

From the Social Selection of Leaders to Evolutionary Advantage

Leadership models, cognitive development, meritocracy, and institutional adaptability

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Abstract

This article develops an evolutionary-institutional model in which a society's long-term competitiveness is determined not so much by its current stock of technologies as by its capacity to continuously generate new knowledge, technologies, and leadership strategies. Central to this model is the social selection of leaders: a collective, largely implicit image of the legitimate leader shapes who a society admits to status, resources, and decision-making power. The proposed model links this mechanism to meritocracy, social mobility, cultural evolution, and the capacity of institutions for self-renewal (Nosalsky, 2026a; Nosalsky, 2026d; Nosalsky, 2026e).

A second level of the model concerns the formation of human cognitive potential. Neurodevelopment is sensitive to environment, and early adversity and chronic stress can alter the developmental trajectories of brain networks and processes associated with myelination (Teicher et al., 2003; McLaughlin, Weissman and Bitrán, 2019). However, the article does not make the unwarranted leap from this fact to the claim that meritocracy directly "produces intelligent scientists." Instead, it proposes a testable hypothesis: a social environment that reduces chronic stress and supports freedom of thought, education, academic autonomy, and open social mobility may increase the likelihood that existing human cognitive potential is fully realized.

A third level concerns the creative process itself. In a separate work, the author proposes an evolutionary architecture for artificial creative cognition, in which variability, autonomous processes, internal state, controlled forgetting, and the selection of search strategies together form a mechanism for generating new hypotheses (Nosalsky, 2026c). In this article, that construct is used as a conceptual analogy and a source of hypotheses, not as evidence that the human brain operates identically to the proposed artificial architecture.

The central conclusion is that institutional reform can be understood as a way of creating an environment in which human creativity, scientific inquiry, and positive social selection mutually reinforce one another. This potentially creates a long-term technological advantage that does not depend on possession of any single technology: a competitor may copy a result, but it is far harder to copy the institutional capacity to keep producing the next one.

1. From the Problem of Modernity to the Problem of the Next Stage of Development

Secularization, emancipation, urbanization, individualization, scientific rationality, and social mobility laid the foundation of modern open societies. Historically, their function was largely to free the individual from traditional constraints. This transition is captured by Popper's (2012, 1945) foundational distinction between closed and open societies, and by the broader historical-institutional distinction between limited-access and open-access social orders (Styckow and Zweynert, 2009). Institutions, understood as the humanly devised rules that structure social, economic, and political interaction (North, 1990), mediate this transition: Acemoglu and Robinson (2012) show that a society's long-run trajectory depends on whether these institutions

are extractive or inclusive. However, dismantling the old hierarchy does not, by itself, create a well-functioning mechanism for selecting a new one.

The contemporary "impasse of modernity" is therefore best understood not as an argument against modernity, but as a problem of its continuation. If social mobility channels gradually close, and elites begin to select successors on the criterion of safety to their own status rather than competence, a society loses its capacity for renewal even while formally democratic procedures remain intact.

Modernity freed the individual from many old hierarchies; the next stage must learn to select new leaders effectively.

2. The Leadership Model as the Central Node

In the proposed framework, the decisive question is not only "who governs," but "whom does society recognize as a legitimate leader." This concerns a complex of socially conscious and socially subconscious models through which it is determined who is permitted to acquire status, trust, resources, and the right to scale their own decisions.

This is consistent with the author's model of the social selection of leaders: the collective image of the legitimate leader shapes the type of selection mechanism at work — aristocratic, oligarchic, clientelist, coercive, conformist, or meritocratic — which in turn shapes the composition of the elite, the quality of institutions, and long-term productivity (Nosalsky, 2026a).

Central to this scheme is the distinction between dominance-based leadership and creation-based leadership. The former concentrates on control over others; the latter on expanding the capacity of other people, and of the system itself, to create new possibilities (Nosalsky, 2026a).

