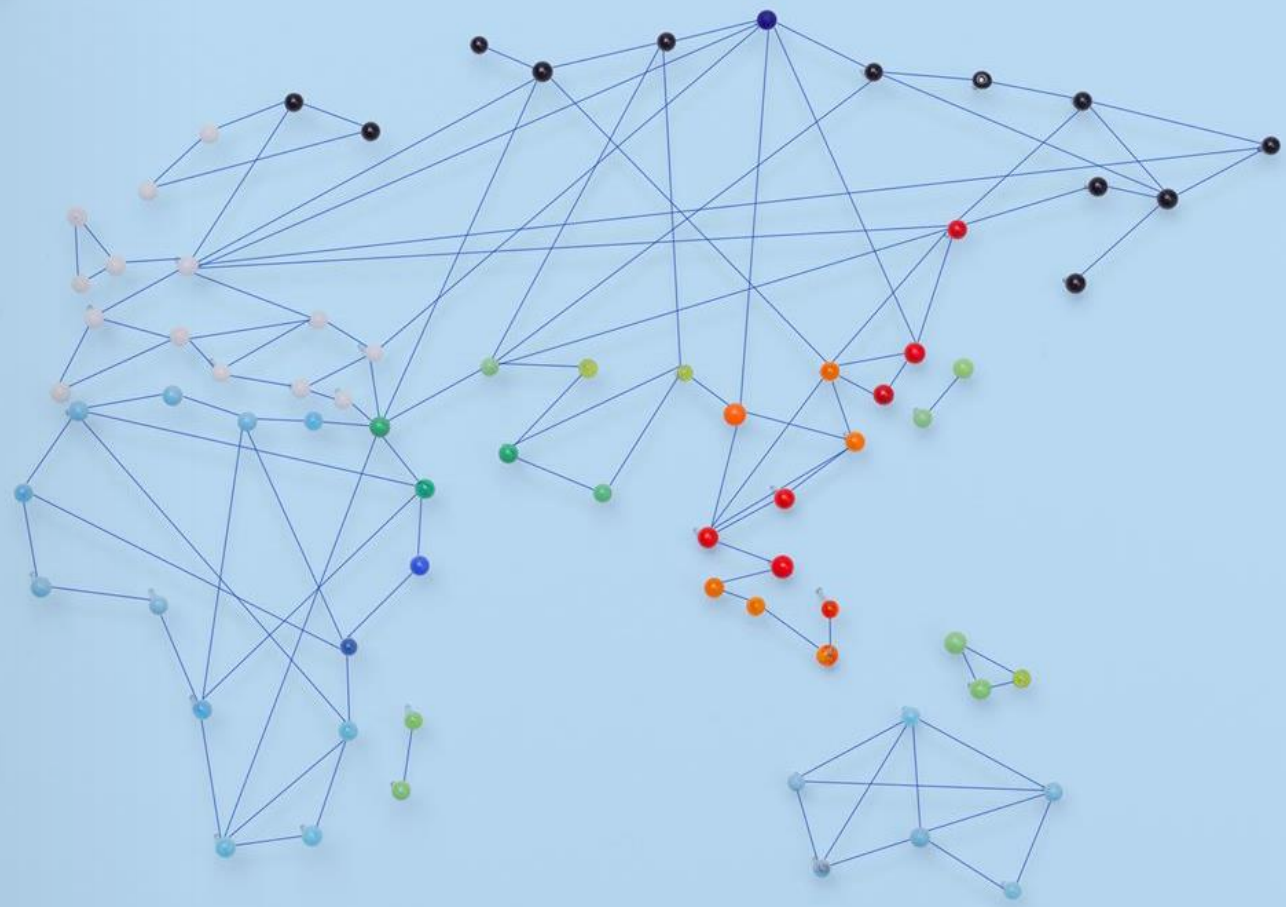
Synchronizing Cyber and Political Events Across Nations: A Three-Minute Thesis Visualization

