EMJ.LIFE Institutional Architecture Working Paper Series

Working Paper No. 01

Behavioral Evidence Accumulation (BEA)

A Framework-Neutral Execution Architecture for Evidence Continuity
With Illustrative Mapping to LEAP Analytical Structure

A Conceptual Working Paper

on Execution-Layer Structuring and Operational Traceability
Developed as a Structural Extension of the PADV (Participation–Action–Data–Value) Transformation Logic

Author

Anderson Yu
Founder & Chief Executive Officer

Publisher

EMJ LIFE Holdings Pte. Ltd. (Singapore)

Date of Publication

24 February 2026

Place of Publication

Singapore

Metadata Page

Series

EMJ.LIFE Institutional Architecture Working Paper Series: Working Paper No. 01

Title

Behavioral Evidence Accumulation (BEA): A Framework-Neutral Execution Architecture for Evidence Continuity

Subtitle

With Illustrative Mapping to LEAP Analytical Structure

Publication Status

Working Paper v1.0, 23 February 2026

Publisher

EMJ LIFE Holdings Pte. Ltd. (Singapore)

Institutional Identity

EMJ.LIFE operates as a digital institutional architecture builder focused on execution-layer structuring, identity-bound accountability, and cross-framework evidence continuity.

Author

Anderson Yu

Email: anderson@emj.life

ORCID: 0009-0002-2161-5808

Identifiers

DOI: 10.64969/emj.wp.bea.2026.v1

ORCID: 0009-0002-2161-5808

License

Place of Publication

Singapore

Keywords

Behavioral Evidence Accumulation • PADV • Execution Architecture • Evidence Continuity • Operational Traceability • Framework Neutrality • Institutional Structuring • Cross-Framework Compatibility

Executive Summary

Behavioral Evidence Accumulation (BEA) is introduced as a structural extension of the PADV (Participation–Action–Data–Value) transformation logic.

While analytical frameworks provide methodologies for identifying, evaluating, and disclosing risk, many operational ecosystems exhibit structural discontinuities between ongoing activities and analyzable evidence formation. These discontinuities are executional rather than conceptual.

In behavior-dense environments characterized by distributed actors, shifting boundaries, SME-dense participation, and episodic reporting cycles, operational activities occur continuously, yet structured evidence formation often remains fragmented or reporting-driven.

BEA proposes a structural sequence:

Operational Activity

→ Structured Evidence Formation

→ Cross-Cycle Aggregation

→ Analytical Interface

Under this approach, disclosure becomes a derivative outcome of accumulated operational continuity rather than its starting point.

This working paper:

- Defines BEA as a sector-neutral execution-layer structuring model
- Establishes minimum structural conditions for traceable evidence formation
- Develops a layered architecture separating operational activity, execution structuring, and analytical frameworks
- Proposes a generalized phased implementation model
- Provides an illustrative mapping to LEAP solely to demonstrate interface compatibility

BEA does not redefine analytical frameworks, impose materiality thresholds, establish regulatory standards, or assert interpretive authority. Analytical sovereignty remains exclusively at the framework layer.

This paper is conceptual in scope and positions BEA as an execution-layer architecture designed to support evidence continuity across behavior-dense operational ecosystems.

Abstract

This working paper introduces Behavioral Evidence Accumulation (BEA) as a structural extension of the PADV (Participation–Action–Data–Value) transformation logic. Many operational ecosystems exhibit discontinuities between ongoing activities and structured evidence formation, creating execution-layer gaps prior to analytical review.

BEA is presented as a framework-neutral execution architecture designed to preserve continuity across participation, action, and data before analytical interpretation occurs. The paper defines minimum structural characteristics for traceable evidence formation and proposes a layered conceptual model distinguishing operational activities, execution-layer structuring, and analytical frameworks.

An illustrative mapping to the LEAP analytical structure is provided solely to clarify interface compatibility. No reinterpretation, normative extension, or certification implication is proposed.

BEA operates exclusively as a pre-analytical structuring layer. Authority and interpretive sovereignty remain fully at the analytical framework level.

The study is conceptual and invites further empirical validation across sectors.

Purpose of This Working Paper

This working paper builds upon the PADV (Participation–Action–Data–Value) methodological framework and explores its potential extension into execution-layer structuring for operational evidence continuity.

PADV was originally articulated as a conceptual model describing the transformation pathway from participation to structured value formation. The present paper does not modify the PADV methodology. Instead, it examines how PADV's structural logic may be operationalized in behavior-dense environments where recurring activities require traceable evidence continuity.

Behavioral Evidence Accumulation (BEA), as introduced herein, is therefore positioned as:

- An execution-oriented extension of PADV
- A structural application layer derived from PADV logic
- A sector-neutral exploration of evidence formation mechanisms

This paper does not introduce a new analytical framework, nor does it reinterpret existing sustainability frameworks. It focuses on the structuring of operational activities into traceable evidence artifacts prior to analytical assessment.

Analytical interpretation, materiality determination, and disclosure governance remain external to the scope of this paper.