3. Positive and Negative Social Selection

Positive selection occurs when a person is allowed to rise not because they are safe for the existing elite, but because they demonstrate an ability to increase the productivity of the system. Negative selection arises when status groups already in place close mobility channels to potential competitors.

Cronyism, patronage, manipulation, conformism, and fear of competition can, in this framework, be understood as different mechanisms for closing off social selection. It is important, however, not to reduce every specific case to the psychological defect of a particular individual: the object of analysis is the institutional mechanism that makes certain behavior advantageous. This concern has a long sociological lineage, beginning with Pareto's (1901/1968) account of the circulation of elites, and a formal counterpart in political economy: models of autocratic leadership show that rulers who prioritize the loyalty of subordinates over their competence systematically degrade the quality of governance, since competence and loyalty are frequently in tension (Egorov and Sonin, 2011).

A separate work by the author describes "closed loops of social selection" and proposes cultural evolution and the transformation of education as a peaceful mechanism for periodically reopening them, rather than waiting for war, revolution, or systemic crisis (Nosalsky, 2026e). The same closed-loop dynamic is framed, at the level of competing social systems, as a stage in an evolutionary competition between societies (Nosalsky, 2026b).

4. From the Quality of Elites to the Quality of Science

If a social system selects its leaders, it simultaneously selects the environments in which scientists, engineers, entrepreneurs, and other holders of complex competencies work. The link "better elites — better science" should therefore be understood institutionally, not biologically: the quality of the elite determines the rules of access to resources, freedom of inquiry, tolerance for failed experiments, the quality of academic competition, and the ability of a young researcher to bypass outdated hierarchies.

This matters especially for science, where new knowledge is often, at first, institutionally unpredictable. A system that rewards only already-established approaches may optimize for stability at the cost of breakthrough discovery. Empirical evidence from major Western funding systems is consistent with this concern: analyses of NIH RO1 grants document a sustained rise in the age at which investigators receive their first independent grant, alongside a declining share of funding reaching younger researchers (Levitt and Levitt, 2017); and a study of the European Research Council — an institution explicitly created to fund high-risk research — finds that applicants with a track record of novel, risk-taking work are systematically less likely to be funded than those without one (Veugelers, Wang and Stephan, 2022). Related evidence suggests that these are not isolated findings: productivity differences between faculty at elite and non-elite universities are substantially explained by structural advantages in resources, networks, and doctoral placement rather than by individual merit alone (Zhang et al., 2022); authority within biomedical science is concentrated in a narrow, self-reinforcing elite (Katz and Matter, 2017); and peer review appears to penalize scientific risk-taking even at the grant-renewal stage, where an applicant's track record should make risk easiest to reward (Azoulay and Greenblatt, 2025). Gross and Bergstrom (2024) argue that such patterns are a rational response to incentive structures that reward steady productivity over exploratory risk, rather than a failure of individual reviewers.

A meritocratic social ladder for science is therefore not merely a fair distribution of career opportunities. It is a mechanism for preserving the variability of scientific inquiry.

5. The Developmental Environment of the Brain: A Necessary Qualification

The next link in the model concerns individual development. Neural networks form and reorganize over the course of development under the influence of both genetic and environmental factors, with twin-study evidence indicating substantial heritability across most human psychological traits alongside a consistently significant environmental contribution (Polderman et al., 2015). Research on early adversity shows a link between threat, deprivation, changes in brain structure and function, and long-term trajectories of cognitive and emotional development (McLaughlin, Weissman and Bitrán, 2019). Severe early stress exposure has also been linked to processes of neurogenesis, synaptic remodeling, and myelination (Teicher et al., 2003).

The developmental environment is therefore not neutral. However, the claim must be formulated carefully: available evidence does not permit the assertion that the absence of meritocratic mobility directly causes insufficient myelination in a future scientist. Rather, a broader hypothesis is warranted: chronic stress, danger, instability, and an unfavorable childhood environment can affect neurodevelopment; consequently, social institutions that reduce toxic stressors and provide a safe educational environment potentially create better conditions for the realization of existing cognitive potential.

