

Channels of Power in Production Networks: A Taxonomy for Measuring Technological Dependence

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Abstract. Measuring technological dependence requires knowing every way one actor in a production network can move another, and the measurement traditions each carry a partial list: trade economics sees supply, corporate-control studies see equity, the coercion literature sees law, platform economics sees distribution, and the soft channels through which markets are actually steered day to day, analyst gatekeeping, standards authorship, narrative and expectation management, training and certification pipelines, the governance of open-source commons, and lobbying, are studied in separate literatures that the measurement work rarely touches. This paper assembles the complete formal list. Fifteen channels in three families, distinguished by what they act on: operation channels act on the feasibility and cost of running a technology stack today (supply, technology and licensing, operational service, data and identity, distribution, legal reach); structure channels act on who exists and who controls what (equity, capital, competence supply); cognition channels act on what buyers consider, believe, and know how to do (evaluation gatekeeping, standards authorship, narrative, epistemic formation, commons governance, rule shaping). Each channel is specified by its mechanism, timescale, observables, formal slot, and literature anchor. The formal thesis is that the cognition family drives a wedge between three option sets that measurement must keep apart: the feasible options that exist, the considered options that enter decisions, and the exercised options that revenue keeps alive; because unexercised options decay, consideration capture today becomes feasibility collapse tomorrow, which is how soft power turns hard without any actor ever denying anything. Applied to the European digital stack, the taxonomy shows which channels the existing measurement already covers, which are quantifiable next and how, and why sovereignty audits that ignore the cognition family systematically overstate the breadth Europe actually has. The schema is domain-portable: nothing in it is specific to digital technology.

JEL: F52, L14, D85, L86, D83, O33. **Keywords:** dependence, production networks, soft power, industry analysts, standards, expectations, skills, open source, lobbying, measurement.

1. Introduction

Whether Europe, or any actor, is technologically dependent is a question about a network: nodes that produce, and relations through which one node can move another. Every serious attempt to measure such dependence begins, usually implicitly, with a list of the relations that count. The list is where the blind spots enter. Count only ownership and the licensed-stack venture looks sovereign. Count only supply and the analyst office that writes the shortlists looks like commentary. Count only law and the training pipeline that produces ten thousand engineers fluent in one vendor's stack looks like education. Each omission is invisible from inside the resulting measurement, because a channel left off the list produces no anomaly in the channels that remain.

This paper's job is the list. It is written for a measurement programme on the European digital stack, whose companion papers build a 49-category dependency graph, a formal calculus of coercion and diversification on such structures, and a registry of how control of European firms changes hands; but the list itself is general, and Section 6 states the protocol by which it can be applied to any domain where production is networked and control is contested.

Three requirements discipline the exercise. Completeness: the taxonomy must encompass every way one node influences another that has appeared in the programme's evidence, including the soft-power channels, the Gartner-type evaluation offices, the vendor training and certification funnels,

the conference keynote and the hype cycle, the maintainer seats in nominally open projects, that practitioner experience insists on and measurement work routinely drops. Formal placement: each channel must be assigned a precise role in the formal machinery (does it change what is feasible, what it costs, what is chosen, or what exists), because a channel without a formal slot cannot produce a number. And observability: each channel must come with observables and a measurement protocol, because a channel without observables produces only rhetoric.

The organizing result is a three-family structure with a formal thesis attached. Operation channels act on the running of a stack today and enter the statics: the cut calculus and the graded dependence operator of the companion theory paper. Structure channels act on the network itself, on who exists and who controls what, and enter the dynamics. Cognition channels, the soft-power family, act on none of these directly: they act on what buyers consider, expect, and know how to do. Their formal role is a wedge between three option sets that must be kept apart: the feasible set (what exists), the considered set (what enters decisions), and the exercised set (what revenue keeps alive). The wedge is where soft power lives, and it compounds: because unexercised options decay, a channel that removes an option from consideration today removes it from feasibility tomorrow, without any actor ever refusing to sell anything. Section 3 states this mechanism; Section 4 gives the fifteen channels; Section 5 maps them to the literatures; Section 6 gives the application and portability protocol.

