing things, to be tested by prices, adoption, and peer criticism, and to be copied when they are right. The term is not a flourish. It names a real institutional-cultural configuration that recurs across time and place, and it integrates disparate literatures — Cantillon’s functional entrepreneur, Mises’s calculation and residual claimancy, Hayek’s discovery procedure and dispersed knowledge, Kirzner’s alertness and equilibration, Mokyr’s Industrial Enlightenment and “market for ideas,” McCloskey’s dignity for the bourgeois life, and Phelps’s grassroots dynamism — into a single, empirically anchored account of how useful knowledge becomes useful industry (Cantillon 2010; Mises 1949; Hayek 1945, 1978; Kirzner 1973, 1979, 1985, 1989; Mokyr 2002, 2009, 2016; McCloskey 2010, 2016; Phelps 2013, 2020; Polanyi 1962).

Three propositions summarize the justification. First, entrepreneurship is a role, not a rank. The decisive acts in a modern economy — spotting a mispricing or unmet need, recombining known parts into a new bundle, rearranging a workflow, translating a bench result into a process that yields — are performed by a great many people who, at that moment, bear uncertainty and accept feedback. A founder of a celebrated firm is one vivid citizen of this order; so is the machinist who improves a jig, the nurse who redesigns a handoff, the coder who packages an open-source module for neglected users, or the agronomist who localizes a technique for a new climate. The republic exists when entry is open, imitation is lawful and honored, criticism can circulate, and failure is survivable — conditions supplied by secure residual claimancy, contestable markets, and freedom of association and speech (Mises 1949; Hayek 1960; Kirzner 1989).

Second, the republic of entrepreneurs is not self-standing; it is braided with the republic of letters and the republic of science. Open correspondence, journals, and voluntary associations made practical knowledge legible to non-elites; self-governed science produced public methods and instruments; enterprise translated both into routines that scale. This braid accounts for the distinctive texture of modern growth: the passage from conjecture to demonstration to diffusion to industry. The pattern is visible

in the early modern Republic of Letters and its norms of priority and civility, in Polanyi's self-coordinating "republic of science," and in the Industrial Enlightenment's fusion of propositional with prescriptive knowledge (Waquet 2017; Grafton 2009; Polanyi 1962; Mokyr 2002, 2009). It also explains why historical counterexamples — societies that produced brilliant discoveries without broad enrichment — share the same missing link: criticism chilled, imitation stigmatized or blocked, or entry hedged with privilege (Mokyr 2016; McCloskey 2016).

Third, the republic explains measured prosperity better than rival frames. Models that seat innovation primarily in elite R&D sectors capture part of the story, but they underweight the social metabolism — the millions of incremental proposals, process improvements, and adoption decisions that compose most productivity growth. "Creative destruction" remains a useful metaphor for step innovations, yet the long-run enrichment is a function of how many citizens can try, how quickly errors are revealed and corrected, and how widely successes are copied — features emphasized by histories of micro-invention, diffusion, and organizational learning (Schumpeter 1942; Rosenberg 1982; Mokyr 1990; David 1990). This reframing brings diffusion, complements, and adoption from the periphery to the center and accords with the record of Britain's Industrial Enlightenment, America's associational ecosystem, France's prize-driven "useful arts," Germany's lab-workshop fusion, and biomedicine's bench-to-bedside-to-factory braid (Hounshell 1984; Jacob 1997; Feldenkirchen 1994; Bliss 1982; Bud 2007).

The term "republic" carries jurisprudential weight. It points to rules, not rulers. What sustains high-energy discovery is not state targeting of outcomes but a commons of legality: secure property and alienability, credible contract enforcement, freedom of entry and exit, and freedoms of speech and association. These rules do not dictate who should win; they ensure that many can try and that the tests are honest (Hayek 1960, 1978; Mises 1935, 1949). The contrast is not between "government" and "market" as abstractions but between two constitutional styles: a republican style, which applies general rules and respects lawful imitation, and a courtly style, which privileges incumbents, politicizes payoffs, and lowers the social return to noticing. The first thickens entrepreneurship into a civic practice; the second thins it into patronage (Hayek 1976; Kirzner 1989).