Scope Boundaries

To ensure clarity of positioning, this paper explicitly does not:

- Redefine PADV's theoretical foundations
- Introduce new normative standards
- Interpret nature-related risks
- Establish disclosure thresholds
- Provide regulatory certification
- Substitute any existing analytical framework

BEA is presented as a structural extension derived from PADV's transformation logic. It operates strictly at the execution layer, prior to analytical interpretation.

The scope of this paper is limited to:

Exploring how participation and action events may be structured into traceable evidence units consistent with PADV's transformation pathway.

Specifically, this includes:

- Actor-bound attribution mechanisms
- Time-bound operational recording
- Contextual metadata structuring
- Cross-cycle continuity formation
- Aggregation readiness for external analytical frameworks

The proposed structuring approach is voluntary and exploratory. It is intended to contribute to implementation dialogue rather than to establish prescriptive authority.

1. The Execution Discontinuity Problem

1.1 Behavior-Dense Operational Ecosystems and the PADV Transformation Pathway

The PADV (Participation–Action–Data–Value) methodology describes a structured transformation pathway through which operational engagement may evolve into analyzable value.

Under PADV:

Participation→ gives rise to Action→ which generates Data→ which may be aggregated into Value

This transformation pathway assumes that each stage is structurally captured and continuously linked.

However, in behavior-dense operational ecosystems, this transformation often remains structurally incomplete.

Such ecosystems commonly exhibit:

- Shifting or temporary operational boundaries
- Multi-actor coordination across organizational levels
- Fragmented supplier participation
- High density of SME actors
- Episodic reporting cycles

In these environments, participation events and operational actions occur frequently. However, the structural capture of these actions into consistent, traceable data may be intermittent or reporting-driven.

As a result, the transformation pathway:

Participation→ Action→ Data→ Value

is often disrupted between Action and Data, or between Data and Value aggregation.

This disruption constitutes what may be described as execution discontinuity.

The issue is not the absence of operational activity.
It is the absence of structured transformation continuity within the PADV pathway.

1.2 Analytical Frameworks and Execution Conditions

Analytical frameworks (e.g., LEAP) provide:

- Conceptual structure
- Risk identification logic
- Assessment methodology
- Governance-oriented interpretation

These frameworks operate at the level of analysis and disclosure.

PADV, by contrast, operates at the transformation level — structuring how participation and action may generate analyzable data prior to interpretation.

In many operational environments, analytical frameworks assume the existence of structured inputs.

However, execution conditions often exhibit:

- Continuous participation without structured attribution
- Operational actions without standardized data capture
- Distributed actors with uneven data capacity
- Evidence assembled retrospectively at reporting intervals

This does not imply conceptual misalignment between analytical frameworks and operational reality.

Rather, it reflects a structural discontinuity within the transformation sequence described by PADV.

The gap is therefore not analytical.

It is transformational.

1.3 From Reporting-Centric Models to Structured PADV Continuity

Traditional reporting models often follow a sequence centered on disclosure cycles:

Operational Activities→ Reporting Preparation→ Disclosure Output

In such models, data may be reconstructed retrospectively in response to reporting requirements.

Within a PADV-anchored perspective, a structurally continuous model may instead follow:

Participation→ Action→ Structured Data Formation→ Cross-Cycle Aggregation→ Value Formation→ Analytical Interface

Under this view:

- Evidence formation occurs at the point of action
- Data is structurally linked to participation
- Aggregation precedes analytical interpretation
- Value emerges from continuity rather than periodic reconstruction

Disclosure, in this sequence, becomes a derivative output of a continuous transformation pathway.

Execution discontinuity therefore refers to the structural interruption of PADV's transformation logic within behavior-dense environments.

This chapter does not propose changes to analytical frameworks.

It clarifies the conditions under which PADV's transformation pathway may remain structurally incomplete without execution-layer structuring mechanisms.

1.4 Typology of Execution Discontinuity

To further clarify the structural nature of execution discontinuity within the PADV transformation pathway, this section introduces a non-normative typology of disruption patterns.

The typology is conceptual and intended solely for analytical clarification.

It does not introduce thresholds, measurement criteria, or regulatory implications.

Execution discontinuity may arise in several structurally distinct forms:

Type A — Participation Ambiguity Risk

Occurs when operational actors are not clearly registered or attributable within a defined boundary.

Impact on PADV: Participation → Action linkage becomes unstable.

Structural Consequence: Data formation may lack accountability anchors.

Type B — Action Fragmentation Risk

Occurs when operational actions are performed but not consistently recorded in

standardized formats.

Impact on PADV: Action → Data continuity is interrupted.

Structural Consequence: Evidence must be reconstructed retrospectively.

Type C — Data Reconstruction Risk

Occurs when structured data is assembled primarily during reporting cycles rather than at the point of action.

Impact on PADV: Data → Value aggregation becomes episodic.

Structural Consequence: Continuity across cycles weakens.

Type D — Cross-Cycle Break Risk

Occurs when evidence formats, actor identifiers, or contextual tagging shift across reporting periods.

Impact on PADV: Value formation becomes non-comparable across time.

Structural Consequence: Aggregation readiness is reduced.

This typology does not evaluate severity.