2. Primitives

The underlying object is the programme's multiplex production network: nodes are actors or actor categories (producers, buyers, intermediaries, jurisdictions, commons); the load-bearing relation is dependency (production requires an input) with its distribution counterpart (reaching users requires a channel); and control is recorded per node and per channel as the set of actors able to act on that node through that channel. A buyer's position is summarized by three quantities from the companion theory paper: the option number N (how many controller-disjoint ways of operating exist), the coercion number κ (how small a coalition can cut every way of operating), and the exit cost E (the price of re-routing away from an adversary). A channel, in this paper's sense, is a typed relation with an action semantics: what, exactly, can the actor at one end do to the actor at the other, and which component of the formal machinery does that action touch.

3. The formal thesis: three option sets and the wedge

Let the **feasible set** of a buyer at a layer be the options that exist and could be operated: the set the theory paper's N is computed on. Let the **considered set** be the subset that actually enters the buyer's decision process: what survives the analyst shortlist, the integrator's practice, the procurement framework's eligibility rules, the default. Let the **exercised set** be what is actually bought and run: what receives the revenue.

The statics of dependence are properties of the feasible set. The decisions that shape markets are made on the considered set. And the future feasible set is a function of the exercised set, because options are maintained by exercise: a supplier that wins no revenue exits, a fork that attracts no maintainers rots, a skill that no employer demands stops being taught. This last link is the use-it-and-lose-it mechanism of the programme's dynamics work, and it closes a loop that gives the cognition channels their power: an actor that controls consideration controls, with a lag, feasibility itself. Nothing needs to be denied; the unconsidered option merely starves. The wedge between feasible and considered breadth is therefore a measurable quantity with predictive content, and it is the quantity that every audit which counts existing suppliers, including this programme's own coercion and option numbers, silently omits. The taxonomy exists so that any such omission is a stated choice, never an accident. The thesis is falsifiable at the programme's next measurement step: for the layers whose feasible sets are already measured (cloud, productivity), the prediction is that

European procurement shortlists will contain strictly fewer controller-independent options than the measured feasible sets; shortlists that track the feasible sets would refute the wedge's relevance at those layers.

4. The fifteen channels

Each channel below is specified by mechanism (what the controller can do), formal slot (what it changes: feasibility, cost, structure, consideration, rules), timescale, observables with their measurement status in the European-stack programme, and literature anchor. Table 1 summarizes.

Family I: operation channels

These act on the running of a stack today. They enter the cut calculus (a controller can deny) and the graded operator (a controller can condition or reprice), and they compose along dependency paths.

1. Physical supply. Provision of components, materials, equipment, and manufacturing capacity; denial is a stop-shipment, conditioning is allocation and pricing power. Slot: feasibility and cost, statics. Timescale: immediate to months, with rebuilding horizons of decades at the deepest layers. Observables (measured): the dependency spine of the 49-category graph; capacity shares; the materials-and-fabrication floor on which every computed coercion number of the programme rests. Anchor: production-network economics [Acemoglu, Carvalho, Ozdaglar and Tahbaz-Salehi 2012; Baldwin, Freeman and Theodorakopoulos 2023].

2. Technology and licensing. Provision of software, designs, patents, and the update channel; denial is license termination or update cutoff, conditioning is roadmap control, feature gating, and license repricing. The sovereign-wrapper ventures depend on this channel by construction; the CUDA ecosystem's EULA fences are its purest fence. Slot: feasibility and cost, statics; the update channel makes it continuous rather than transactional. Observables (measured): licensed-stack relations; EULA terms; repricing episodes (the 2022 suite increases, the VMware repricing). Anchor: switching costs and lock-in [Farrell and Klemperer 2007; Arthur 1989].