Because the republic is a civic order, culture matters. McCloskey's thesis — that dignity and liberty for makers and traders unleashed the Great Enrichment — gives the mechanism by which rules become habits: when talk about enterprise turns respectful, more people step forward; when imitation is honorable, copying accelerates; when criticism is safe, error correction speeds (McCloskey 2010, 2016). Phelps adds the experiential dimension — curiosity at work, appetite for novelty — which helps explain why some apparently well-institutionalized places nonetheless lose

dynamism: if the cultural script prizes security, status, or credentialed deference over self-authorship and exploration, the proposal rate falls even without overt predation (Phelps 2013, 2020). Mokyr shows that the Industrial Enlightenment's open "market for ideas" — linking propositional science to prescriptive shop-floor know-how via letters, societies, cheap print, and instruments — enabled multitudes of ordinary artisans and tinkers to act as effective entrepreneurs, thereby explaining how a republic of entrepreneurs repeatedly turns useful knowledge into useful industry (Mokyr 2002, 2016; Grafton 2009; Waquet 2017).

If the concept is to become a popular term in growth and development, it must generate testable predictions and useful measurements. It does. The framework predicts, for example, that (i) productivity growth covaries with indicators of proposal density (new product and process introductions, not merely patents), feedback speed (lead times, defect-discovery cycles, A/B iteration cadence), and diffusion breadth (standard adoption, interfirm quality spillovers); (ii) places with open standards and voluntary consortia show faster complement discovery and thus higher returns to general-purpose technologies; and (iii) shocks that lower the cost of proposing (open-source platforms, modular supply, permissive IP within finite terms) raise the rate of small improvements and the pace at which frontier ideas become ordinary tools (Bresnahan and Trajtenberg 1995; David 1985; Khan 2020; Benkler 2006; Raymond 1999). These can be operationalized: track adoption curves of standards and interfaces, organization-level learning rituals, supplier churn and co-development depth, replication and negative results in science and engineering, and real-time telemetry of product iteration. The "invisible half" of growth — process and organization — becomes visible when we look where the republic actually works (Womack, Jones, and Roos 1990; Liker 2004; Ohno 1988).

The framework also offers a discipline for policy that avoids both dirigiste hubris and laissez-faire incuriosity. It does not ask the state to choose winners; it asks civic and commercial actors to keep interfaces open and tests fair. Practical implications follow: prefer general over discretionary rules; privilege interoperability and open standards where network effects are strong; defend contestability in procurement and licensing; design intellectual property to teach first-movers' methods while ensuring expiry and scope that invite entry; protect reputation systems from manipulation; invest in measurement infrastructures that make quality legible to outsiders; and cultivate learning clubs — meetups, maker spaces, morbidity-and-mortality conferences, code forges — where criticism is cheap and proposals are frequent (Hayek 1960; Khan 2020; Benkler 2006; Raymond 1999).

For development economics, the republic of entrepreneurs clarifies why capital deepening, schooling years, or imported blueprints so often underperform: without permission to experiment and means to imitate, knowl-

edge does not diffuse, complements do not accumulate, and general-purpose technologies remain curiosities (Mokyr 2002; Phelps 2013; Bresnahan and Trajtenberg 1995). The agenda is therefore wider and humbler than “build a lab” or “pick a cluster.” It is to secure law for strangers, esteem for the shop and the stall, open passage for criticism, and a civic rhetoric that praises useful novelty even when it comes from the wrong address. Where those preconditions arise — in Lagos maker circles, Nairobi fintech, Shenzhen factories, or Pune medical-device shops — the republic forms itself (McCloskey 2016; Phelps 2020).

The normative case is also plain. A society in which many can be entrepreneurs episodically — at different moments of a life, on different scales — distributes agency as well as income. It makes room for ordinary daring and converts disappointment into information rather than stigma. It dignifies work by making improvement part of the job. In such a society, the “captain of industry” is not an overlord but a neighbor who happened to be right before others were — whose rents are receipts for usefulness and invitations to imitate, not charters for privilege (Kirzner 1989; McCloskey 2006; Mises 1949). We should talk this way because it is truer to how prosperity actually happens and because it directs admiration to the civic conditions that let many people try.

For all these reasons, “republic of entrepreneurs” should be a central term in our analytical and policy vocabularies. It subsumes the insights of price theory, innovation studies, and economic history into a single grammar; it travels across sectors and scales; it yields predictions and measurements; it respects freedom without romanticizing heroism; and it equips development practice with a feasible, liberal agenda. From the seventeenth-century coffeehouse to the twenty-first-century code review, from the workshop lathe to the bioreactor, the modern world has been built by citizens proposing, testing, and copying under fair rules. To name that achievement a republic is not metaphor but description. To keep it is our constitutional task.

