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What do you think?

Intelligence that cannot explain itself may still compute — but cannot convince.

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Explainability as a feature of intelligence?

From minds and machines to organizations

October 9th 2025 – Explainable AI Training Week @ BFH, Bern

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Why Explainability Matters Today?

Basic examples:

- Algorithms perform reasoning tasks once reserved for humans
- Opaque models create trust, governance, and learning gaps

Explainability might restore **interpretive sovereignty.**

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Overview

1. Intelligence across disciplines
2. Explainability as a relational feature of intelligence
3. Case study of added value of explainability for ECOINT
4. Short role-play – if time permits

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PART I — Intelligence across disciplines

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Educational Sciences: Intelligence as Learnability & Plasticity

- Intelligence ↔ Education: **mutual dependence** (Mayer)
- From singular, innate ability (Binet, Spearman)→ modular, improvable skills (Hunt, Sternberg)
- **Plasticity**: intelligence can grow through explanation (Collins et al.)
- **Emotional intelligence** bridges emotion and reason (Humphrey et al.)

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Psychological Sciences: Intelligence as Adaptation & Problem-Solving

- g factor (Spearman): a single general intelligence
- s factors & multiple intelligences (Gardner, Sternberg)
- Fluid vs. crystallized intelligence (Horn & Cattell) – Age factor
- Measurement: IQ as ratio of mental age / biological age

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Intelligence in Nature: Distributed and Collective Forms

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Intelligence in Nature: Distributed and Collective Forms

- Animals: adaptive behavior for survival
- Swarm intelligence: group problem-solving
- Plants: distributed decision systems
- Blobs: maze-solving

Intelligence doesn't require centralization but requires coordination.

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Artificial Intelligence: Computation & Optimization

- LLMs as simulation of adaptive reasoning
- Machine Learning: experience-based generalization
- Deep Learning: various levels of abstraction and depth through neural architectures and layers

The same reflexivity humans use in thought ("why did I decide this?") must now exist in machines to **translate computation back into understanding**.

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Intelligence in Security & Strategic Studies

Intelligence, operationally follows the intelligence cycle model:

- *Direction*: identifying what to know – and *who should know which part*
- *Collection*: gathering raw information (human, signal, imagery, open source).
- *Processing*: cleaning, translating, structuring.
- *Analysis*: making meaning, testing hypotheses.
- *Dissemination*: delivering conclusions to decision-makers.
- *Feedback*: updating priorities for the next loop.

Purpose: reduce uncertainty for decision-makers

This mirrors the logic of explainability: traceable reasoning from data → interpretation → decision → review.

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Synthesis Across Disciplines

Domain	Core View of Intelligence	Key Lesson	Implicit Need for Explainability
Education	Learnability & plasticity	Intelligence can be taught	Teaching = explaining
Psychology	Adaptation & problem-solving	Contextual reasoning	Contextual explanations
Nature	Distributed adaptation	Collective coordination	Shared understanding
AI	Computation & optimization	Externalized cognition	Transparency of process
Security	Directed sense-making	Reliable decision loops	Traceable reasoning

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PART II — Explainability as a Feature of Intelligence

From Capability to Feature

Intelligence used to mean "being good at reasoning."

Now, being intelligent also means being able to explain one's reasoning to others.

Explainability can thus be considered a **meta-feature of intelligence**: converting knowledge into communicable understanding, **enabling learning and correction,** which **depends on the scale of the** explanation **relation** (micro, meso, macro, meta).

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Added value of Explainability

- One insight → many audiences
- Explainability = Relationship between
  - the explainer (model / analyst)
  - the explanation (message / representation)
  - the explainee (decision-maker / user)

The "right" explanation depends on **who** asks, **why**, and in **which context**. What else does it depend on?

Explainability could thus be considered as **relational**.

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PART III — Implementing XAI in the case of ECOINT

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Recap of ECOINT

- Henri Martre (1994)

"Economic Intelligence is the coordinated **research**, **processing**, and **dissemination** of useful information for economic actors, with the aim of exploiting it for competitiveness and security."