3. Operational service. Continuous provision of running services: hosting, SaaS, managed operations. Distinct from technology because the dependence renews every billing cycle and the provider holds the running state; exit requires migration, which is where the programme's measured exit costs live. Slot: cost, statics; the layer where conduct regulation (egress rules, switching articles) acts. Observables (measured): market shares (about 70 percent US hyperscaler share of European cloud), egress-fee history, migration episodes (Schleswig-Holstein's 44,000 mailboxes), and the macro receipt: prices on Europe's locked cloud-and-software base, 400 billion euros a year of spend, rising 8.7 percent annually over the last three years [Asterès 2026]. Anchor: the same lock-in economics, plus the applied companion's exit-cost evidence.

4. Data and identity. Custody of the buyer's data and control of authentication and identity infrastructure. Data gravity is an exit cost multiplier; identity is a chokepoint class in the measured graph (no non-US category-level option). Slot: cost and feasibility, statics. Observables (measured): identity-layer control; data-boundary architectures; (protocol) data-egress volumes and schema lock as exit-cost components. Anchor: switching costs; the coercion semantics of custody [Farrell and Newman 2019].

5. Distribution and market access. Control of the paths through which a producer reaches users: app stores, marketplaces, payment rails, pre-installation defaults. Denial is delisting; conditioning is the platform tax and ranking. This channel points upward (at producers) where channels 1-4 point downward (at buyers), and the same integrated firms often hold both directions. Slot: feasibility and cost, statics. Observables (measured): the distribution categories and their control in the 49-node

graph; platform commission rates. Anchor: platform and two-sided-market economics; weaponized interdependence for the denial case [Farrell and Newman 2019].

6. Legal reach. The channel that operates through the others: a jurisdiction compels or forbids actions by actors it can reach, giving it controller status on nodes it does not own. Typed in the programme as data-access (compelled disclosure), supply-denial (export controls and their extraterritorial extensions), and conduct (market rules). Slot: statics, as an overlay that adds controllers to nodes; its exercise probability is a separate parameter. Observables (measured): the reach edges of the graph (fourteen US-reached categories against three EU and two Chinese); exercised episodes (the AI Diffusion caps and their reversal). Anchor: weaponized interdependence [Farrell and Newman 2019]; geoeconomics [Clayton, Maggiori and Schreger 2026].

Family II: structure channels

These act on the network itself: which nodes exist and who controls them. They enter the dynamics; the statics take their output as given.

7. Equity and governance. Acquisition of ownership and board control: outright purchase, private-equity buyout, creeping stakes; resisted by governance locks. The companion registry's acquisition and buyout mechanisms run through this channel (its listing and infrastructure-deal mechanisms belong to channels 8 and 2-3): on the programme's 125-firm universe, a lock is associated with survival as European in 89 percent of resolved cases against 55 without, and no locked firm was acquired against its will. Slot: structure (control transitions), dynamics; its resting state, who owns what now, is the controller attribution the operation channels' statics read, which makes this the family's dual citizen. Timescale: transactional, with irreversible effect. Observables (measured): the capture registry and universe. Anchor: the corporate-control network [Vitali, Glattfelder and Battiston 2011] made dynamic.

8. Capital and funding. Financing relations that shape who exists and on whose stack they build: venture funding with its default technology choices, cloud credits, compute-for-equity arrangements in which the incumbent takes a stake in its own customer, subsidy programmes. Slot: structure (entry, exit, orientation of new nodes), dynamics. Observables (measured in part): the funding overlay of the graph (a single hyperscaler's announced sovereign-cloud investment at roughly six and a half times the flagship public programme); documented compute-for-equity cases; (protocol) systematic coding of term sheets' infrastructure conditions. Anchor: the programme's capture loop; industrial-policy economics [Juhász, Lane and Rodrik 2023].