REFERENCES

- Abbe, Ernst, 1899. On the Aims and Organization of Scientific Work at the Zeiss Works. (Reprinted in various collections.)
- Adler, Paul S., 1993. Time-and-Motion Regained. *Harvard Business Review* **71**(1), 97–108.
- Aghion, Philippe, and Peter Howitt, 1992. A Model of Growth through Creative Destruction. *Econometrica* **60**(2), 323–351.
- Aghion, Philippe, Céline Antonin, and Simon Bunel, 2021. The Power of Creative Destruction. Cambridge, MA: Harvard University Press.
- Allen, Robert C., 2009. The British Industrial Revolution in Global Perspective. Cambridge: Cambridge University Press.

- Appert, Nicolas, 1810. *L'art de conserver les substances animales et végétales*. Paris: Patris.
- Arrow, Kenneth J., 1951. *Social Choice and Individual Values*. New Haven: Yale University Press. (2nd ed., 1963.)
- Bähr, Johannes, and Paul Erker, 2016. *The Siemens Entrepreneurs: Continuity and Change in the Era of Globalization*. New York: Routledge.
- Benkler, Yochai, 2006. *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven: Yale University Press.
- Blagg, Christopher R., 2007. The Early History of Dialysis for Chronic Renal Failure in the United States: A View from Seattle. *Seminars in Dialysis* **20**(3), 193–197.
- Bliss, Michael, 1982. *The Discovery of Insulin*. Chicago: University of Chicago Press. (Rev. ed., 2007.)
- Böhm-Bawerk, Eugen von, 1889. *The Positive Theory of Capital*. London: Macmillan.
- Bresnahan, Timothy F., and Manuel Trajtenberg, 1995. General Purpose Technologies 'Engines of Growth'? *Journal of Econometrics* **65**(1), 83–108.
- Bud, Robert, 2007. *Penicillin: Triumph and Tragedy*. Oxford: Oxford University Press.
- Cantillon, Richard, 1755. *Essai sur la nature du commerce en général*. London (posthumous).
- Cantillon, Richard, 2010. *An Essay on Economic Theory*. Trans. Chantal Saucier; ed. Mark Thornton. Auburn, AL: Ludwig von Mises Institute.
- Chandler, Alfred D., Jr., 1977. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, MA: Harvard University Press.
- David, Paul A., 1985. Clio and the Economics of QWERTY. *American Economic Review* **75**(2), 332–337.
- David, Paul A., 1990. The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox. *American Economic Review* **80**(2), 355–361.
- Essinger, James, 2004. *Jacquard's Web: How a Hand-Loom Led to the Birth of the Information Age*. Oxford: Oxford University Press.
- Feldenkirchen, Wilfried, 1994. *Siemens, 1847–1900: The Rise of a Global Enterprise*. Columbus: Ohio State University Press.
- Fontaine, Olivier, S.M. Garner, and A. Bhan, 2007. Oral Rehydration Therapy: The Simple Solution for Millions of Children. *BMJ* **334**(7593), s14–s15.
- Goodman, Dena, 1994. *The Republic of Letters: A Cultural History of the French Enlightenment*. Ithaca, NY: Cornell University Press.
- Grafton, Anthony, 2009. *Worlds Made by Words: Scholarship and Community in the Modern West*. Cambridge, MA: Harvard University Press.
- Hayek, F. A., 1945. The Use of Knowledge in Society. *American Economic Review* **35**(4), 519–530.
- Hayek, F. A., 1960. *The Constitution of Liberty*. Chicago: University of Chicago Press.
- Hayek, F. A., 1976. *Law, Legislation and Liberty, Vol. 2: The Mirage of Social Justice*. Chicago: University of Chicago Press.
- Hayek, F. A., 1978. Competition as a Discovery Procedure. In *New Studies in Philosophy, Politics, Economics and the History of Ideas*, 179–190. Chicago: University of Chicago Press. (Orig. 1968, German.)

