Narrative Compression and Legitimacy Decay in Mandate-Constrained Institutions: A Structural Model of Information Distortion Under Political Friction

Code+Philosophy

Abstract

Institutions operating in politically sensitive environments encounter systematic compression of complex evaluative processes into simplified narratives. Such compression may distort public perception of mandate fidelity and procedural symmetry, thereby accelerating institutional legitimacy decay. This paper extends the Intent Integrity and Symmetry frameworks by modeling narrative compression as an operator acting between operational action and public system outcome. A probabilistic legitimacy decay function is introduced to quantify instability under sustained distortion. The framework distinguishes structural communication compression from normative bias and provides a neutral diagnostic tool for institutional resilience monitoring in high-friction environments.

1 Introduction

Institutional legitimacy depends not only on procedural integrity (Weber, 1978; Easton, 1965) and cross-actor symmetry (Suchman, 1995), but also on the translation of complex institutional operations into public narratives (Habermas, 1989).

Modern governance systems operate within information environments characterized by media amplification, political framing, selective reporting, social media abstraction, and strategic misrepresentation (Entman, 1993; Bennett & Livingston, 2018). Even when institutional alignment remains high, compression between operational complexity and public narrative may create perception asymmetry.

Legitimacy erosion often originates in this compression gap (Tyler, 2006; Carpenter, 2010).

2 System Extension

Recall the system chain:

$$I(t) \to D_F(I(t)) \to A(t) \to C(A(t)) \to S(t) \to M(t) \tag{1}$$

Where:

- C = Narrative compression operator
- $S(t)$ = Public system perception outcome
- $M(t)$ = Institutional memory

This paper formalizes C and its impact.

3 Narrative Compression Operator

Let:

$$C : \mathbb{R}^n \to \mathbb{R}^m, \quad m < n \tag{2}$$

Narrative compression reduces dimensional complexity (Shannon, 1948).

Operational action:

$$A(t) \in \mathbb{R}^n \tag{3}$$

contains legal nuance, evidentiary gradation, jurisdictional constraints, conditional findings, and procedural caveats.

Compressed narrative:

$$S(t) \in \mathbb{R}^m \tag{4}$$

often reduces to headline claims, binary framing, actor labeling, or selective emphasis (Tversky & Kahneman, 1974).

Thus:

$$S(t) = C(A(t)) \tag{5}$$

Loss of dimensionality introduces distortion risk.

4 Compression Divergence Metric

Define compression divergence:

$$\Delta_C(t) = \|A(t) - C^{-1}(S(t))\| \tag{6}$$

Where C^{-1} represents reconstructed narrative approximation.
High $\Delta_C(t)$ indicates distortion between institutional action and public perception.
This divergence parallels framing distortion models in political communication theory (Entman, 1993).

5 Legitimacy Decay Function

We define probability of destabilizing legitimacy event:

$$P_d(t) = 1 - e^{-\lambda \Delta_C(t)} \tag{7}$$

Where:

- λ = amplification coefficient

Higher λ reflects polarized or accelerated media environments
(McLuhan, 1964; Sunstein, 2007).

Interpretation:

- Small divergence $\rightarrow$ negligible decay risk
- Moderate divergence $\rightarrow$ gradual erosion
- High divergence + high amplification $\rightarrow$ rapid legitimacy collapse

This function models structural instability rather than normative evaluation.

6 Interaction with Symmetry and Integrity

Institutional stability becomes:

$$Stability(t) = f\left(\overline{III_i(t)}, \overline{SC_{ij}}, \Delta_C(t)\right) \tag{8}$$

Even high mandate integrity may fail to preserve stability if compression divergence is large (Giddens, 1990).

Conversely, modest integrity deviation may remain stable if compression is minimal.

This explains why some institutions collapse under narrative pressure while others endure despite operational strain.

7 Memory Accumulation

Legitimacy decay has cumulative memory effects.

$$\frac{dM}{dt} = (S(t) - S_0) - \gamma M(t) \tag{9}$$

Where:

- $M(t)$ = accumulated legitimacy memory
- S_0 = baseline institutional trust
- γ = institutional recovery coefficient

Repeated compression divergence reduces recovery capacity, modeling long-term reputational drift (Carpenter, 2010).

8 Governance Reform Implications

The framework suggests:

- Transparency must target compression reduction
- Dimensional reporting must counter oversimplification
- Institutions must monitor divergence, not merely criticism
- Communication design is structural, not cosmetic

Narrative resilience becomes part of institutional design (Coombs, 2007).

9 Conclusion

Institutional legitimacy is not preserved solely through procedural fidelity. It requires structural management of narrative compression and distortion dynamics. By modeling compression divergence and legitimacy decay probabilistically, this framework offers neutral diagnostic insight into institutional stability under high-friction political environments.

Integrity must be measured.
Symmetry must be monitored.
Compression must be managed.

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