Traits: Both a process and a governance system

Cycle: Collection → Processing → Analysis → Dissemination → Protection

AI and ECOINT: each step of the cycle will likely involve use of AI tools, thus decision making is threatened by unknown opacities

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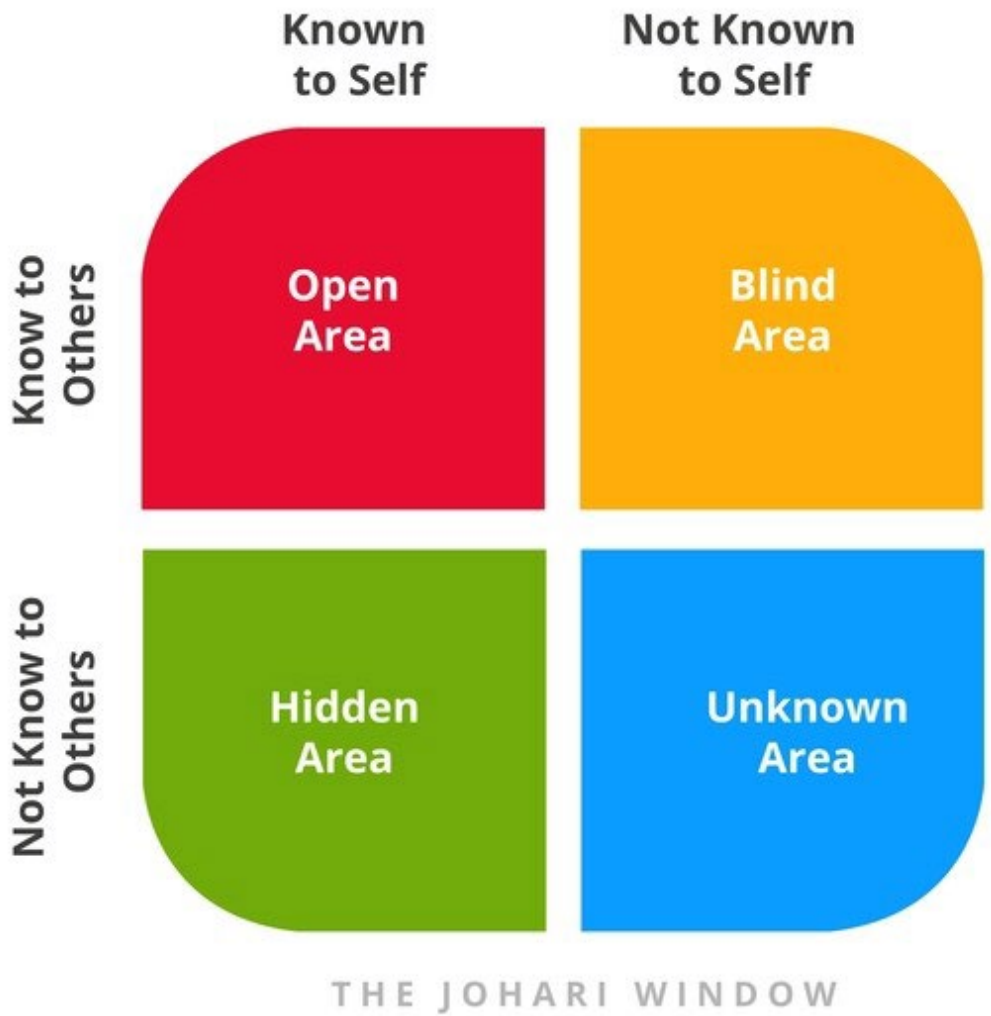
Recap of ECOINT