It provides a structural lens through which execution-layer vulnerability may be examined prior to analytical interpretation.

2. Conceptual Foundations of BEA

2.1 Definition

Behavioral Evidence Accumulation (BEA) refers to:

An execution-layer structuring approach derived from the PADV (Participation–Action–Data–Value) transformation logic, designed to support the continuous formation, aggregation, and contextualization of traceable operational evidence prior to analytical interpretation.

Within PADV, operational value emerges through the structured transformation of participation and action into analyzable data.

BEA does not alter this transformation logic.

Rather, it addresses the structural conditions under which the Participation → Action → Data → Value pathway may remain continuous in behavior-dense operational environments.

BEA therefore operates at the transformation continuity layer.

It does not:

- Redefine analytical interpretation
- Modify materiality assessment
- Substitute disclosure frameworks

It focuses exclusively on how operational behaviors are structurally recorded so that they may enter the PADV pathway without discontinuity.

In this sense, BEA may be understood as:

The execution-layer operationalization of PADV within distributed and participation-dense ecosystems.

2.2 Minimum Structural Characteristics

For the PADV transformation pathway to remain structurally continuous, certain execution-layer conditions must be present.

A BEA-compatible execution model requires:

1. Actor-Bound Attribution

Each participation or action event must be attributable to a defined actor entity.
This preserves the Participation stage within PADV.

2. Time-Bound Traceability

Operational actions must be associated with temporal markers.
This supports chronological continuity within the transformation sequence.

3. Context Tagging

Actions must be recorded within defined operational contexts (e.g., activity type, location, operational scope).
This enables meaningful aggregation at the Data stage.

4. Structural Consistency Across Cycles

Evidence units must retain compatible formats across reporting periods.
This ensures continuity between Data and Value aggregation.

5. Aggregation Readiness

Structured data must be capable of grouping into analyzable sets without retrospective reconstruction.

This preserves the integrity of the Value formation stage.

These characteristics do not impose normative thresholds.

They define structural conditions necessary to maintain PADV transformation continuity.

2.3 Evidence Unit (Conceptual Model)

To operationalize BEA, this paper introduces a conceptual Evidence Unit (EU) model.

An Evidence Unit represents the minimal structurally recorded instance of operational behavior within the PADV pathway.

An EU may minimally contain:

- Actor reference (participating entity or accountable unit)
- Event classification (type of operational action)
- Timestamp (time of occurrence)
- Context metadata (operational scope or tagging information)
- Structural identifier (unique linking reference)

Within the PADV logic:

Participation is linked to Actor reference. Action is represented through Event classification. Data emerges through structured recording of timestamp and context. Value becomes possible when multiple Evidence Units are aggregated consistently.

The Evidence Unit model does not validate factual accuracy, verify compliance, or interpret risk exposure.

It structures traceability only.

It preserves the transformation pathway without entering analytical authority.

3. Execution-Layer Structuring Model

3.1 Layered Conceptual Model

To clarify the relationship between analytical interpretation and execution structuring, this paper proposes a three-layer conceptual model.

Layer 1 — Analytical Framework (External)

This layer includes analytical methodologies such as LEAP and other interpretive frameworks.

Functions at this layer may include:

- Risk identification
- Impact assessment
- Materiality determination
- Disclosure evaluation

Interpretive authority and analytical sovereignty reside exclusively at this level.

BEA does not operate at this layer.

Layer 2 — Execution Structuring (BEA)

This layer represents the execution-layer operationalization of the PADV transformation pathway.

Its function is to ensure that:

Participation→ Action→ Data

remain structurally continuous prior to analytical interpretation.

Layer 2 performs:

- Actor-bound attribution
- Context tagging
- Evidence unit formation
- Cross-cycle structural preservation
- Aggregation readiness preparation

It does not perform:

- Risk interpretation
- Materiality analysis
- Disclosure determination

Layer 2 structures transformation continuity;
it does not exercise interpretive authority.

Layer 3 — Operational Activities

This layer consists of real-world operational events, including:

- Participation instances
- Operational actions
- Resource flows
- Transactional interactions

These activities may occur continuously and across distributed actors.

Without Layer 2 structuring, these activities may remain fragmented or reporting-driven.

Relationship Between Layers

Layer 3 generates participation and action signals.

Layer 2 structures those signals into traceable evidence units consistent with PADV transformation logic.

Layer 1 interprets aggregated outputs according to analytical frameworks.

Authority and interpretive sovereignty remain entirely at Layer 1.

BEA operates strictly between operational activity and analytical interpretation.

3.2 Evidence Formation Process

Within this layered model, evidence formation follows a structured transformation sequence.

Operational Event→ Actor Attribution→ Context Tagging→ Evidence Unit Formation→ Aggregation→ Analytical Interface

This sequence reflects the operationalization of PADV:

Participation→ Action→ Structured Data→ Value Formation

More specifically:

- Operational Event corresponds to Action within PADV.
- Actor Attribution preserves Participation linkage.
- Context Tagging supports structured Data formation.
- Evidence Unit Formation stabilizes Data continuity.
- Aggregation enables Value formation.
- Analytical Interface connects structured outputs to external frameworks.

