

**CORE© INSIGHT SERIES**

Continuous Opportunity and Risk Dynamics Engine

Article 2 of 5 — The TTS

# Beyond the Heat Map: The Threat-Trajectory Score

*Replacing static risk scoring with a dynamic, formula-driven measure that tells you where risks are going*

Adrian Clements | 2026 | Article 2 of 5 | CORE© Insight Series

## The Problem This Article Addresses

The risk heat map is the dominant output of enterprise risk management. It is also, demonstrably, inadequate. Two risks with identical heat map positions may be moving in completely opposite directions — one improving, one accelerating toward crisis. Boards and risk committees are making escalation and resource allocation decisions on information that is systematically stripped of its most critical signal: momentum. This article introduces the Threat-Trajectory Score — a direct replacement for static scoring that adds the directional, dynamic information that risk decisions actually require.

## Summary

The heat map has served enterprise risk management for thirty years. In that time, business environments have become faster, more interconnected, and more prone to non-linear disruption. The heat map has not kept pace. The Threat-Trajectory Score (TTS) — the mathematical engine of CORE© — is a direct replacement: a dynamic, multi-dimensional risk score that incorporates velocity, systemic amplification, information processing limits, and criticality proximity into a single auditable number.

## 1. The Problem with Static Risk Scoring

### Failure Mode 1: The Stable-Looking Accelerating Risk

A risk that is deteriorating between review cycles — moving from background concern to operational threat — scores identically at consecutive risk committee meetings until someone manually upgrades it. By the time the score changes, the response window may have narrowed

significantly. This is not a process failure; it is a structural limitation of a model with no velocity term.

### Failure Mode 2: The False Equivalence

Two risks sitting in the same heat map cell may have completely different systemic profiles. One is an isolated operational risk with no cascade potential. The other is embedded in a network of interdependencies that will amplify it rapidly once it crosses a threshold. The heat map cannot distinguish them. The TTS can.

### Failure Mode 3: The Crossed Threshold

All complex systems have phase-transition thresholds: points at which incremental deterioration produces sudden, qualitative change. The 2008 financial crisis, the COVID supply chain collapse, and virtually every major corporate failure exhibit this pattern. A scoring model without a criticality term cannot detect proximity to these thresholds. The TTS does.

## 2. The Threat-Trajectory Score Framework

### 2.1 The Formula

#### The TTS Formula

$$\text{TTS}(t) = \{ [L(t) \times I(t) \times V(t) \times (1 + A \times \exp(\alpha \cdot t))] / \sqrt{(1 - (v/v_{\text{max}})^2)} \} \times [1 + \beta \times (\psi/\psi_c)^\gamma]$$

The formula has four multiplicative components, each capturing a distinct dimension of risk dynamics. It looks complicated. Its not. We already have all the information needed.

### 2.2 The Four Components

#### Base Risk Score: $L(t) \times I(t) \times V(t)$

The conventional Likelihood and Impact terms, now time-indexed, multiplied by Velocity  $V(t)$  — the rate of change of risk magnitude. Positive velocity means the risk is deteriorating. Negative velocity means it is improving. This single addition converts the score from a photograph into a trend. The data for velocity estimation comes from the same lead indicator monitoring that currently feeds the likelihood assessment.

#### Amplification: $(1 + A \times \exp(\alpha \cdot t))$

The amplification factor captures the self-reinforcing dynamics that characterise systemic risks — financial contagion, supply chain cascades, reputational spirals. Parameter  $A$  sets initial amplification magnitude;  $\alpha$  is the rate of acceleration. Both are calibrated from sector incident data and the organisation's own historical record in a one-time workshop exercise.

#### Information Inertia: $1 / \sqrt{(1 - (v/v_{\text{max}})^2)}$

How resistant to change are we? How fast are decisions actually implemented?, this term captures a phenomenon every senior manager recognises: when a crisis is moving very fast,

the organisation's ability to process information and make decisions becomes the binding constraint. As risk velocity approaches the maximum rate at which the organisation can effectively respond, the TTS inflates to reflect this decision-making compression. It's a reflection of company culture if you will.

### Criticality: $[1+\beta x(\psi/\psi_c)^\gamma]$

The criticality multiplier activates as a risk approaches the threshold  $\psi_c$  — the point at which the system transitions from recoverable deterioration to phase change, (Catastrophy in a worst case). Below this threshold the multiplier is near unity; above it, it amplifies sharply, providing an automatic escalation signal grounded in system dynamics rather than management judgement.

## 3. What the TTS Provides That the Heat Map Cannot

### An Escalation Signal with an Objective Trigger

In conventional ERM, escalation is a judgement call made by a committee. The TTS criticality multiplier provides an objective, formula-driven escalation trigger: when the multiplier exceeds a pre-agreed threshold, the risk automatically elevates to the next governance level. This removes a significant source of escalation latency from the risk management process.