Visualizing the connection between cyber and political events

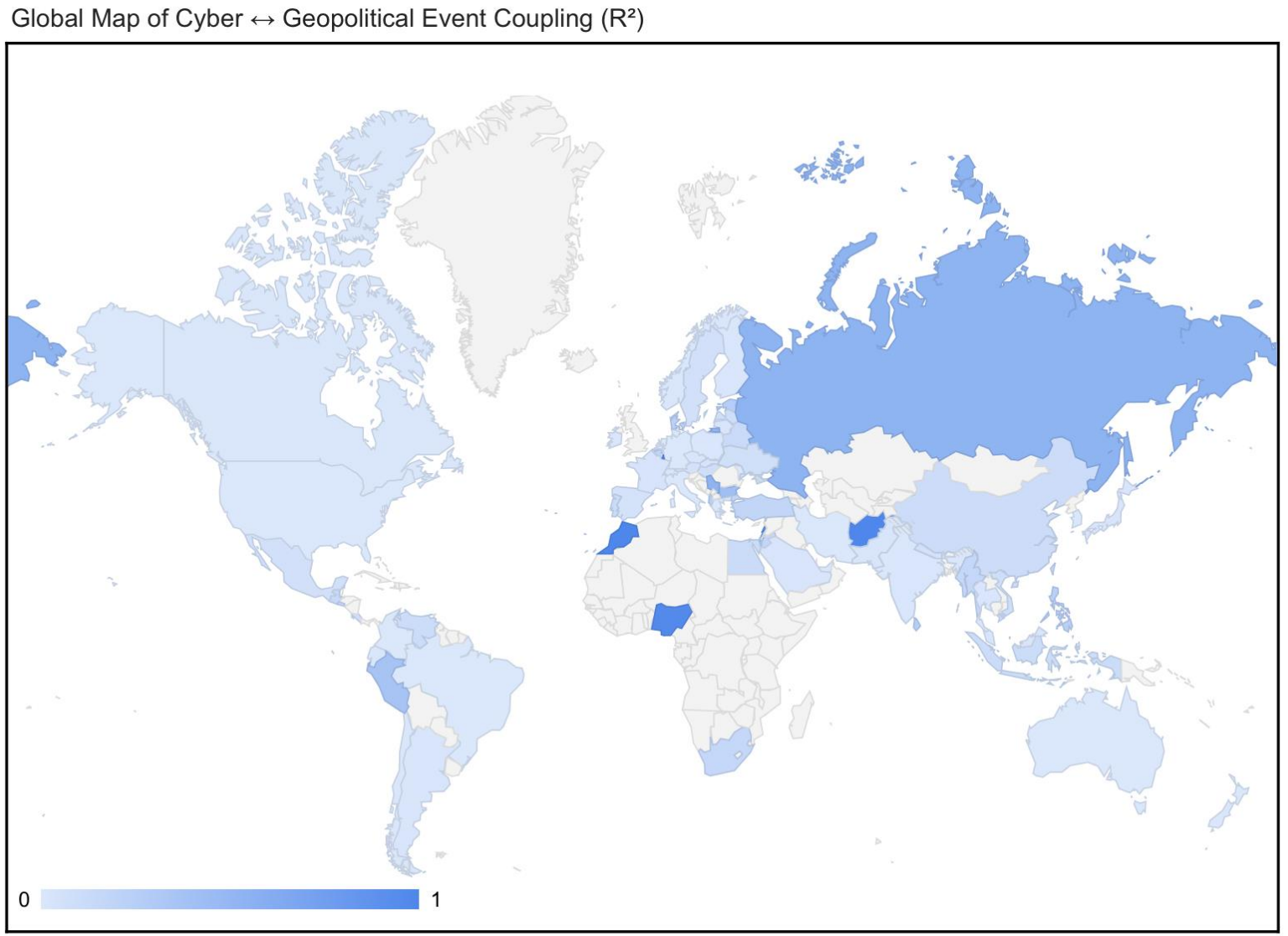


Global Coupling of Cyber & Political Events (R^2)

Degree of Coupling: Darker shading indicates a tighter month-to-month cyber ↔ political synchronization (higher R^2).

Hotspots of Synchrony: Russia, China, Iran (R^2>0.40) show very strong coupling—cyber surges mirror geopolitical spikes.

Coldspots of Independence: United States and many Western nations hover near $R^2 \approx 0$, suggesting alternative factors drive their cyber activity.