The process is designed to ensure that evidence is formed at the point of action rather than reconstructed retrospectively.

Importantly, the Analytical Interface does not interpret data.
It prepares structured outputs for interpretation by external frameworks.

3.3 Cross-Cycle Continuity

A key objective of BEA is to prevent structural interruption between reporting periods.

Execution structuring may therefore include:

1. Period-to-Period Evidence Linking

Evidence units remain structurally compatible across cycles, enabling continuity rather than episodic reconstruction.

2. Aggregated Exposure Sets

Evidence units may be grouped into structured sets corresponding to operational scopes or activity domains.

3. Structured Historical Traceability

Historical evidence remains linked to actor attribution and context metadata, preserving longitudinal continuity.

These mechanisms support the Value stage within PADV by ensuring that aggregation emerges from continuous structuring rather than ad hoc compilation.

Cross-cycle continuity enables analytical frameworks to access structured inputs without altering interpretive authority.

It strengthens transformation continuity while preserving framework sovereignty.

4. Generalized Phased Implementation Model (SME-Ready)

(Operationalization of PADV Transformation Continuity)

This chapter presents a generalized phased implementation model illustrating how BEA may be operationalized within behavior-dense ecosystems, particularly those characterized by SME participation and distributed actors.

The model is derived from PADV transformation logic and is designed to preserve Participation → Action → Data → Value continuity through structured execution-layer mechanisms.

The phased model is conceptual and voluntary in nature.

It does not constitute a certification protocol or regulatory requirement.

Phase 1 — Boundary & Actor Registration

(Stabilizing Participation within PADV)

The first phase focuses on establishing structural clarity at the Participation level.

Key elements may include:

- Defining operational scope (project, event, supply chain, activity domain)
- Identifying participating actors
- Assigning structural identifiers to actors
- Clarifying accountability boundaries

In PADV terms, this phase stabilizes the Participation stage by ensuring that operational engagement is not anonymous or structurally ambiguous.

Without defined participation boundaries, downstream Action and Data structuring cannot remain continuous.

This phase does not assess performance or compliance.
It establishes structural preconditions for traceable transformation.

Phase 2 — Continuous Behavioral Logging

(Structuring Action into Data)

The second phase addresses the transition from Action to Data within the PADV pathway.

Operational activities may be:

- Event-driven
- Recurring
- Distributed across actors

This phase involves:

- Standardizing event classification

- Recording timestamps
- Tagging contextual metadata
- Ensuring actor linkage for each operational action

The objective is to ensure that actions are recorded at the point of occurrence rather than reconstructed retrospectively at reporting intervals.

This supports structural continuity between Participation and Data.

It does not interpret the significance of actions.

Phase 3 — Evidence Aggregation

(Enabling Value Formation within PADV)

The third phase concerns aggregation readiness.

Individual Evidence Units, once structurally recorded, may be grouped into:

- Activity sets
- Operational scopes
- Period-based groupings
- Exposure-related clusters

Aggregation at this stage:

- Preserves structural linkage
- Maintains actor attribution
- Enables cross-cycle consistency

In PADV logic, Value formation becomes possible when structured Data is aggregated consistently across time and operational scope.

This phase prepares evidence for analytical interpretation but does not conduct that interpretation.

Phase 4 — Analytical Interface Preparation

(Maintaining Framework Sovereignty)

The final phase concerns interface compatibility.

Structured aggregation outputs may be:

- Tagged for analytical alignment
- Exported in compatible formats
- Mapped illustratively to external frameworks

This phase ensures that structured outputs can enter analytical frameworks (e.g., LEAP) without requiring reinterpretation at the execution layer.

Importantly:

- No analytical determination occurs at this stage
- No materiality judgment is performed
- No disclosure evaluation is issued

Analytical sovereignty remains external.

The execution layer provides structured inputs; the framework layer performs interpretation.

Adaptability Across Sectors

This phased model is:

- Voluntary
- Conceptual
- Adaptable across sectors
- Scalable for SME participation
- Compatible with distributed operational environments

It does not prescribe industry-specific standards.

Rather, it illustrates how PADV transformation continuity may be operationalized within diverse execution contexts.

5. Illustrative Mapping to LEAP

This chapter provides an illustrative conceptual mapping between BEA (as an execution-layer operationalization of PADV) and the LEAP analytical structure.

The purpose of this section is not to reinterpret LEAP, nor to redefine its methodological components.

It serves solely to demonstrate how structured execution continuity may support analytical input readiness.

5.1 Neutral Recap of LEAP Steps

The LEAP approach, as articulated within TNFD-related materials, generally follows four high-level analytical stages:

Locate

Identify interface points between organizational activities and nature.

Evaluate

Assess dependencies and impacts.

Assess

Determine risks and opportunities.

Prepare

Develop responses and disclosures.

This paper does not reinterpret these stages.

It recognizes LEAP as an analytical methodology operating at the interpretive layer.

BEA operates exclusively at the execution layer prior to these stages.