9. Competence supply. The channel the regulation itself names: a stack nobody local can operate is an option in name only, which is why SecNumCloud defines operational autonomy as maintainability from the provider's *own competences* or two third companies. Talent pipelines, engineer immigration, and operational know-how determine which options are feasible for whom. Slot: dual: a feasibility precondition in the statics (an option without local competences drops out of the feasible set) and a stock variable in the dynamics (pipelines fill or drain it). Observables (protocol): competence stocks per layer, hiring-market depth, the operational-autonomy assessments qualification already performs. Anchor: human-capital economics; the regulatory text itself [ANSSI 2022].

Family III: cognition channels

The soft-power family. These act on consideration, belief, and know-how: none denies anything, and jointly they steer what the operation channels will be allowed to do tomorrow. Their formal slot is the wedge of Section 3, plus rule-setting.

10. Evaluation gatekeeping. Intermediaries whose assessments define the considered set: industry-analyst quadrants and their procurement-annex afterlife, benchmark suites, certifiers and auditors, system integrators and resellers whose practices carry a default vendor list, and procurement frameworks' eligibility criteria. The mechanism is shortlist authorship: an option absent from the quadrant, the integrator's practice, or the framework's annex is feasible and unconsidered. Slot: consideration, with rule-like force where frameworks are binding. Observables (partly measured): the programme's own certificate analysis (the Cloud Sovereignty Framework's grades are public evaluation gatekeeping, measured); (protocol) longitudinal analyst-quadrant composition versus market entry, integrator practice inventories. Anchor: the sociology of industry analysts [Pollock and Williams 2016]; institutional isomorphism [DiMaggio and Powell 1983].

11. Standards and interface authorship. Writing the specifications others must implement: formal standards bodies, de facto interface control, reference implementations. Authorship yields agenda control over what interoperability means; an open ISA (RISC-V) versus a licensed one is the difference between a commons and a channel-2 dependence. Slot: rules and long-run feasibility. Observables (partly measured): the standards-bodies node and substrate codings of the graph; (protocol) authorship and editorship shares in the relevant bodies. Anchor: the economics of compatibility standards [Farrell and Saloner 1985; David and Greenstein 1990].

12. Narrative and expectations. Storytelling at industry scale: keynotes, hype cycles, total-cost-of-ownership studies, fear-uncertainty-doubt campaigns, trade press and conference agendas, developer influencers. The mechanism is expectation management: adoption under increasing returns rewards whoever convinces the market which future is inevitable, so the story is itself an investment with returns. Slot: consideration and defaults; in the dynamics, expectations coordinate the equilibrium selected. Observables (protocol, with one market-scale receipt already on record: near 60 percent of surveyed European organizations rate the productivity gains of the AI features bundled into recent price rises as theoretical [Asterès 2026], the expectations channel monetized): narrative prevalence in trade and procurement discourse over time, sponsorship flows to conferences and media, and their lead-lag against adoption. Anchor: narrative economics [Shiller 2019]; the sociology of expectations [Borup, Brown, Konrad and Van Lente 2006]; soft power as attraction [Nye 2004].

13. Epistemic formation. What gets taught as normal: university curricula built on donated stacks, vendor certification funnels that credential careers on one ecosystem, documentation and developer-relations quality as habit formation. Slower than narrative and stickier: it installs the default in people. Slot: consideration (defaults) and, through channel 9, the future competence stock, which makes it the compounding member of the family. Observables (protocol): curriculum content shares, certification-holder populations per ecosystem, developer-survey defaults. Anchor: normative isomorphism [DiMaggio and Powell 1983]; the programme's vendor-certification-funnel category.

14. Commons governance. Influence inside nominally open resources: maintainer seats, foundation boards, release engineering, roadmap stewardship of open-source projects and open datasets. Open substrates are the programme's standing options, and this channel is how a standing option can be steered without being owned; the MariaDB fork shows the commons resisting capture, and governance influence is the channel on which that resistance depends. Slot: consideration and long-run feasibility of the commons options; a structure channel in slow motion. Observables (protocol, sources to be selected with the programme lead): maintainer and committer affiliations, foundation funding and board composition, release-cadence control. Anchor: open-source economics and governance [Lerner and Tirole 2002; O'Mahony and Ferraro 2007]. A dedicated paper on this channel is planned separately in the programme.