This is fundamentally different from the idea of "producing intelligent people" through administrative means. The task of institutions is not to manufacture a particular kind of brain, but not to block the development of human potential through chronic danger, humiliation, closed social mobility, or the systematic punishment of independent thought.

6. Freedom of Thought as the Infrastructure of Creativity

Scientific creativity requires not only education but a space in which a person can form and test unusual hypotheses. Academic freedom in this model has not only a normative but also an evolutionary function: it sustains the diversity of hypotheses from which a system can select productive ones.

A social system must therefore simultaneously ensure freedom of generation and rigor of testing. Without freedom, premature convergence occurs; without rigorous testing, false theories accumulate.

7. Creative Thinking and Evolutionary Search

This logic directly intersects with the author's model of Artificial Creative Cognition (ACC). There, creative problem-solving is modeled not as the linear execution of a single program but as the interaction of partially autonomous agents, incomplete information, controlled variability, internal state, forgetting, and the selection of search strategies (Nosalsky, 2026c). This work is a conceptual and experimental program; it does not claim to report obtained experimental results.

Particularly important for the social model is the two-level principle: selection acts not only on individual hypotheses but on the very strategies by which those hypotheses are generated. At the level of society, this corresponds to the meta-selection of institutions: a system must be able not only to choose the best solution within existing rules, but also to change the rules themselves once they cease to generate productive solutions.

8. Peacefully Opening Closed Loops

Historically, war, external threat, and systemic crisis have been able to temporarily change the criteria of social selection, forcing even closed systems to grant resources to people capable of solving urgent problems. Formal work in political economy corroborates this mechanism at the level of state institutions: external conflict has been shown to durably increase a state's investment in its own fiscal and administrative capacity (Besley and Persson, 2008). This is, however, an extremely costly mechanism.

The concept of "opening closed loops of social selection," proposed by the author, offers a peaceful alternative: changing cultural conceptions of the legitimate leader, the education system, and channels of social mobility before an external crisis forces the system to do so by force (Nosalsky, 2026e). Viewed at the level of competing social systems, this same dynamic can be framed as a stage within a broader evolutionary competition among societies, in which antagonistic pressure between systems acts as one — costly — driver of institutional change (Nosalsky, 2026b).

A society does not need war as a mechanism for renewing its elites; it needs the institutional capacity to renew its elites without war.

9. Technological Advantage as a Consequence, Not a Starting Goal

This model implies a different view of technological competition. A specific technology can be copied. Blueprints can be transferred, a specialist can relocate, a production process can be replicated, or equipment can be purchased. It is far harder to replicate the social system that continuously generates the next technology. This view is consistent with evolutionary theories of economic and technological change, in which innovation arises from variation and selection among organizational routines and combinations of existing components, rather than from isolated acts of invention (Nelson and Winter, 1982; Arthur, 2009; Basalla, 1988).

Strategic advantage can therefore be defined as the difference between the speed of copying an already-existing technology and the speed of creating the next generation of technologies.

If a competitor can copy the product, competitive advantage must be relocated from the product to the mechanism of its continuous creation.

In this framing, microchips, artificial intelligence, robotics, or unmanned systems are not separate end goals but examples of domains where advantage depends on the continuity of creative search. This does not mean that any particular country is guaranteed to "always stay ahead." It means that the institutional capacity for the continuous generation and selection of new solutions can become a more durable advantage than possession of any single technology.

10. The Difference Between Innovation and Borrowing

The history of science and technology contains numerous instances of knowledge transfer, espionage, international migration of specialists, and technology copying. However, this does not imply a simple dichotomy of "the West invents, the East copies." The scientific and technological development of any civilization results from borrowing, independent discovery, recombination, and institutional adaptation.

The Needham Question, the history of Soviet acquisition of rocket technology after the Second World War, the history of nuclear espionage, and contemporary technology transfer should therefore be treated as empirical cases bearing on a single question: can a system that efficiently borrows ready-made solutions permanently catch up with a system that more quickly creates the next generation of solutions?