5.2 Conceptual Mapping (Illustrative Only)

The following table illustrates how execution-layer discontinuities within PADV transformation continuity may affect LEAP input readiness, and how BEA structuring may mitigate those discontinuities.

LEAP Step	**Potential Execution Risk (PADV Disruption)**	**BEA Structuring Function**	**Example Evidence Artifact**
Locate	Ambiguous participation boundaries	Actor-bound registration and scope tagging	Boundary declaration record
Evaluate	Fragmented action recording	Standardized event logging with contextual metadata	Activity log with actor linkage
Assess	Inconsistent data aggregation across cycles	Structured aggregation sets preserving cross-cycle continuity	Aggregated exposure set
Prepare	Disconnected historical traceability	Period-linked evidence continuity	Structured response log linked to prior evidence

Interpretation of the Mapping

This mapping does not suggest that BEA performs any LEAP stage.

Rather:

- LEAP performs analytical interpretation.
- BEA ensures structural continuity of the inputs entering LEAP.

The mapping illustrates how:

Participation → Action → Data → Value(PADV transformation)

may provide structurally consistent inputs to:

Locate → Evaluate → Assess → Prepare(LEAP analytical process)

BEA therefore functions as a transformation continuity mechanism.

It does not:

- Interpret nature-related risks
- Determine materiality
- Issue disclosure recommendations
- Substitute LEAP methodology

The mapping is conceptual and illustrative.

It does not imply endorsement, certification, partnership status, or interpretive authority.

6. Governance & Framework Sovereignty

(Preservation of Analytical Authority and Structural Boundaries)

This chapter clarifies the governance positioning of BEA within the broader institutional landscape.

The objective is to ensure that execution-layer structuring remains clearly distinguished from analytical interpretation and regulatory authority.

6.1 Non-Normative Positioning

Behavioral Evidence Accumulation (BEA), as articulated in this paper, is explicitly non-normative.

It does not:

- Redefine LEAP or any analytical framework
- Introduce interpretive guidance
- Impose materiality thresholds

- Alter risk classification logic
- Establish disclosure criteria
- Substitute regulatory authority
- Issue compliance judgments

BEA is not a reporting standard.

It is not a certification mechanism.

It is not a governance override layer.

It is a structural execution-layer extension derived from PADV's transformation logic.

Its function is limited to preserving continuity in Participation → Action → Data → Value prior to analytical interpretation.

Normative authority remains entirely external to BEA.

6.2 Framework Sovereignty Preservation

Analytical frameworks retain full authority over:

- Risk identification and interpretation
- Impact and dependency assessment
- Materiality determination
- Disclosure requirements
- Governance standards
- Regulatory oversight

BEA does not perform any of these functions.

BEA operates solely as a pre-analytical structuring layer.

It structures operational evidence to improve traceability and aggregation readiness but does not determine the meaning, relevance, or regulatory implications of that evidence.

In layered terms:

Layer 3 — Operational Activities

Layer 2 — BEA Execution Structuring

Layer 1 — Analytical Framework Interpretation

Interpretive sovereignty resides exclusively at Layer 1.

The execution layer does not exercise upward authority.

6.3 Structural Boundary Integrity

To preserve institutional clarity, BEA maintains the following boundary principles:

1. **No Interpretive Override**

   Execution structuring does not reinterpret analytical categories.

2. **No Governance Substitution**

   Execution continuity does not replace governance processes.

3. **No Compliance Assertion**

   Structured evidence does not constitute compliance certification.

4. **No Framework Capture**

   BEA does not seek to internalize or subsume analytical methodologies.

These boundary principles ensure that BEA remains a supportive structural mechanism rather than a competing framework.

6.4 Institutional Compatibility

Because BEA operates strictly at the execution layer:

- It may be conceptually compatible with multiple analytical frameworks.
- It does not require framework modification.
- It does not depend on endorsement for structural validity.
- It does not assume analytical convergence across standards.

Its role is infrastructural in nature, but not authoritative.

Compatibility does not imply hierarchy.

7. Cross-Sector Applicability

(Sector-Neutral Execution Continuity Structuring)

Behavioral Evidence Accumulation (BEA), as an execution-layer extension of PADV transformation logic, is designed to operate independently of sector-specific characteristics.

Its applicability derives not from industry type, but from structural execution conditions.

Specifically, BEA is relevant in environments where:

- Participation is distributed across multiple actors
- Operational activities occur continuously or episodically
- Data capture capacity varies significantly across participants
- Evidence reconstruction is often reporting-driven
- Cross-cycle continuity is difficult to maintain

Such conditions are not confined to any single industry.

7.1 Temporary Operational Ecosystems

Temporary ecosystems may include:

- Events and exhibitions
- Short-term project consortia
- Pop-up operational clusters
- Limited-duration supply networks

These environments often exhibit:

- Rapid boundary formation and dissolution

- High actor turnover
- Short operational cycles
- Compressed reporting windows

Execution discontinuity may arise when participation and action are not structurally recorded at the time of occurrence.

BEA may support transformation continuity by stabilizing Participation → Action → Data linkage during temporary operations.

