PRODUCTISATION STUDIES CANON · MCS V1.0

Mediated Coordination Sciences *(MCS):* A Formal Discipline of Inter-System Synchronisation

Declaring the formal study of how independently mediated systems achieve stable coordination — establishing Coordination Equilibrium, the Coordination Ratio, the Mediation Architecture Compatibility Principle, and the canonical position of MCS within Productisation Studies.

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ABSTRACT

The Productisation Studies canon establishes, through Constraint Productisation Theory and the Ontology of Mediation, the internal stability conditions of mediated systems and the universal cycle through which pressure becomes coordination. However, internal stability does not guarantee coordination. A system may remain fully stable while remaining incapable of synchronising with other stable systems. This paper declares Mediated Coordination Sciences (MCS) as the fifth formal framework within the Productisation Studies canon — the study of how independently mediated systems achieve stable coordination. MCS introduces Coordination Equilibrium as the condition distinct from stability, the Coordination Ratio (CR = MSC/MCD) as its governing metric, the Mediation Architecture Compatibility Principle (MACP) as the architectural prerequisite, and a taxonomy of five Coordination Failure modes. The paper repositions civilisation as an emergent network of compatible mediation architectures rather than a collection of stable systems, and establishes MCS as the framework that begins precisely where OOM ends.

1. The Object of Study

Every discipline requires a distinct scientific object — a phenomenon that is real, observable, and not fully explained by any existing framework. Mediated Coordination Sciences studies a phenomenon that the Productisation Studies canon approaches but does not formally address: the conditions under which independently stable mediated systems are able to synchronise with each other.

This is not the same question as stability. Constraint Productisation Theory answers the stability question definitively: a system survives amplification when CI ≥ AF. This is not the same question as intelligibility. The Structural Intelligibility

Sciences answer how meaning survives mediation. This is not the same question as amplification deformation. FAMS answers how scaling pressure distorts systems.

The coordination question is: given that system S_A and system S_B are each individually stable, intelligible, and productised — what must additionally be true for them to synchronise?

> *Productisation studies how useful structures become persistent. MCS studies how persistent structures become coordinatable. These are different scientific objects.*

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2. Foundational Axioms

AXIOM MCS-1

Pressure Universality

Every coordinated system exists under pressure. Pressure remains the ontological substrate. No coordination occurs in the absence of pressure.

AXIOM MCS-2

Mediation Universality

All coordination occurs through mediation. No system coordinates directly with reality. Coordination always occurs through mediation layers. What is coordinated is always a mediated representation, not reality itself.

AXIOM MCS-3

Architectural Dependence

Every stable mediated system contains a Mediation Architecture: MA(S) = {Classification, Constraint, Amplification, Governance, Persistence}. The form of this architecture determines what a system can and cannot coordinate with.

AXIOM MCS-4

Compatibility Requirement

No sustained coordination can occur between systems whose mediation architectures are mutually unintelligible at the interaction boundary, regardless of each system's internal stability. Compatibility is the additional necessary condition beyond stability.

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3. Coordination Equilibrium

Internal equilibrium is the condition CPT describes:

CPT INTERNAL EQUILIBRIUM

$$CI \geq AF$$

A single system's constraint integrity must meet or exceed its amplification factor. This is a necessary but insufficient condition for inter-system coordination.

Coordination Equilibrium is the condition MCS introduces. It is not a property of a single system. It is a property of the relationship between two systems:

MCS COORDINATION EQUILIBRIUM

$$MSC(A,B) \geq \theta_C(MCD, domain)$$

Mediation System Compatibility must meet or exceed the domain-specific Coordination Threshold for sustained synchronisation to hold between S_A and S_B.

The two equilibrium conditions govern different layers. CPT equilibrium is vertical — governing the internal structure of each system independently. Coordination Equilibrium is horizontal — governing the relationship between systems at their interaction boundary.

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4. Mediation Architecture Compatibility — The MACP

The Mediation Architecture Compatibility Principle (MACP) states that the possibility of coordination between two systems is fully determined by the pairwise compatibility of their mediation architectures across five components. Each component corresponds to a layer of the mediation architecture established in the foundational axioms.

MSC CONSTRUCTION

$$MSC(A,B) = w_1 \cdot CAC + w_2 \cdot CnAC + w_3 \cdot AAC + w_4 \cdot GAC + w_5 \cdot PAC$$

Where $\Sigma w_i = 1$. Weights are domain-determined. CAC (Classification Architecture Compatibility) is the foundational layer: classification failure propagates incompatibility downstream to all other components.