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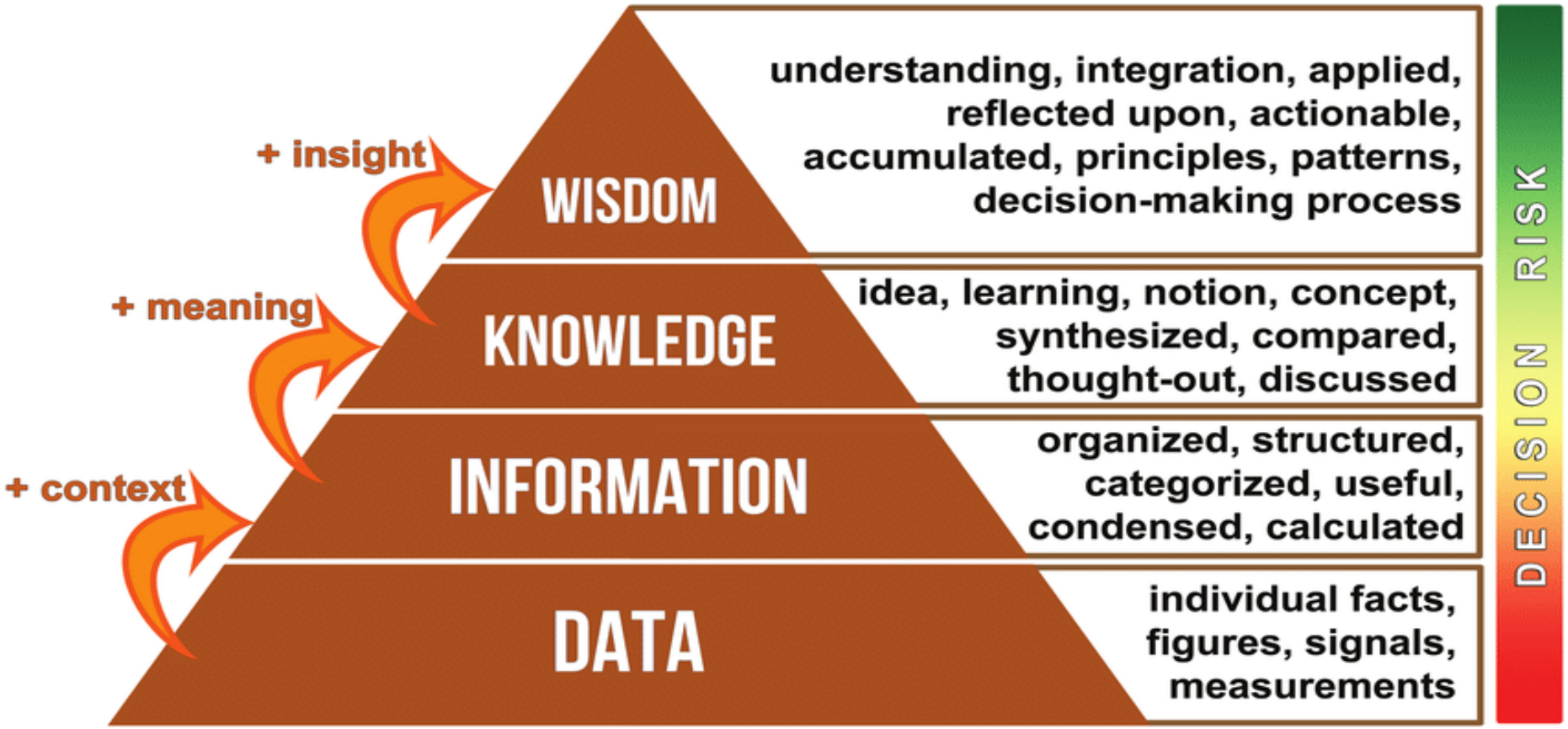
Recap on ECOINT

- Decision making & risk



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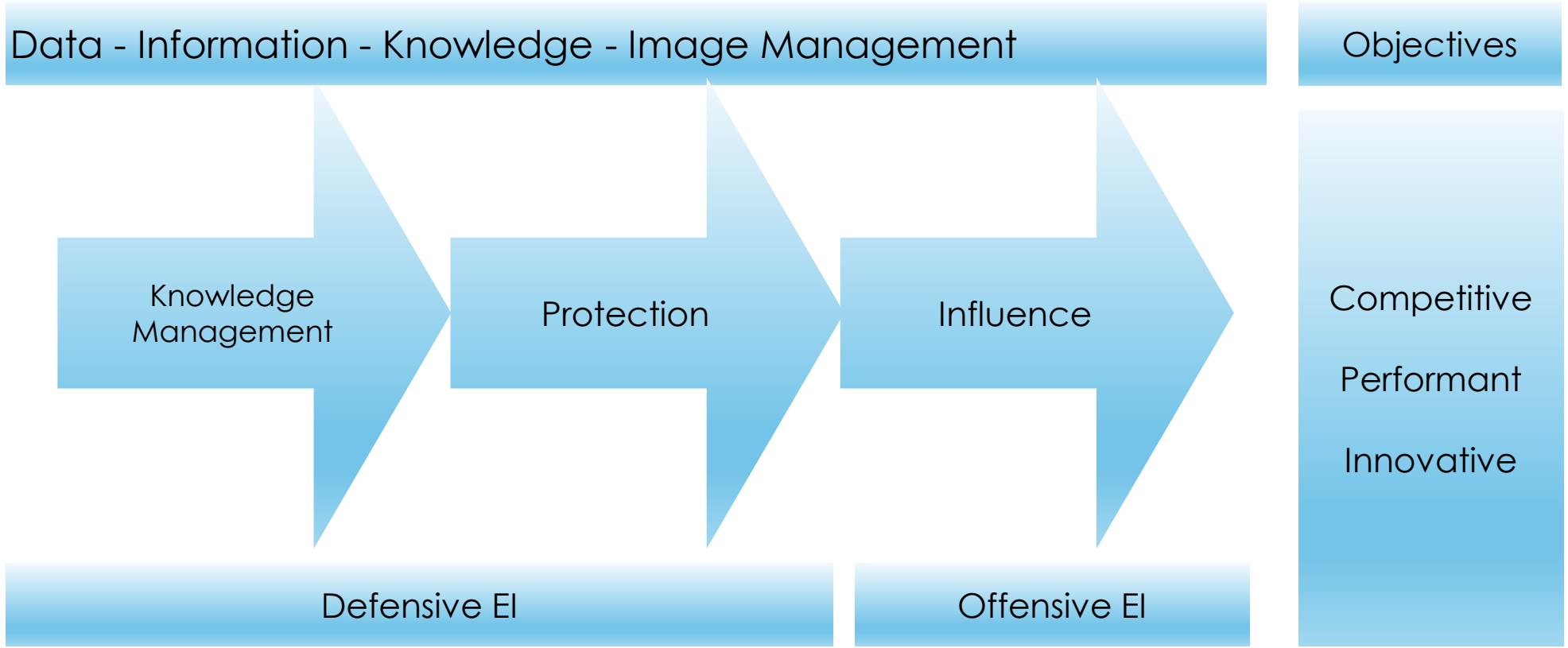
Recap on the ECOINT cycle



