From Speed to Signal

How Edge Migrated from Information Access to Dimensionality Reduction

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Disclaimer

This paper presents an analytical framework for discussion. It does not constitute investment, legal, military, or policy advice, nor does it advocate specific actions. The views expressed are personal and intended to provoke informed debate.

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1. Introduction

There was a time when competitive edge came from **seeing the world sooner**.

Information was scarce, unevenly distributed, and slow to move. Firms that could compress the physical distance between events and decision-makers could extract real economic value. This was not metaphorical — it was operational reality.

In accounts marking **Caxton Associates**'s 40th anniversary, it was noted that copies of the **Financial Times** were flown across the Atlantic on **Concorde**, allowing the firm's New York office to read tomorrow's news today.

At the time, this behaviour was rational. Latency was measured in hours or days, not milliseconds. The binding constraint was access.

That world no longer exists.

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2. When Speed Stops Being Scarce

Today, information moves at effectively zero marginal cost.

News is instant.
Market data is ubiquitous.
Latency is widely commoditised.

For most participants, raw inputs arrive at roughly the same time and at similar levels of granularity.

The implication is subtle but profound:

When access and speed are no longer scarce, they cease to be primary sources of edge.

This does not imply that speed has ceased to matter everywhere. In specific niches — such as high-frequency trading, proprietary sensing, or privileged data collection — latency and access remain scarce and valuable. The argument here is that **for the majority of decision-makers**, the binding constraint has shifted.

Yet despite unprecedented information availability, decision quality has not improved proportionally. Confusion, volatility, and narrative instability have arguably increased.

The problem is not a lack of information.
It is an excess of it.

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3. The Real Constraint: Dimensionality, Not Volume

Information overload is often described as a volume problem. This framing is incomplete.

The deeper challenge is **dimensionality**.

In this context, dimensionality refers not to the amount of data, but to the **number of interacting variables, perspectives, time horizons, and feedback loops required to describe a system coherently**.

Historically, information arrived in low-dimensional, structured artefacts:

- A newspaper
- A speech
- A policy announcement
- A price series

Even when information was slow, it was cognitively tractable.

Modern data is different by nature. It arrives as:

- Continuous streams
- Interconnected networks
- Narrative feedback loops
- Cross-domain correlations
- Second-order reactions to first-order interpretations

A single event now spans economic, political, social, regulatory, technological, geographic, and temporal dimensions simultaneously.

Human cognition did not evolve to reason reliably in such high-dimensional state spaces.

The dominant failure mode today is not ignorance, but **premature narrative collapse**: compressing a complex, multi-factor reality into a simple explanation too early.

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4. Why Filtering Alone Fails

Traditional information management assumes:

1. Remove irrelevant data
2. Keep what remains
3. Decide

This approach works only when the underlying structure is simple.

In high-dimensional systems, meaning often resides in **relationships**, not individual data points. Aggressive filtering that ignores structure destroys signal.

Reducing volume without respecting dimensionality does not solve the problem — it accelerates misinterpretation.

This aligns with long-standing observations in cognitive science and economics, including the idea that attention — not information — is the scarce resource, articulated decades ago by **Herbert Simon**.

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5. AI as Dimensionality Reduction Infrastructure

This is where AI fits naturally — without mysticism.

AI's primary contribution today is not consciousness, autonomy, or independent judgment.

It is **dimensionality reduction**.

Modern machine-learning systems map high-dimensional inputs into lower-dimensional latent representations, preserving structure while compressing complexity. In practical terms, they:

- Combine many weak, correlated signals into interpretable patterns
- Preserve relationships across domains
- Maintain context across time
- Make complex environments cognitively navigable

This is not automation of thinking.
It is **compression of state space**.

AI reshapes the surface on which human judgment operates — it does not replace judgment itself.

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6. Human Cognition as Proof of Necessary Filtering

Humans already operate inside extreme information density.

At any moment, the sensory system ingests vastly more data than consciousness can process: visual detail, sound, bodily position, internal signals, emotional state, memory cues, and environmental context. The brain does not attempt to present this full state to awareness.