- Heskett, James L., W. Earl Sasser Jr., and Leonard A. Schlesinger, 1997. *The Service Profit Chain*. New York: Free Press.
- Hilt, Eric, 2007. When Did Ownership Separate from Control? Corporate Governance in the Early Nineteenth Century. *Journal of Economic History* **67**(2), 353–386.
- Hounshell, David A., 1984. *From the American System to Mass Production, 1800–1932*. Baltimore: Johns Hopkins University Press.
- Inkster, Ian, 1975. Science and the Mechanics' Institutes, 1820–1850: The Case of Sheffield. *Annals of Science* **32**(5), 451–474.
- Jacob, Margaret C., 1997. *Scientific Culture and the Making of the Industrial West*. New York: Oxford University Press.
- Jeffrey, Kirk, 2001. *Machines in Our Hearts: The Cardiac Pacemaker, the Implantable Defibrillator, and American Health Care*. Baltimore: Johns Hopkins University Press.
- Jeffreys, Diarmuid, 2004. *Aspirin: The Remarkable Story of a Wonder Drug*. London: Bloomsbury.
- Jevons, William S., 1879. Richard Cantillon and the Nationality of Political Economy. *Contemporary Review* **34**, 67–87.
- Khan, B. Zorina, 2005. *The Democratization of Invention: Patents and Copyrights in American Economic Development, 1790–1920*. Cambridge: Cambridge University Press.
- Khan, B. Zorina, 2020. *Inventing Ideas: Patents, Prizes, and the Knowledge Economy*. New York: Oxford University Press.
- Kirzner, Israel M., 1973. *Competition and Entrepreneurship*. Chicago: University of Chicago Press.
- Kirzner, Israel M., 1979. *Perception, Opportunity, and Profit*. Chicago: University of Chicago Press.
- Kirzner, Israel M., 1985. *Discovery and the Capitalist Process*. Chicago: University of Chicago Press.
- Kirzner, Israel M., 1989. *Discovery, Capitalism, and Distributive Justice*. Oxford: Basil Blackwell.
- Knight, Frank H., 1921. *Risk, Uncertainty and Profit*. Boston: Houghton Mifflin. (Reprint: Chicago: University of Chicago Press, 1971.)
- Lamoreaux, Naomi R., and Kenneth L. Sokoloff, 1999. Inventors, Firms, and the Market for Technology in the Late Nineteenth and Early Twentieth Centuries. In Naomi R. Lamoreaux, Daniel M. G. Raff, and Peter Temin, eds., *Learning by Doing in Markets, Firms, and Countries, 19–60*. Chicago: University of Chicago Press.
- Landes, David S., Joel Mokyr, and William J. Baumol, eds. 2010. *The Invention of Enterprise: Entrepreneurship from Ancient Mesopotamia to Modern Times*. Princeton, NJ: Princeton University Press.
- Lax, Eric, 2004. *The Mold in Dr. Florey's Coat: The Story of the Penicillin Miracle*. New York: Henry Holt.
- Levinson, Marc, 2006. *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger*. Princeton, NJ: Princeton University Press.
- Liker, Jeffrey K., 2004. *The Toyota Way*. New York: McGraw-Hill.
- McCloskey, Deirdre N., 1985. *The Rhetoric of Economics*. Madison: University of Wisconsin Press. (2nd ed., 1998.)