Knowledge Management: This involves collecting and analyzing information about the actor's environment, including competitors, customers, markets, and technologies.

Information protection: This involves protecting the actor's information from unauthorized access, use, disclosure, disruption, modification, or destruction.

Influence: This involves using information to influence the actor's environment, such as by lobbying for favorable laws and regulations or by shaping public opinion.

ECOINT Phase	Traditional Objective	How AI enhances it	Explainability Feature Needed	Strategic Value
Collection	Gather reliable info	• Automated web-scraping, OSINT • Entity & sentiment detection • Data deduplication	**Source transparency & data lineage** — know *where* data originated, *how* it was selected	Builds **trust** in inputs → reliable situational awareness
Processing	Structure & transform	• Pre-processing pipelines • Feature engineering by ML	**Model interpretability** — document transformations & algorithmic criteria	Ensures **control** of pipelines → defensible analytics
Analysis	Derive meaning	• Predictive & prescriptive models • Topic modeling, anomaly detection • Simulation dashboards	**Causal reasoning & counterfactuals** — explain *why* variables drive outcomes	Increases **decision confidence** & scenario credibility
Dissemination	Share insights	• LLMs (auto-report writing, briefings) • Adaptive visualization	**Narrative explainability** — tailor explanation to user type & cognitive load	Promotes **collective understanding** & faster alignment
Protection	Safeguard assets	• Threat-detection for data leaks • Policy-compliance monitoring	**Explainable governance** — traceable alerts, interpretable risk rules	Enhances **accountability & resilience** of EI systems

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ECOINT Phase	Key Stakeholders	Core Question They Ask	Type of Explanation Needed	Relational Rationale
Collection	Field analysts, data engineers, domain experts	"Why are these sources and indicators selected?"	**Methodological / provenance** (source reliability, bias, legality)	They need to trust and replicate input choices.
Processing	IT teams, data scientists, quality officers	"How was data transformed and filtered?"	**Technical / procedural** (algorithms used, cleaning logic)	They ensure reproducibility and identify errors.
Analysis	Intelligence officers, economists	"Why does the model or analysis point to this conclusion?"	**Causal / counterfactual** (drivers, variable influence)	They need interpretability to defend recommendations.
Dissemination	Managers, executives, communicators	"What does this mean for our decisions or strategy?"	**Narrative / visual** (storyline, dashboard, scenario framing)	They need clarity and contextual sense-making.
Protection	Compliance, legal, audit, ethics boards	"Can we prove that the process was fair and accountable?"	**Governance / ethical** (audit trail, documentation)	They require traceability to ensure legitimacy.

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PART IV — Quick poll

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Roleplay

An AI-assisted Economic Intelligence monitor raises an **alert**:
“Risk of disruption to our critical component supply from Country X next quarter.”

Do you trigger a *Procurement Contingency Plan* today?
🟩 Yes 🟥 No / Wait for confirmation

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Explanations

Collection (Provenance): Alert is based on open-source reports + satellite night-light data showing a 12% month-over-month drop in the industrial zone that hosts your suppliers.

Processing (Pipeline): Data were deduplicated, translated, and geolocated; older reports from advocacy blogs were down-weighted by credibility scoring.

Analysis (Causal Driver): A new export licensing rule was enacted in Country X; historically, similar rules reduced actual shipments by ~15% within 6–8 weeks for comparable sectors.

Protection (Governance/Risk): The model's false-positive rate on disruption alerts is ≈ 20%; however, regulatory scrutiny is rising on vendor concentration—waiting might expose board-level risk if disruption hits.

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Explainability as **a feature of intelligence?**

Thank you for your attention !

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