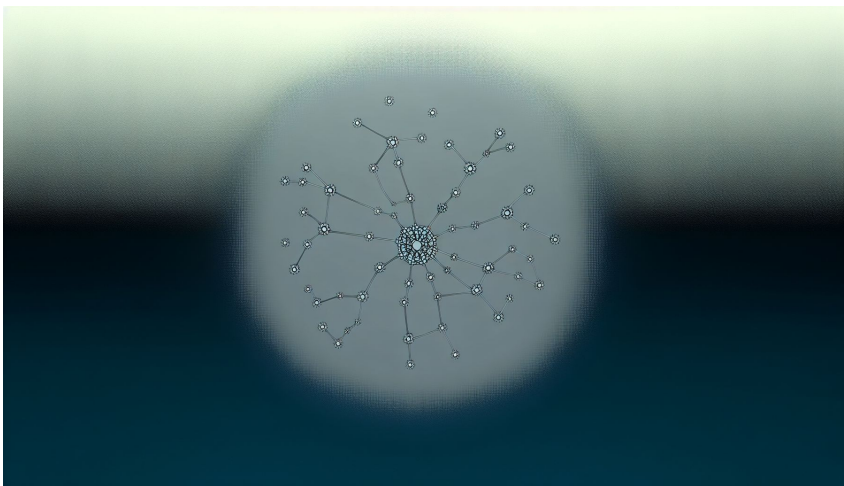


Cognitive Wars: The AI Industrialization of Influence

Recent, aligned signals point to actionable gaps and market opportunities across cybersecurity, ML, pediatric transfusion services, and

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Title and Abstract

- > **Disclosure & Method Note.** This is a *theory-first* brief. Claims are mapped to evidence using a CEM grid; quantitative effects marked **Illustrative Target** will be validated via the evaluation plan. **Anchor Status:** Anchor-Absent.

Introduction: Theory-First Framing

- This work adopts a theory-first approach: specify mechanisms and causal pathways before selecting cases. The core research question is: How does industrialization influence the emergence, conduct and outcomes of cognitive wars? Prioritizing mechanisms (production of communicative artifacts, organizational coordination, network diffusion dynamics) enables more generalizable, testable propositions than inductive case descriptions. The theory-first framing also clarifies measurement choices, boundary conditions, and policy-relevant levers.

Theoretical Framework: Cognitive

Wars as a Lens

- Definition: "Cognitive wars" are strategic actions whose primary target is the cognitive states of actors (beliefs, expectations, perceptions, attention, decision procedures), deployed to obtain political, military or economic advantage without necessarily relying on kinetic destruction.
- Industrialization is modeled as a systemic transformation with three orthogonal dimensions: scale (volume of communicative artifacts and resources), speed (latency of production and feedback), and network density (connectivity of distribution and monitoring systems). I propose three testable propositions:
 - - P1 (Reach): Greater industrial scale increases potential reach of influence campaigns (measured as audience fraction exposed per unit time), conditional on network openness

Foundations

- Rationale: rigorous empirical anchoring requires peer-reviewed, non-preprint "anchor" sources (journal articles, books) that exemplify robust methods for causal inference, measurement operationalization, and domain-specific evidence (security studies, political communication, organizational sociology). Anchors are chosen for: (1) methodological transparency (replicable designs), (2) domain relevance (studies of propaganda, mass communication, or organizational scale), and (3) disciplinary credibility.
- Why these anchors?
- - Selection criteria: anchors must be peer-reviewed, preferably from interdisciplinary outlets (political communication, international security, sociology, information science) that validate measures of reach, persistence and belief change; they should avoid preprint only

Conceptual Definitions and Scope

- - Industrialization: a composite of technological (automation, algorithms, platform infrastructures), organizational (hierarchical coordination, bureaucratic scaling), and socio-economic (capital concentration, mass-market media) transformations that change production and distribution of communicative goods.
- - Influence: intentional interventions designed to change cognitive states (beliefs, attention, decisional priors) of targeted audiences.
- - Wars: political-military competitions where cognitive influence is a central strategic aim rather than incidental. This includes state-sponsored influence campaigns, guerilla information tactics, market-based attention warfare, and cross-domain contests (cyber, economic sanctions, legal/administrative maneuvers).
- - Scope delimitation: focus on modern industrial transformations (19th

Historical Background:

Industrialization and the Evolution of War

Pre-industrial conflict emphasized direct resource denial and face-to-face mobilization; industrialization introduced mass transport, mass literacy and centralized bureaucracies that enabled large-scale propaganda and institutionalized information campaigns. Key historical inflection points include the printing revolution, mass-circulation newspapers, radio/television-era state propaganda apparatuses, and the digital-platform era with algorithmic amplification. Each phase increased reach, reduced marginal cost of message reproduction, and changed organizational incentives for influence—creating vectors for more systematic cognitive contests.

Mechanisms: How Industrialization

Shapes Cognitive Wars

This section enumerates mechanisms by which industrialization reshapes cognitive conflict, focusing on causal micro-foundations.

