

ACE-Adjusted Return on Intelligence

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Core thesis

AI makes analysis and computational intelligence abundant. The scarce production factor becomes attentive human cognition applied to consequential evaluation under valid authority.

The relevant economic question is no longer only:

| How much labour cost did AI remove?

It becomes:

| How effectively did the system convert cheap machine intelligence into valuable, legitimate and risk-adjusted action while preserving scarce human evaluation capacity?

Primary unit: Attentive Cognitive Evaluation

Attentive Cognitive Evaluation (ACE) is the scarce human production unit in an AI-native organization.

One **ACE-second** is one second in which a human:

1. gives focused attention to a defined decision surface;
2. has sufficient context to understand the matter;
3. applies relevant experience and judgment;
4. holds valid authority for the decision;
5. accepts responsibility for the consequence.

An ordinary labour second is not automatically an ACE-second. Time spent searching, waiting, formatting, routing, reconstructing context or reviewing irrelevant material consumes attention but does not produce Attentive Cognitive Evaluation.

ACE exists only when attention, context, cognition, judgment, authority and responsibility are simultaneously present.

Cost of ACE

Let:

- C_h = fully loaded human cost per second;
- p_f = probability of focused attention;
- p_c = probability that sufficient context is present;
- p_j = probability that genuine judgment is required;
- p_a = probability that valid authority is present.

Then:

$$\text{ACE-second cost} = C_h / (p_f \times p_c \times p_j \times p_a)$$

This explains why useful senior evaluation is far more expensive than salary divided by working time.

Machine unit: AI Deliberation Second

An **AI Deliberation Second (ADS)** is one second of model and tool activity used to reduce uncertainty before a decision or action.

ADS may include retrieval, comparison, anomaly detection, simulation, policy checking, evidence assembly, explanation and proposal generation.

ADS and ACE are not interchangeable. ADS produces analysis. ACE converts analysis into accountable evaluation and legitimate authority.

Conversion ratio

$$\text{ACE Leverage} = \text{useful ADS} \times \text{decision-quality factor} \times \text{context-completeness factor} / \text{ACE-seconds consumed}$$

The purpose is not to send more machine output to humans. It is to compress large amounts of machine work into the smallest sufficient decision surface.

Production function

$$\text{Realized value} = \text{machine intelligence} \times \text{ACE} \times \text{execution integrity}$$

Execution integrity includes correct identity, authority, policy, context, evidence, enforcement and outcome traceability.

If ACE or execution integrity approaches zero, enterprise value collapses even when the model is highly capable.

ACE-Adjusted Return on Intelligence

Traditional AI ROI overweights labour reduction and throughput. It often ignores review burden, false actions, accountability gaps, rework, control cost and the value of preserved ACE capacity.

The proposed metric is **ACE-Adjusted Return on Intelligence (AARI)**.

Let:

- V = value created by completed actions;
- L = expected losses avoided;
- E = economic value of ACE capacity released;
- R = rework and coordination cost avoided;
- C_{ai} = model, compute, tool and data cost;
- C_g = governance, verification and control cost;
- C_{ace} = ACE cost still consumed;
- C_e = expected error, incident and remediation cost;
- q = decision-quality factor from 0 to 1;
- a = authority-validity factor from 0 to 1;
- x = execution-integrity factor from 0 to 1.

Then:

$$AARI = [(V + L + E + R) \times q \times a \times x] - (C_{ai} + C_g + C_{ace} + C_e) / (C_{ai} + C_g + C_{ace})$$

The released-capacity component is:

$$E = \text{ACE-seconds released} \times \text{marginal value per ACE-second}$$

The marginal value reflects the best alternative use of the authorized person's evaluation capacity, not merely payroll cost.

Core KPI: ACE Yield

$$\text{ACE Yield} = \text{risk-adjusted value realized} / \text{ACE-seconds consumed}$$

At company level:

$$\text{Enterprise ACE Yield} = \text{total risk-adjusted realized value} / \text{total ACE-seconds consumed}$$

This measures how well the organization allocates its scarcest human production factor.

ACE Utilization

ACE Utilization = ACE-seconds spent on genuinely human-required evaluations / total senior attention seconds

Low utilization means the organization wastes scarce cognition and authority on searching, formatting, routine checking, coordination or low-consequence approvals.

Authorization Compression

Authorization Compression = total preparation seconds avoided / ACE-seconds consumed at clearance

A governed system may use hundreds of ADS to prepare a matter that requires only a few ACE-seconds to authorize.

The goal is not to remove the human. It is to ensure that human cognition is applied only where judgment, mandate and responsibility add real value.

Worked example

A payment approval currently requires 15 minutes from a finance director.

After implementation:

- AI and tools perform 240 seconds of investigation;
- governance checks identity, mandate, policy, evidence and payment context;
- the finance director spends 20 ACE-seconds reviewing and authorizing;
- 880 human attention seconds are released;
- the model and governance run costs 2.50 NOK.

If the loaded human cost is 0.50 NOK per second, the direct released capacity is worth 440 NOK before avoided fraud, reduced rework or faster processing.

Capacity return = $(440 - 2.50) / 2.50 = 175\times$

The full AARI additionally includes quality, authority validity, execution integrity and avoided loss.

Organizational implication

Managers become allocators of ACE capacity, not primarily producers of analysis.

Work should be routed according to consequence, uncertainty and required authority, not only department and job title.

AI systems should spend abundant ADS to preserve scarce ACE, but stop at the boundary where human authority and accountability are required.

Governance is therefore not overhead after automation. It is the conversion mechanism that allows machine intelligence to become legitimate enterprise action.

Canonical statement

AI makes intelligence abundant. The scarce resource is Attentive Cognitive Evaluation. The real ROI of AI is the risk-adjusted value created per ACE-second consumed.

Canonical metrics

1. Attentive Cognitive Evaluation (ACE)
2. ACE-second
3. AI Deliberation Second (ADS)
4. ACE Leverage
5. ACE Yield
6. ACE Utilization
7. Authorization Compression
8. ACE-Adjusted Return on Intelligence (AARI)