- McCloskey, Deirdre N., 2006. *The Bourgeois Virtues: Ethics for an Age of Commerce*. Chicago: University of Chicago Press.
- McCloskey, Deirdre N., 2010. *Bourgeois Dignity: Why Economics Can't Explain the Modern World*. Chicago: University of Chicago Press.
- McCloskey, Deirdre N., 2016. *Bourgeois Equality: How Ideas, Not Capital or Institutions, Enriched the World*. Chicago: University of Chicago Press.
- Mises, Ludwig von, 1935. Economic Calculation in the Socialist Commonwealth. In F. A. Hayek, ed., *Collectivist Economic Planning*, 87–130. London: Routledge. (Trans. of 1920 essay.)
- Mises, Ludwig von, 1949. *Human Action: A Treatise on Economics*. New Haven: Yale University Press.
- Mokyr, Joel, 1990. *The Lever of Riches: Technological Creativity and Economic Progress*. New York: Oxford University Press.
- Mokyr, Joel, 2002. *The Gifts of Athena: Historical Origins of the Knowledge Economy*. Princeton, NJ: Princeton University Press.
- Mokyr, Joel, 2009. *The Enlightened Economy: An Economic History of Britain, 1700–1850*. New Haven: Yale University Press.
- Mokyr, Joel, 2014. A Flourishing Economist: A Review Essay on Edmund Phelps's *Mass Flourishing: How Grassroots Innovation Created Jobs, Challenge, and Change*. *Journal of Economic Literature* **52**(1), 189–196.
- Mokyr, Joel, 2016. *A Culture of Growth: The Origins of the Modern Economy*. Princeton, NJ: Princeton University Press.
- Nalin, Dilip R., and Richard A. Cash, 1968. Oral or Nasogastric Maintenance Therapy for Cholera in Adults. *The Lancet* **292**(7569), 370–373.
- Ohno, Taiichi, 1988. *Toyota Production System: Beyond Large-Scale Production*. Portland, OR: Productivity Press.
- Phelps, Edmund S., 2013. *Mass Flourishing: How Grassroots Innovation Created Jobs, Challenge, and Change*. Princeton, NJ: Princeton University Press.
- Phelps, Edmund S., with Raicho Bojilov, Hian Teck Hoon, and Gylfi Zoega, 2020. *Dynamism: The Values that Drive Innovation, Job Satisfaction, and Economic Growth*. Cambridge, MA: Harvard University Press.
- Phelps, Edmund S., 2023. *My Journeys in Economic Theory*. New York: Columbia University Press.
- Picon, Antoine, 2004. *French Architects and Engineers in the Age of Enlightenment*. Cambridge, MA: MIT Press.
- Polanyi, Michael, 1962. The Republic of Science: Its Political and Economic Theory. *Minerva* **1**(1), 54–73.
- Rae, John, 1834. *Statement of Some New Principles on the Subject of Political Economy*. Boston: Hilliard, Gray.
- Raymond, Eric S., 1999. *The Cathedral and the Bazaar*. Sebastopol, CA: O'Reilly.
- Romer, Paul M., 1990. Endogenous Technological Change. *Journal of Political Economy* **98**(5), S71–S102.
- Rosenberg, Nathan, 1982. *Inside the Black Box: Technology and Economics*. Cambridge: Cambridge University Press.
- Say, Jean-Baptiste, 1803. *Traité d'économie politique*. Paris: Deterville.

- Schumpeter, Joseph A., 1934. *The Theory of Economic Development*. Cambridge, MA: Harvard University Press. (Trans. of 1911 ed.)
- Schumpeter, Joseph A., 1942. *Capitalism, Socialism and Democracy*. New York: Harper & Brothers.
- Smith, Adam, 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations*. London: W. Strahan and T. Cadell.
- Spengler, Joseph J., 1954. Richard Cantillon: First of the Moderns. *Journal of Political Economy* **62**(4), 281–295.
- Thomson, Ross, 2009. *Structures of Change in the Mechanical Age: Technological Innovation in the United States, 1790–1865*. Baltimore: Johns Hopkins University Press.
- Uglow, Jenny, 2002. *The Lunar Men: The Friends Who Made the Future 1730–1810*. London: Faber & Faber.
- Waquet, Françoise, 2017. The Republic of Letters. In Victoria Moul, ed., *A Guide to Neo-Latin Literature*, 242–257. Cambridge: Cambridge University Press.
- Weissman, Drew, and Katalin Karikó, 2005. Suppression of RNA Recognition by Toll-Like Receptors: The Impact of Nucleoside Modification and the Evolution of Vaccines. *Immunity* **23**(2), 165–175.
- Womack, James P., Daniel T. Jones, and Daniel Roos, 1990. *The Machine That Changed the World*. New York: Rawson Associates.
- Wood, Gaby, 2002. *Edison's Eve: A Magical History of the Quest for Mechanical Life*. New York: Alfred A. Knopf.
- Ziliak, Stephen T., and Deirdre N. McCloskey, 2008. *The Cult of Statistical Significance: How the Standard Error Costs Us Jobs, Justice, and Lives*. Ann Arbor: University of Michigan Press.
- Zilsel, Edgar, 1942. The Sociological Roots of Science. *American Journal of Sociology* **47**(4), 544–562.
- Zou, Heng-fu, 2018. *The Republic of Entrepreneurs*. CEMA Working Paper No. 686. China Economics and Management Academy, Central University of Finance and Economics (Beijing).
- Zou, Heng-fu, 2025. *The Republic of Entrepreneurs: A Critique of Schumpeter on Entrepreneurs, Innovation, and Cycles*. Working paper.