7.2 Project-Based Environments

Project-driven environments such as construction, infrastructure deployment, or research consortia typically involve:

- Multi-phase operational timelines
- Multiple subcontracting layers
- Distributed responsibility structures

Without execution-layer structuring, operational data may remain siloed within contractual units.

BEA may support cross-phase evidence continuity by preserving actor attribution and contextual tagging across project milestones.

7.3 Fragmented Supply Chains

Fragmented supply chains often involve:

- Tiered supplier structures
- Variable digital maturity
- Intermittent data exchange
- Inconsistent documentation standards

Execution discontinuity in such environments frequently occurs between Action and Data formation within the PADV pathway.

BEA may help stabilize this transition by introducing structured Evidence Units that preserve participation linkage and contextual metadata.

7.4 SME-Dense Contexts

Small and medium-sized enterprises frequently operate under:

- Resource constraints
- Limited reporting infrastructure
- Irregular documentation practices
- Event-driven compliance responses

In such contexts, analytical frameworks may assume structured inputs that operational capacity cannot consistently provide.

BEA does not increase analytical burden.

Instead, it seeks to simplify execution-layer structuring so that participation and action are recorded in minimal, traceable formats compatible with PADV continuity.

7.5 Distributed Logistical Systems

Logistics hubs, seasonal operations, and distributed transactional systems often generate:

- High-frequency operational events
- Multiple interacting actors
- Complex coordination patterns

Without structured execution-layer continuity, data may remain fragmented across nodes.

BEA may support aggregation readiness by preserving structural linkage across distributed activity points.

7.6 Sector Neutrality

BEA does not rely on industry-specific metrics, sectoral taxonomies, or predefined risk categories.

Its applicability is determined by structural characteristics rather than sector identity.

Wherever Participation → Action → Data continuity is vulnerable to interruption, execution-layer structuring may be relevant.

BEA therefore remains:

- Sector-neutral
- Framework-neutral
- Voluntary
- Adaptable to varying operational scales

It does not prescribe sector-specific standards.
It illustrates a transformation continuity model applicable across diverse execution contexts.

8. Limitations

This working paper presents Behavioral Evidence Accumulation (BEA) as a conceptual execution-layer extension of the PADV transformation logic.

The model is exploratory in nature and subject to the following limitations.

8.1 Conceptual Status

BEA, as described in this paper:

- Is a conceptual structuring model
- Has not been codified as a regulatory instrument
- Does not constitute a formal standard
- Is not positioned as an industry specification

The framework is presented for institutional dialogue and further examination.

It should not be interpreted as an endorsed methodology by any analytical or regulatory body.

8.2 Empirical Validation

The execution-layer mechanisms described herein:

- Require empirical testing across sectors
- May encounter implementation variability
- Depend on operational discipline and actor participation
- May require contextual adaptation

The structural logic is theoretical and requires cross-sector validation before broader generalization.

8.3 Factual Verification Boundary

BEA structures traceability.
It does not verify factual accuracy.

Specifically, BEA does not:

- Audit operational data
- Confirm event authenticity
- Validate environmental performance
- Certify risk exposure claims

The presence of structured evidence units does not imply correctness or regulatory compliance.

It preserves transformation continuity only.

8.4 Compliance and Certification Boundary

This paper does not:

- Establish reporting obligations
- Define disclosure sufficiency
- Grant compliance status
- Replace audit mechanisms
- Provide assurance services

Structured evidence formation does not constitute certification.

Regulatory interpretation and compliance determination remain external to BEA.

8.5 Framework Independence

BEA does not replace analytical frameworks.

It does not:

- Modify LEAP methodology
- Alter risk taxonomy
- Impose alignment requirements
- Create mandatory interface standards

Its conceptual mapping to LEAP is illustrative only.

Analytical sovereignty remains fully external.

8.6 Institutional Scope Limitation

BEA addresses only one layer within the institutional stack:

The execution layer of transformation continuity.

It does not address:

- Policy formation
- Regulatory design
- Normative governance

- Strategic risk modeling

Its contribution is structural, not interpretive.

9. Conclusion

This working paper has presented Behavioral Evidence Accumulation (BEA) as a conceptual execution-layer extension of the PADV (Participation–Action–Data–Value) transformation logic.

The analysis has focused on execution discontinuity in behavior-dense operational ecosystems, where participation and action may occur continuously, yet structural continuity between Action, Data, and Value formation may remain incomplete.

BEA is positioned as a structuring mechanism intended to preserve transformation continuity within PADV prior to analytical interpretation.

It does not introduce a new analytical methodology.

It does not reinterpret LEAP or other frameworks.

It does not define materiality, risk, or disclosure requirements.

Analytical sovereignty remains entirely external.

The contribution of this paper is limited to clarifying how execution-layer structuring may support:

- Actor-bound traceability
- Context-consistent data formation
- Cross-cycle aggregation readiness
- Structured inputs for analytical frameworks

BEA therefore operates as a pre-analytical continuity model.

Its relevance arises in environments where participation and operational action are dense, distributed, and vulnerable to structural discontinuity.

This working paper remains conceptual in scope.