COMPONENT	SYMBOL	WHAT IT GOVERNS	FAILURE CONSEQUENCE
Classification Architecture Compatibility	CAC	Whether systems segment equivalent pressure into mutually interpretable categories	C1 — Classification Fragmentation: the deepest failure mode
Constraint Architecture Compatibility	CnAC	Whether systems recognise each other's constraint boundaries as valid	C2 — Constraint Fragmentation
Amplification Architecture Compatibility	AAC	Whether systems can sustain throughput parity at their interaction boundary	C3 — Amplification Fragmentation
Governance Architecture Compatibility	GAC	Whether systems can jointly enforce accountability across the boundary	C4 — Governance Fragmentation
Persistence Architecture Compatibility	PAC	Whether systems preserve the terms of coordination across mediation cycles	C5 — Semantic Fragmentation

5. The Coordination Ratio

Following the structural architecture of the Stability Ratio in CPT, the Coordination Ratio is defined as:

COORDINATION RATIO

$$CR = MSC(A,B) / MCD(A,B)$$

CR is the ratio of available compatibility resource to the mismatch pressure that must be overcome. MCD — Mediation Complexity Differential — quantifies the interpretive work required at the interaction boundary to maintain intelligibility across the two architectures.

$CR \geq 1$ — Coordination Stable

$CR = \theta_c / MCD$ — Threshold

$CR < 1$ — Coordination Failure

The CR and SR are structurally parallel. Just as SR falls below threshold when amplification outpaces constraint, CR falls below threshold when mismatch pressure outpaces architectural compatibility. Just as SR has no upper ceiling, CR has no upper ceiling — greater architectural alignment is always preferable.

The MCD is not fixed. It is itself a function of the degree of architectural divergence between S_A and S_B, meaning the Coordination Threshold θ_c is domain-dependent — exactly as the usefulness threshold θ and SR tolerances are domain-

dependent in CPT. Two systems from radically different domains face higher MCD and therefore require higher MSC to achieve the same CR.

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6. The Coordination Theorem

THEOREM MCS-1 · COORDINATION COMPATIBILITY THEOREM

Stable systems do not necessarily coordinate. The necessary and sufficient conditions for sustained inter-system coordination are distinct from the conditions for internal stability.

Formal statement: Coordination(S_A, S_B) holds sustainably iff:

$$\text{Condition 1: } CI_A \geq AF_A \wedge CI_B \geq AF_B$$

$$\text{Condition 2: } MSC(A,B) \geq \theta_c(MCD, \text{domain})$$

Condition 1 is necessary but insufficient — stability does not imply compatibility. Condition 2 is necessary but insufficient — compatibility between unstable systems cannot sustain coordination because unstable systems produce incoherent outputs. Both conditions together are jointly sufficient.

□

The Coordination Theorem is the formal bridge between CPT and MCS. CPT provides Condition 1; MCS provides Condition 2. Neither discipline can be reduced

to the other, and neither is complete without the other when the problem of inter-system coordination is the question under investigation.

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7. The Two Governing Laws

The canon now has two governing equilibrium laws operating at different levels:

STABILITY LAW · CPT

Constraint Integrity must govern Amplification

$CI \geq AF$

Governs a single system's internal health. Domain: the system boundary.

COORDINATION LAW · MCS

Mediation Compatibility must exceed Coordination Threshold

$MSC \geq \theta_c$

Governs the relationship between two systems. Domain: the interaction boundary.

Together they yield the Combined Coordination Proposition:

COMBINED COORDINATION PROPOSITION

$$[CI_A \geq AF_A] \wedge [CI_B \geq AF_B] \wedge [MSC(A,B) \geq \theta_c] \Rightarrow \text{Persistent Coordination}$$

Persistent Coordination ⟹ Civilisational Continuity when sustained across a network of systems.

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8. Coordination Failure Modes

MCS introduces five failure modes that are distinct from the nine CPT failure types. CPT failures are internal to a single system. Coordination Failures occur at the

interaction boundary between two systems, and may occur even when both systems individually have SR ≫ 1.

C3 — Amplification Fragmentation

Scale mismatch is irreconcilable

Systems share meaning but operate at radically different amplification scales. Local-global disconn
shared; scale is not.

9. Civilisation Reinterpreted

The classical account of civilisation treats it as the accumulation of population, resources, and institutions. MCS proposes a deeper account:

CLASSICAL ACCOUNT	MCS ACCOUNT
Civilisation = Population + Resources + Institutions Explains civilisational persistence through material and institutional accumulation. Cannot explain why institutions with abundant resources collapse when their mediation architectures become incompatible.	**Civilisation = Network of Coordinated Mediation Architectures** Explains civilisational persistence through sustained compatibility between the mediation architectures of its constituent systems. Institutions survive because they maintain compatibility. Markets survive because they maintain compatibility. Standards survive because they maintain compatibility. Civilisations collapse when Coordination Failure propagates faster than compatibility can be restored.