### A Directional Risk Register

A TTS-scored risk register carries directional information: each entry has a current score, a velocity indicator, and an amplification status. The CFO can read, at a glance, not just which risks are rated highest but which are deteriorating fastest and which are approaching systemic amplification.

### Auditability

Every TTS calculation has a traceable parameter source, a calibration date, and a validation statistic. Regulatory bodies in financial services, energy, and critical infrastructure are moving toward quantitative requirements for risk methodologies. A TTS-scored risk register is auditable and defensible in a way that a heat map is not.

## 4. How to Initiate This in Your Organisation

The practical entry point is a parameter augmentation exercise applied to the existing risk register. The recommended initiation sequence:

- Step 1 — Velocity tagging: in the next risk assessment cycle, add a velocity estimate (improving / stable / deteriorating / accelerating) to each of the top ten risks. This immediately produces a velocity-weighted priority ranking.
- Step 2 — Amplification calibration: run a half-day calibration workshop with the risk function, using the organisation's own incident history to set amplification parameters

A and  $\alpha$  for the highest-priority risk categories. This is a one-time exercise, reviewed annually.

- Step 3 — Criticality threshold setting: work with the risk committee to define criticality thresholds  $\psi_c$  for each major risk category, using the risk appetite statement as the anchor. These become the objective escalation triggers in the revised governance protocol.

### First Step for the Risk Committee

At the next risk committee meeting, select the three risks currently rated High and ask: what is each one's velocity — is it stable, deteriorating, or accelerating? Present the velocity-adjusted ranking alongside the conventional heat map. The divergences between the two rankings are exactly where the heat map is misleading you.

## 5. Conclusions

The heat map has reached the limit of what two dimensions and a colour palette can communicate. The TTS extends the existing model across four additional dimensions while remaining directly compatible with ISO 31000 and COSO risk assessment infrastructure. The transition is incremental and the improvement in decision quality is immediate.

### Key Takeaways

- The heat map's fundamental limitation is the absence of a velocity term — it cannot distinguish a stable risk from an accelerating one.
- TTS adds velocity, amplification, information inertia, and criticality to the existing L x I model — producing a directional, dynamic score.
- The criticality multiplier provides an objective, formula-driven escalation trigger, replacing committee judgement with a calibrated system signal.
- Implementation begins with velocity tagging of existing risk records — one additional field, applied in the next assessment cycle.
- For boards and audit committees, TTS produces a register that is auditable, defensible, and directionally informative.

### ABOUT THIS SERIES: CORE© IN PRACTICE — Five Articles for Business Leaders

**The Overarching Message:** Your organisation makes risk decisions daily with tools designed thirty years ago. They score severity. They do not measure direction. They record what is at risk. They do not tell you whether you still have time to act. CORE© changes that. This series shows business leaders how to move from static risk registers

to a dynamic, causally-grounded risk intelligence system that integrates with the frameworks you already have.

**Why this matters to CEOs, CFOs, and Boards:** Risk misread as stable when it is accelerating destroys value silently. Opportunity visible in the data but invisible in the framework is value permanently foregone. CORE© provides the temporal and causal layer that converts existing risk data into forward-looking strategic intelligence for CEOs, CFOs, and boards.

#### Article 1 | RiskTime — The Missing Dimension

**Problem:** Boards and executives make risk decisions without knowing how fast a risk is moving or how much time remains to act.

**Key message:** RiskTime quantifies the effective decision window: how long the organisation has before a risk becomes causally locked in.

#### Article 2 ◀ YOU ARE HERE | The Threat-Trajectory Score — Beyond the Heat Map

**Problem:** Static Likelihood x Impact scoring cannot distinguish between a risk that is stable and one accelerating toward crisis.

**Key message:** TTS replaces the heat map with a dynamic, formula-driven score measuring direction, velocity, and systemic amplification.

#### Article 3 | The CCORD — Making Causal Structure Visible

**Problem:** Risk diagrams show severity at a point in time. They do not show whether the organisation still has the ability to intervene.

**Key message:** The CCORD makes the intervention boundary explicit, distinguishing risks that can be managed from those already locked in.

#### Article 4 | Every Crisis Is Someone's Opportunity — The Dual-Axis Model

**Problem:** Conventional risk management is structurally biased toward the downside, causing organisations to miss the upside of disruption.

**Key message:** CORE© computes opportunity and threat simultaneously, enabling boards to allocate resources across defence and growth.

#### Article 5 | Integration — Embedding CORE© in Your Existing Governance

**Problem:** New risk methodologies are dismissed because they appear to require discarding existing infrastructure.

**Key message:** CORE© is an augmentation, not a replacement. A three-phase roadmap embeds it into ISO 31000, COSO, and the Three Lines Model.

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