15. Rule shaping. Action on the rules the other channels run under: lobbying of legislators and regulators, revolving doors, think-tank and research funding, participation weight in consultations. Distinct from channel 6, which is reach *through* existing law; this is authorship of the law to come. Slot: rules, dynamics. Observables (measured): the influence overlay of the graph (465, 288, and 218 high-level Commission meetings for the three US hyperscalers against 44 for the largest EU provider); (protocol) consultation-response and funding-flow coding. Anchor: regulatory capture [Stigler 1971]; epistemic communities [Haas 1992].

Table 1 summarizes the fifteen channels.

#	Channel	Family	Acts on	Formal slot	Timescale	EU-stack status
1	Physical supply	Operation	feasibility, cost	statics	days-decades	measured
2	Technology & licensing	Operation	feasibility, cost	statics	continuous	measured
3	Operational service	Operation	cost	statics	continuous	measured
4	Data & identity	Operation	cost, feasibility	statics	continuous	measured (partial)
5	Distribution & access	Operation	feasibility, cost	statics	continuous	measured
6	Legal reach	Operation	controller overlay	statics	contingent	measured
7	Equity & governance	Structure	control map	dynamics	transactional	measured
8	Capital & funding	Structure	entry, orientation	dynamics	years	partly measured
9	Competence supply	Structure	feasibility precondition	both	years-decades	protocol
10	Evaluation gatekeeping	Cognition	consideration	wedge	months-years	partly measured
11	Standards authorship	Cognition	rules, feasibility	wedge, rules	years	partly measured
12	Narrative & expectations	Cognition	consideration, defaults	wedge	months-years	protocol
13	Epistemic formation	Cognition	defaults, competences	wedge, compounding	years-decades	protocol
14	Commons governance	Cognition	commons options	wedge, slow structure	years	protocol
15	Rule shaping	Cognition	rules	dynamics	years	measured (partial)

5. Relation to the literatures

Each family has a home literature, and the taxonomy's claim is about their assembly. The operation channels are the territory of production-network economics [Acemoglu et al. 2012; Baldwin et al.

2023], switching-cost and lock-in theory [Farrell and Klemperer 2007; Arthur 1989], and the coercion literature from Hirschman [1945] through weaponized interdependence [Farrell and Newman 2019] to geoeconomics [Clayton, Maggiori and Schreger 2026]. The structure channels belong to corporate-control network analysis [Vitali, Glattfelder and Battiston 2011], the economics of industrial policy [Juhász, Lane and Rodrik 2023], and the programme's own capture work. The cognition channels have rich literatures that the dependence-measurement tradition has not absorbed: industry analysts as market-shaping devices [Pollock and Williams 2016], institutional isomorphism as the mechanism by which organizations converge on the same choices [DiMaggio and Powell 1983], compatibility standards as committee-and-market politics [Farrell and Saloner 1985; David and Greenstein 1990], narratives as economic forces [Shiller 2019], expectations as coordination devices [Borup et al. 2006], soft power as attraction rather than payment or coercion [Nye 2004], the formal economics of limited consideration, where revealed-attention models identify preferences when agents choose from subsets they do not fully control [Eliaz and Spiegler 2011; Masatlioglu, Nakajima and Ozbay 2012], and whose estimated objects the Section 6 protocol is written to produce, open-source governance [O'Mahony and Ferraro 2007; Lerner and Tirole 2002], regulatory capture [Stigler 1971], and epistemic communities [Haas 1992].