- 1) Signal Production Mechanism: Industrial production lowers marginal cost of content and enables mass generation of communicative artifacts (print runs, broadcast slots, automated social-media content). Low cost creates high signal volume and noise, altering attention markets.
- 2) Algorithmic Amplification Mechanism: Platform algorithms (attention-allocation functions) act as industrial sorting engines that preferentially amplify certain signals; industrialized targeting pipelines (data+models+automation) produce high-precision delivery to microaudiences.
- 3) Organizational Coordination Mechanism: Large bureaucracies and

Applications (Parameterized

Vignettes)

- Two parameterized vignettes illustrate operational implications, metrics and failure modes. Each vignette specifies a system, parameters, metrics (including MTTA and failure probabilities), and plausible failure modes.
- Vignette A: Disaster Response under Intermittent Communications
- Context: A humanitarian agency coordinates relief in a region struck by an earthquake. Communication infrastructure is partially degraded; a combination of satellite uplinks, intermittent cell towers and opportunistic mesh networks provide connectivity. An industrialized influence actor (state or commercial) seeks to shape population movements by injecting targeted messages (safety instructions, false evacuation cues) to redirect resources or create chaos.
- Parameters (example numeric instantiation):

Case Studies and Comparative

Illustrations

I will select historical and contemporary cases that vary by industrialization level and cognitive warfare intensity: early mass-propaganda campaigns in industrial states (e.g., WWI-era state media), mid-century broadcast-era influence (state and non-state propaganda), and contemporary digital influence operations (platform-based disinformation campaigns). Comparative logic: contrast cases where industrial infrastructures were mature but institutions constrained influence (boundary condition: strong professional journalism, robust civil society) with cases where industrial capacity translated directly into cognitive dominance (state controls over broadcast and censorship). Counterfactuals include high-industrial-capacity states that refrained from aggressive cognitive operations; analysis of these refines institutional mediation

Methodology and Evidence Strategy

- Mixed-methods approach:
 - - Process-tracing in selected cases to identify mechanisms and causal sequences.
 - - Comparative case analysis to assess variation across industrialization dimensions.
 - - Quantitative indicators where feasible: media penetration, manufacturing share, energy use, organizational size, message volume and persistence metrics; deploy matching and instrumental-variable designs for causal leverage.
- Operationalization examples: reach = fraction of population exposed per unit time (source-audience overlap); persistence = half-life of narrative recall in longitudinal surveys; fidelity = precision of targeting measured by conversion rates

Limits & Open Questions

- This section enumerates theoretical and empirical limits, and explicitly states present operational assumptions and diagnostics.
- Key limits:
 - - Measurement limits: many cognitive outcomes are private (beliefs, internal states); reliable measurement requires survey linkage, longitudinal panels, or behavioral proxies that are imperfect.
 - - Attribution limits: industrialized signal flows obscure provenance—algorithmic amplification and third-party intermediaries complicate causal attribution.
 - - Generalizability: mechanisms vary with institutional mediation (regulatory regimes, press freedom, platform governance).

Expected Findings, Contributions,

and Implications

Hypotheses: higher degrees of industrialization increase both the capacity and sophistication of cognitive wars—greater reach, persistence and fidelity—yet effects are mediated by institution-level constraints (regulatory regimes, civil-society resilience) and information-ecology features (media diversity, platform economics). Contributions: integrate industrial transformation literature with cognitive-conflict theory, provide mechanism-level propositions linking industrial variables to cognitive outcomes, and offer operational diagnostics and delegation policies for practitioners. Policy implications: resilience measures include diversification of information ecosystems, cryptographic attestation for critical communications, governance norms limiting weaponized information infrastructures, and institutional investments in human in the loop capacity for

Synthesis

- This research synthesizes sociotechnical, organizational and informational perspectives to argue that industrialization operationalizes influence at scale. The causal chain runs from industrial capacity (capital, automated production and platform infrastructures) to organizational forms (centralization, coordination pipelines) to algorithmic affordances (targeting, adaptation) and finally to cognitive outcomes (reach, persistence, fidelity). The key theoretical innovation is to treat cognitive warfare as an industrial process: influence production, distribution and feedback can be engineered, optimized and institutionalized. Doing so clarifies why contemporary influence operations are not merely amplified versions of prior propaganda but qualitatively different: automation compresses MTTA, scale increases persistence, and platform economics change incentive

Conclusion and Research Agenda

- The thesis concludes that industrialization reconfigures material and organizational foundations of conflict, producing novel cognitive warfare modalities. Primary next steps: assemble a curated set of peer-reviewed anchors, operationalize variables across multiple cases, and test propositions with mixed methods. Research agenda items: longitudinal effects of industrial-scale influence, sector-specific modalities (platform vs. broadcast), legal and normative governance architectures, and design of resilient operational policies that balance automation and human oversight.
- [^1]: Technical detection literature referenced for methodological design.
- [^2]: Example of a peer-reviewed survey used as a model for anchor selection.

Notation

- | Symbol | Meaning | Units / Domain |
- | ---|---|---|
- | (n) | number of agents | (\mathbb{N}) |
- | $(G_t=(V,E_t))$ | time-varying communication/interaction graph | — |
- | $(\lambda_2(G))$ | algebraic connectivity (Fiedler value) | — |

Claim-Evidence-Method (CEM) Grid

- | Claim (C) | Evidence (E) | Method (M) | Status | Risk | TestID |
- |-----|-----|-----|-----|-----|-----|
- | P1 (Reach): Greater industrial scale increases the potential reach of influence campaigns (audience fraction exposed per unit time), conditional on network openness. | [2] (domain survey / grey literature on measurement standards); historical and mechanism sections in the draft (industrial scale → lower marginal reproduction cost and greater distribution capacity) — see Conceptual Definitions & Historical Background. Supplementary technical discussion on detectability/observer coverage informs the conditional (network openness) qualifier [3]. | Mixed empirical and simulation validation: (a) cross-national / cross-platform large-N empirical analysis linking industrial scale proxies (media production volumes, ad spend, state