On this account, civilisational continuity is not merely a matter of stability — it is a matter of maintained compatibility across a network. A civilisation can be

composed entirely of individually stable systems and still dissolve if their mediation architectures progressively diverge. The C5 failure mode — Semantic Fragmentation — is the mechanism by which this dissolution typically proceeds.

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10. The Updated Universal Chain

With MCS formally declared, the Universal Mediation Cycle from OOM is extended at its coordination node:

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Pressure
  ↓
Mediation
  ↓
Demand
→
Usefulness
→
Constraint
  ↓
Intelligibility
→
Intelligence
  ↓
Coordination
Equilibrium
←
MCS
begins
here
```

```
Governing
laws
layer.
Core UPDATED
CANON
CHAIN
OOM
+
MCS
LAW:
lim[CFP→∞]
Pr(C)
=
1
CPT
Law:
CI
≥
AF
SR
Law:
Sr
MSC
≥ (ci·Os(I)) /
θc (an·Ω(S)·Pr)
required
at
```

MCS does not replace OOM. It does not revise CPT. It begins at the precise point where OOM's chain ends — the Coordination node — and studies what must be true

of the systems arriving at that node for coordination to hold. The transition from Intelligence to Coordination in the OOM chain is now governed by Theorem MCS-1.

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11. Discipline Stack — Canon Position

FRAMEWORK	SCIENTIFIC OBJECT	GOVERNING QUESTION	LEVEL
CPT	Internal system stability	Can a system survive amplification?	Single system
OOM	Mediation architecture	How does pressure become structure?	Single system · universal cycle
SIS	Intelligibility survival	How does meaning persist through mediation?	Single system · signal layer
FAMS	Amplification deformation	How does scaling pressure distort systems?	Single system · scale dynamics
MCS	Inter-system synchronisation	How do independently mediated systems coordinate?	Multi-system · interaction boundary

MCS is the fifth framework in the canon. Its scientific object — Coordination Equilibrium between independently mediated systems — is not a restatement of any prior framework. It is the study of what happens at the boundary between

stable systems, a question none of the preceding frameworks were designed to answer.

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12. Research Programme — Open Questions

MCS RESEARCH PROPOSITION

MCS proposes that coordinated systems exhibit a universal compatibility structure — that the same five architectural components (Classification, Constraint, Amplification, Governance, Persistence) determine coordination possibility across all domains. The framework invites examination across:

- Biological systems — cellular signalling, immune coordination, neural synchronisation
- Economic systems — market interoperability, monetary architecture compatibility
- Social systems — institutional coordination, cultural intelligibility preservation
- Technical systems — protocol compatibility, API design, distributed systems governance
- Political systems — treaty architecture, international coordination mechanisms
- AI systems — model interoperability, multi-agent coordination under shared constraint

The framework does not assert that these domains are identical. It asserts that the same structural question — what architectural compatibility is required for coordination — applies to all of them, and

that the MSC construction provides a common formal language for investigating it.

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13. Conclusion — The Discipline Declared

The Coordination Problem, established in the companion paper, is a genuine scientific object. This paper has formalised its study as a discipline. Mediated Coordination Sciences is the study of how independently mediated systems achieve stable coordination — the conditions, the mechanisms, the failure modes, and the civilisational consequences of their presence or absence.

The canon now reads as a complete causal stack. The Productisation Imperative explains why constraint forms from persistent pressure. CPT explains whether formed constraint is stable. SR governs how stability is maintained. SIS explains how meaning survives mediation. FAMS explains how amplification deforms systems. MCS explains how stable, intelligible, productised systems synchronise with each other. The Manifesto explains what happens when civilisational coordination fails at scale.

> *The Productisation Imperative explains why civilisation generates constraints. The SR Governance Engine explains whether those constraints survive amplification. MCS explains whether the systems carrying those constraints can find each other.*

Prerequisites: This paper presupposes familiarity with the companion paper, *The Coordination Problem: Compatibility Conditions for Inter-System Mediation* (Adeniji, 2026), which provides the proof-of-phenomenon on which this discipline declaration rests. It further presupposes familiarity with Adeniji (2026), *Productisation as an Ontological Discipline* [SSRN 6113388], and with Constraint Productisation Theory v1.4 and the Ontology of Mediation.

Canon lineage: MCS v1.0. Fifth framework in the Productisation Studies canon. Follows CPT, OOM, SIS, FAMS. Precedes any further civilisational-layer frameworks.

Epistemic status: Discipline declaration paper. First-order human authorship. Canon-lock: derivative use of MCS terminology (Coordination Equilibrium, Coordination Ratio, MSC, MACP, MCD, Coordination Failure modes C1–C5) requires explicit citation of this paper and SSRN 6113388.

Note on Mediation: Mediation in this paper refers to the general systems operation through which pressures, meanings, capabilities, and intentions are transformed between states, actors, scales, or contexts — not to dispute-resolution mediation, which is one narrow application of this general principle.