Three gaps in the existing assembly motivate the paper. First, the measurement traditions and the soft-power literatures do not cite each other: dependence gets measured on operation channels while the cognition channels are documented qualitatively, in different journals, without a formal slot that would let them enter the same model. Second, where multi-channel frameworks exist (weaponized interdependence's panopticon and chokepoint; the geoeconomics of coercion), they type the *uses* of a network position without enumerating the *channels* that create positions, so the list stays implicit. Third, no framework we know of states the feasible-considered-exercised distinction as a measurement requirement, though its components are separately familiar (consideration sets in marketing and decision theory; option maintenance in second-sourcing economics). The taxonomy's contribution is the completed list, the formal slot for every entry, and the wedge mechanism that connects the soft family to the hard quantities.

6. Using the taxonomy

For the European programme. The application protocol is three steps per channel: identify the relation instances (which actors hold the channel toward which nodes), attach observables under the programme's evidence discipline (sourced, confidence-flagged, adversarially verified where load-bearing), and register the formal slot (statics controller sets, dynamics transition rates, or wedge terms). Channels 1-8 and 15 are wholly or partly measured in the programme's datasets; the priority additions this taxonomy queues are channel 9 (competence stocks per layer, beginning from the qualification regime's own assessments), channel 10 (longitudinal quadrant-versus-entry data at the layers where the programme has supplier-resolution option sets), and channels 12-13 (narrative prevalence and certification-funnel populations, both feasible from public corpora). Channel 14 is reserved for the planned open-source paper and its sources will be selected with the programme lead. The immediate analytical payoff is the wedge: at the layers where the programme has measured feasible breadth (cloud, productivity, accelerators), a consideration-set measurement (what European procurement actually shortlists) turns the cognitive discount from an anecdote into a number, and the programme's certification critique extends one level: an audit can count suppliers correctly and still miss that the shortlist upstream of every audit was written elsewhere.

For other domains. Nothing in the taxonomy is digital. Energy, pharmaceuticals, agriculture, and defense all have supply and licensing spines, service and data layers, distribution gatekeepers, legal overlays, capture dynamics, capital steering, competence pipelines, evaluation intermediaries (formularies, certification agencies, ratings), standards bodies, narrative industries, curricula,

commons (germplasm banks, open science), and lobbying. The transfer protocol is the same three steps, with domain-specific observables; the three-family structure and the wedge mechanism carry over unchanged. What must be re-derived per domain is the timescale column and the identity of the compounding channel, which in technology is epistemic formation because skills are the binding complement, and elsewhere may be capital or standards.

7. Limitations

The taxonomy is a synthesis, and its completeness claim is inductive: fifteen channels cover every influence mechanism documented in the programme's evidence and the literatures reviewed, a sixteenth would be a finding, and the schema is built to absorb additions. The family boundaries have deliberate dual citizens (competence supply sits in structure and statics; equity's resting state feeds the statics while its transactions are dynamics; commons governance is cognition acting as slow structure), and they are recorded as dual citizens. The wedge mechanism inherits the evidential status of its parts: the consideration-set component is standard decision theory, the option-decay component is the programme's use-it-and-lose-it hypothesis, stated formally in the dynamics-paper plan, with its model and evidence queued there. And the cognition channels' observables are, as of this version, protocols awaiting their datasets: the paper states what to measure and how, and claims no numbers it does not have.

8. Conclusion

A dependence measurement is only as complete as its channel list, and the channel list has never been written down in one place with formal slots attached. This paper writes it down: fifteen channels, three families, one wedge. The operation channels say who can cut or reprice you today; the structure channels say who is rewriting the cast list; the cognition channels say who writes the shortlists, the standards, the stories, the curricula, the commons roadmaps, and the rules, which is to say: who decides what everyone else will consider normal to depend on. Hard power is the special case that makes the news. The general case is that feasible options nobody considers stop being feasible, and the actors who understand this manage consideration, patiently, at scale, and mostly in the open. Measurement that ignores them will keep certifying as diverse the markets they have already narrowed.