Formal growth models distinguishing innovation from imitation suggest that an economy relying on borrowing without a growing innovative base converges toward a lower long-run growth path rather than achieving permanent parity with innovators (Segerstrom, 1991). Whether a system can exploit externally acquired knowledge, moreover, depends on its own prior investment in related research capacity — its "absorptive capacity" (Cohen and Levinthal, 1990) — a condition illustrated concretely by the Soviet Union's incorporation of German rocket engineers and technology after 1945 (Siddiqi, 2009), and more broadly by the long historical record of knowledge circulating across civilizations through translation, migration, and trade (Renn and Hyman, 2012). This question is far more productive for research than assumptions about the civilizational or biological incapacity of particular peoples for creativity.

11. From the Creative Individual to the Creative Society

Consistent with a broader view of gene-culture coevolution, in which genetic and cultural inheritance jointly shape human behavior over generations (Richerson, Boyd and Henrich, 2010), the proposed system can be represented as a sequence of interconnected levels:

1. biological and psychological individual variability;
2. conditions of early development and learning;
3. the possibility of freely forming hypotheses and independent thought;
4. academic and professional competition;
5. meritocratic social mobility;
6. the selection of leaders on the basis of their capacity to expand others' possibilities;
7. institutional capacity to open closed loops of selection;
8. the continuous generation, testing, and scaling of new technologies.

Weakness in any one link can reduce the effectiveness of the next. This is precisely why technology policy, education reform, academic freedom, and the reform of social mobility should not be treated as isolated domains.

12. The Central Hypothesis

A society's long-term competitiveness depends on its capacity to create an environment in which human cognitive potential is converted, with maximal freedom, into creative hypotheses; creative hypotheses into tested knowledge; knowledge into technologies; and technologies into new possibilities for society.

In this system, the model of the legitimate leader is the central social mechanism, and creative thinking is the central cognitive mechanism. Meritocracy and social mobility connect these two levels. Institutional evolution ensures their long-term self-renewal.

13. What Specifically Needs Reforming

If this hypothesis is correct, what requires reform is not a single political institution but the entire system of social selection. Priorities include:

- opening social mobility channels for new talent;
- reducing the role of cronyism and patronage in personnel selection;
- protecting productive competition within elites;
- reducing the rewards for manipulative status-dominance behavior;
- strengthening academic freedom and the independence of research inquiry;
- early education that builds the capacity to recognize manipulation and assess competence;
- creating institutional channels through which new generations can peacefully change the criteria of social selection;
- developing systems for testing new ideas that do not destroy them at the generation stage.

14. Conclusion

The proposed construction makes it possible to connect several levels that are usually treated separately: the social selection of leaders, cultural evolution, the development of human capital, neurodevelopment, creative thinking, academic freedom, and technological competitiveness.

Its central thesis is not that any particular civilization possesses an innate advantage. On the contrary, advantage is a potential outcome of institutional architecture. A society gains an advantage when it is better than its competitors at converting individual variability into collective knowledge, knowledge into technology, and technology into the next cycle of inquiry.

In this model, preventing war and overcoming stagnation are related tasks. The better a society is able to peacefully renew its elites, sustain creative potential, and generate new technological solutions, the less it depends on crisis-driven mechanisms of renewal — war, revolution, or external threat.

This is not yet a proven theory but a research program. Its strongest next form requires operationalization: measurable characteristics must be defined for the image of the legitimate leader, the openness of social mobility, institutional competition, academic freedom, early-life stress, cognitive development, and innovative productivity — and it must then be tested whether these together form the predicted causal system.

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Methodological Note

This text integrates the author's own concepts into a single research model. The author's own works are cited as prior formulations of individual components of the model, not as independent external confirmation of the theory as a whole. In particular, the hypotheses linking social institutions to neurodevelopment, creative productivity, and long-term technological advantage require separate empirical testing.