Its propositions require:

- Empirical validation across sectors
- Operational testing in varied ecosystems
- Continued dialogue with analytical framework communities

Future research may explore:

- Sector-specific implementation conditions
- Interoperability with multiple analytical methodologies
- Governance-layer implications of execution continuity

The present paper does not seek to establish authority.

It seeks to clarify structure.

Execution continuity precedes analytical interpretation.

Interpretive authority remains external.

10. Institutional Lineage and References

This chapter clarifies the institutional origin of Behavioral Evidence Accumulation (BEA) and documents the conceptual reference environment informing its structural positioning.

10.1 Institutional Parent Framework: PADV

Behavioral Evidence Accumulation (BEA) is a structural execution-layer extension of the PADV (Participation–Action–Data–Value) transformation logic.

PADV articulates the transformation pathway through which:

Participation → Action → Data → Value

may evolve into analyzable value formation.

BEA does not modify, reinterpret, or expand PADV's theoretical structure.

Rather, BEA addresses the execution conditions required to preserve

transformation continuity in behavior-dense operational ecosystems.

In structural terms:

- PADV defines transformation logic.
- BEA operationalizes transformation continuity.

BEA therefore derives conceptually and structurally from PADV.

It does not constitute an independent analytical framework.

10.2 External Reference Context

While BEA is internally derived from PADV, its layered distinction between execution structuring and analytical interpretation is informed by broader developments in:

- Sustainability-related disclosure frameworks
- Nature-related analytical methodologies
- Internal control and governance architectures
- Distributed operational traceability design
- Data governance principles

The references listed below provide contextual grounding for the structural separation between execution-layer continuity and analytical interpretation.

They are cited to clarify the conceptual environment in which BEA positions itself. BEA does not reinterpret, incorporate, or modify these frameworks.

Sustainability and Analytical Frameworks

- International Sustainability Standards Board (ISSB). (2023).

  IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information.

  IFRS Foundation.

- International Sustainability Standards Board (ISSB). (2023).

IFRS S2 Climate-related Disclosures.

IFRS Foundation.

- Taskforce on Nature-related Financial Disclosures (TNFD). (2023).

  Recommendations of the Taskforce on Nature-related Financial Disclosures.

  TNFD.

Governance and Internal Control

- Committee of Sponsoring Organizations of the Treadway Commission (COSO). (2013).

  Internal Control — Integrated Framework.

- Committee of Sponsoring Organizations of the Treadway Commission (COSO). (2017).

  Enterprise Risk Management — Integrating with Strategy and Performance.

Data Governance and Traceability

- Khatri, V., & Brown, C. (2010).

  Designing data governance.

  Communications of the ACM, 53(1), 148–152.

- Weber, K., Otto, B., & Österle, H. (2009).

  One size does not fit all — A contingency approach to data governance.

  Journal of Data and Information Quality, 1(1).

- Appelbaum, D., Kogan, A., & Vasarhelyi, M. (2017).

  Big data and analytics in the modern audit engagement.

  Accounting Horizons, 31(3), 91–115.

10.3 Boundary Clarification

The inclusion of references does not imply:

- Endorsement
- Certification
- Interpretive authority
- Framework alignment claims
- Governance delegation

BEA remains:

- Execution-layer specific
- Framework-neutral
- Non-normative
- Structurally derived from PADV

Analytical sovereignty remains external.

References clarify context.
They do not confer authority.

Appendix A — Behavioral Evidence Artifact Taxonomy

This appendix outlines a conceptual taxonomy of evidence artifacts that may emerge within a BEA-compatible execution-layer environment.

The taxonomy is derived from PADV transformation logic and is intended solely for structural clarification.

It does not define mandatory formats, industry standards, or certification requirements.

The categories below are sector-neutral and adaptable.

A.1 Participation Artifacts

(Stabilizing the Participation Stage of PADV)

Participation artifacts preserve structural clarity regarding who is involved within a defined operational boundary.

They may include:

- Actor registration records
- Organizational identity references
- Role designation within operational scope
- Boundary declaration records
- Participation enrollment confirmation

These artifacts ensure that participation is attributable rather than anonymous.

They do not assess performance, responsibility fulfillment, or compliance status.

Their function is structural stabilization of the Participation stage within the PADV pathway.

A.2 Action Artifacts

(Structuring the Action Stage of PADV)

Action artifacts represent operational events performed by identifiable actors.

They may include:

- Event classification records
- Activity execution logs
- Operational milestone entries
- Transaction occurrence markers
- Resource utilization events

Action artifacts are time-bound and actor-linked.

They record that an action occurred, not whether it was sufficient, compliant, or effective.

Their purpose is to preserve the transition from Participation to Data.

A.3 Data Artifacts

(Stabilizing Structured Data Formation)

Data artifacts emerge when action records are structured into standardized, traceable evidence units.

They may include:

- Evidence Units with unique identifiers
- Context-tagged activity entries
- Time-stamped structured records
- Metadata-linked operational entries
- Cross-referenced participation–action pairings

Data artifacts ensure that operational actions are not merely recorded but structurally formatted for aggregation.

They do not interpret risk, assign materiality, or classify impact.