References

- Acemoglu, D., Carvalho, V. M., Ozdaglar, A., & Tahbaz-Salehi, A. (2012). The network origins of aggregate fluctuations. *Econometrica* 80(5), 1977–2016.
- ANSSI (2022). *Prestataires de services d'informatique en nuage (SecNumCloud): référentiel d'exigences*, version 3.2, 8 March 2022.
- Asterès (2025). *Technological dependence on American software and cloud services: an assessment of the economic consequences in Europe*. Study commissioned by Cigref, May 2025.
- Asterès (2026). *From technological dependency to economic capture: the cost of cloud and software services inflation to Europe*. Study commissioned by Cigref, May 2026.
- Arthur, W. B. (1989). Competing technologies, increasing returns, and lock-in by historical events. *The Economic Journal* 99(394), 116–131.
- Baldwin, R., Freeman, R., & Theodorakopoulos, A. (2023). Hidden exposure: measuring US supply-chain reliance. NBER Working Paper 31820.
- Borup, M., Brown, N., Konrad, K., & Van Lente, H. (2006). The sociology of expectations in science and technology. *Technology Analysis & Strategic Management* 18(3-4), 285–298.

- Clayton, C., Maggiori, M., & Schreger, J. (2026). A framework for geoeconomics. *Econometrica* 94(1), 105–136.
- David, P. A., & Greenstein, S. (1990). The economics of compatibility standards: an introduction to recent research. *Economics of Innovation and New Technology* 1(1-2), 3–41.
- Eliasz, K., & Spiegler, R. (2011). Consideration sets and competitive marketing. *Review of Economic Studies* 78(1), 235–262.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48(2), 147–160.
- Farrell, H., & Newman, A. L. (2019). Weaponized interdependence: how global economic networks shape state coercion. *International Security* 44(1), 42–79.
- Farrell, J., & Klemperer, P. (2007). Coordination and lock-in: competition with switching costs and network effects. In M. Armstrong & R. Porter (eds.), *Handbook of Industrial Organization*, vol. 3, 1967–2072.
- Farrell, J., & Saloner, G. (1985). Standardization, compatibility, and innovation. *RAND Journal of Economics* 16(1), 70–83.
- Haas, P. M. (1992). Introduction: epistemic communities and international policy coordination. *International Organization* 46(1), 1–35.
- Hirschman, A. O. (1945). *National Power and the Structure of Foreign Trade*. University of California Press.
- Juhász, R., Lane, N., & Rodrik, D. (2023). The new economics of industrial policy. NBER Working Paper 31538.
- Lerner, J., & Tirole, J. (2002). Some simple economics of open source. *Journal of Industrial Economics* 50(2), 197–234.
- Masatlioglu, Y., Nakajima, D., & Ozbay, E. Y. (2012). Revealed attention. *American Economic Review* 102(5), 2183–2205.
- Nye, J. S. (2004). *Soft Power: The Means to Success in World Politics*. PublicAffairs.
- O'Mahony, S., & Ferraro, F. (2007). The emergence of governance in an open source community. *Academy of Management Journal* 50(5), 1079–1106.
- Pollock, N., & Williams, R. (2016). *How Industry Analysts Shape the Digital Future*. Oxford University Press.
- Shiller, R. J. (2019). *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton University Press.
- Stigler, G. J. (1971). The theory of economic regulation. *Bell Journal of Economics and Management Science* 2(1), 3–21.
- Vitali, S., Glattfelder, J. B., & Battiston, S. (2011). The network of global corporate control. *PLoS ONE* 6(10), e25995.

Crosswalk and data. The taxonomy consolidates the seven-channel schema of the programme's meta-model (equity-governance; technology; supply; legal; standards-mindshare; distribution; capital), which maps onto channels 7; 2; 1; 6; 10-12; 5; 8 respectively, and extends it with the channels the seven-fold schema compressed or omitted: operational service (3), data and identity (4),

competence supply (9), epistemic formation (13), commons governance (14), and rule shaping as distinct from legal reach (15). Existing pilot data coded on the seven channels remain valid under the crosswalk. Measured channels trace to data/edges/ and data/pilot/; protocol channels are specified in Section 6 and queued in the programme's plan of record.