Instead, it performs continuous, aggressive filtering.

Most inputs are suppressed. Some are elevated. A small subset becomes attention, action, or conscious thought.

This process happens largely without awareness — and it is deeply imperfect.

Humans routinely miss:

- Objects in plain sight
- Signals masked by expectation
- Information inconsistent with prevailing narratives

Yet without this filtering, purposeful action would be impossible. Uncompressed reality is not actionable.

The implication is critical:

Lossy compression is not a flaw of cognition — it is a prerequisite for decision-making.

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7. AI as an Externalised Cognitive Filter

AI systems perform a function analogous to human perceptual filtering, but at the scale and dimensionality of modern data.

They:

- Suppress most inputs
- Elevate patterns
- Preserve relationships across domains
- Surface information that warrants attention

Like human cognition, this filtering is imperfect. Important signals may be missed. Spurious correlations may be elevated. Context may be misunderstood.

Unlike biological perception, AI filters are shaped by training data, objectives, and institutional incentives — introducing failure modes that differ from human biases.

A critical risk arises when the criteria used for compression are opaque to the human decision-maker. Dimensionality reduction necessarily embeds assumptions about relevance, correlation, and salience. When these assumptions are poorly understood, the apparent "edge" may be illusory — a confident narrative built on hidden biases, artefacts, or hallucinated structure.

AI does not eliminate epistemic risk.
It **reshapes** it.

The risk is not that AI filters imperfectly, but that filtered output is mistaken for ground truth.

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8. AI as Computer, Not Oracle

A useful analogy is the arrival of the computer itself.

When computers became widely available:

- Access was broad
- Hardware was comparable
- Outcomes diverged dramatically

The difference was not the machine — it was **how it was used**.

Some used computers as:

- Typewriters
- Calculators
- Filing cabinets

Others used them to:

- Model systems
- Simulate futures
- Design new workflows
- Create new forms of leverage

AI follows the same pattern.

It is a **general-purpose cognitive substrate**. Value capture will be uneven, skill-dependent, and expressive of the user's existing thinking style.

AI amplifies cognition — it does not standardise it.

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9. On Self-Conscious AI

Much public discourse focuses on whether AI will become self-aware.

This may be an important research question, but it is largely orthogonal to present economic reality.

At this stage, AI is best understood as:

An extraordinarily capable indexer and stitcher of high-dimensional data into coherent, navigable representations.

Indexing is not trivial. It turns data into memory, memory into retrieval, and complexity into navigation.

Calling AI an “amazing indexer” is not reductive — it is precise.

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10. The New Concorde — and Its Limits

The Concorde did not make the world larger.
It made it **smaller in the dimension that mattered: time**.

AI does not make information simpler.
It makes it **lower-dimensional in the dimensions humans can act on**.

Where Concorde collapsed physical distance, AI collapses cognitive distance — between data and interpretation, between signal and action.

However, the Concorde analogy carries an important lesson. Concorde was eventually retired not because it failed technically, but because it became economically inefficient for most users. It was not replaced by a faster aircraft, but by technologies that eliminated the need for physical speed altogether. When information could move instantly, the economic value of transporting decision-makers faster collapsed.

As AI-based compression becomes widespread, the source of advantage migrates again — not to the filter itself, but to **how it is used**.

When everyone has access to similar models, edge accrues to those who:

- Frame better questions
- Resist premature narrative closure
- Integrate filtered signals into coherent decision processes
- Exercise judgment under uncertainty

The scarce skill is no longer speed, nor access, nor even compression — but **disciplined interpretation**.

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11. Conclusion

Edge has not disappeared. It has migrated.

- From access to interpretation

- From speed to structure
- From volume to dimensionality

In the past, firms built advantage by moving newspapers faster than competitors.

Today, advantage comes from moving the **conditions for understanding** faster than noise.

AI does not understand.
It reorganises complexity so that understanding becomes possible under cognitive and temporal constraints.

AI is not the trader.
It is the aircraft.