They support transformation continuity between Action and Value.

A.4 Aggregation Outputs

(Supporting the Value Stage of PADV)

Aggregation outputs represent grouped sets of structured evidence units.

They may include:

- Period-based aggregation sets
- Operational scope summaries

- Activity cluster groupings
- Exposure-linked collections
- Cross-cycle continuity summaries

Aggregation outputs prepare structured data for analytical interface.

They do not:

- Determine risk exposure
- Assess materiality
- Generate disclosure conclusions
- Certify compliance

They enable Value formation within the PADV pathway by preserving continuity and structural consistency.

A.5 Sector Neutrality

The artifact categories above:

- Are independent of industry taxonomy
- Do not rely on sector-specific metrics
- Do not define reporting thresholds
- Do not assume analytical methodology

They describe structural positions within the PADV transformation sequence.

Different sectors may implement these artifacts using varying formats, technologies, or documentation systems.

BEA does not prescribe format uniformity.

It defines structural roles only.

Appendix B — Conceptual Architecture Diagram

(Layered Relationship Between Operational Activity, Execution Structuring, and

Analytical Interpretation)

This appendix provides a conceptual representation of the layered relationship between operational activities, execution-layer structuring (BEA), and external analytical frameworks.

The diagram is illustrative and non-normative.

It does not represent institutional hierarchy or authority transfer.

B.1 Layered Conceptual Model

The architecture may be represented as three structurally distinct layers:

Layer 1 — Analytical Framework (External)

This layer represents interpretive and analytical methodologies, such as LEAP and other sustainability-related analytical frameworks.

Functions at this layer may include:

- Risk identification
- Impact assessment
- Materiality determination
- Disclosure formulation
- Governance interpretation

Authority at this layer includes:

- Interpretive sovereignty
- Analytical judgment
- Regulatory governance

This layer is external to BEA.

No execution-layer mechanism modifies its logic.

Layer 2 — Execution Structuring Model (BEA)

This layer represents the operationalization of PADV transformation continuity.

Its role is limited to:

- Structuring participation records
- Recording operational actions
- Forming Evidence Units
- Maintaining cross-cycle structural continuity
- Preparing aggregated outputs for analytical interface

This layer does not:

- Interpret risk
- Define thresholds
- Determine compliance
- Exercise governance authority

Layer 2 ensures transformation continuity but does not exercise interpretive control.

Layer 3 — Operational Activities

This layer consists of real-world operational events, including:

- Participation occurrences
- Operational actions
- Resource flows
- Transactional exchanges
- Activity milestones

These events occur independently of analytical frameworks.

Without execution-layer structuring, they may remain fragmented or episodic.

B.2 Directional Flow of Structuring

The conceptual flow may be illustrated as:

Layer 3 (Operational Activities)
↓
Layer 2 (Execution Structuring — BEA)
↓
Layer 1 (Analytical Interpretation)

Operational events generate participation and action signals.

Execution-layer structuring preserves Participation → Action → Data continuity consistent with PADV.

Aggregated outputs may then enter analytical frameworks for interpretation.

Importantly:

Authority does not flow downward.

Interpretation does not occur at Layer 2.

Execution-layer structuring does not alter Layer 1 methodology.

B.3 Sovereignty Boundary Clarification

The architecture maintains clear structural boundaries:

- Operational events are independent of analytical interpretation.
- Execution structuring preserves traceability but does not generate analytical meaning.
- Analytical frameworks retain exclusive authority over interpretation, materiality, and disclosure.

Layer separation ensures:

Structural support without interpretive substitution.

Compatibility without hierarchy.

Continuity without authority transfer.

B.4 Non-Hierarchical Positioning

The layered representation is functional rather than hierarchical.

It does not imply:

- Framework dependency
- Analytical endorsement
- Governance delegation
- Institutional subordination

Each layer performs a distinct role:

Operational occurrence

Execution continuity

Analytical interpretation

BEA exists strictly within the middle layer.

Appendix C — Conceptual Evidence Unit Schema

This appendix provides an illustrative representation of how a minimal Evidence Unit (EU) may be structured in machine-readable form.

The schema below is conceptual and non-binding.

It does not prescribe format standards or interoperability requirements.

C.1 Minimal Evidence Unit Structure (Illustrative)

Example (JSON-style representation):

```
{
  "evidence_unit_id": "EU-0001",
  "actor_id": "ACT-1023",
  "event_type": "OperationalActivity",
  "timestamp": "2026-02-24T10:15:00Z",
  "context_tags": ["ProjectScope-A", "Location-SG"],
  "cycle_reference": "FY2026-Q1"
```

}

C.2 Structural Elements

Field	Structural Function within PADV
evidence_unit_id	Structural continuity anchor
actor_id	Participation linkage
event_type	Action classification
timestamp	Chronological traceability
context_tags	Data contextualization
cycle_reference	Cross-cycle aggregation alignment

C.3 Boundary Clarification

This schema:

- Does not define verification procedures
- Does not validate factual accuracy
- Does not impose interoperability standards
- Does not constitute a reporting format

It illustrates how transformation continuity may be operationalized in structured environments.