Strength of Fit & Top 3 Comparison

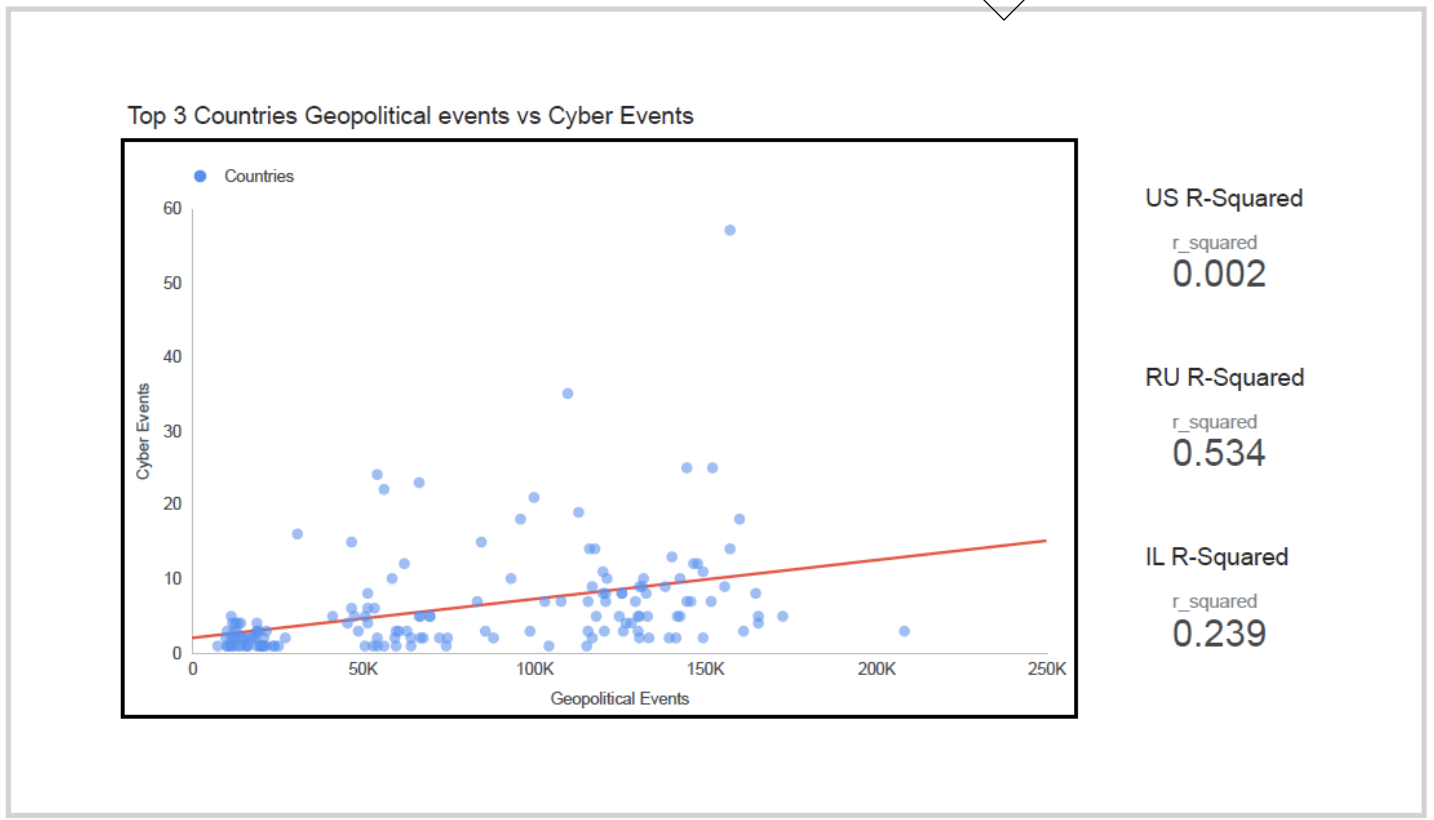
RU: R^2=0.534 → strong sync
IL: R^2=0.239 → moderate sync
US: R^2=0.002 → no sync

What R^2 Reveals: Explains the % of variance in monthly cyber-event counts that's linearly tied to geopolitical event volume.

Russia Leads: $R^2 \approx 0.53$ → over half of Russia's cyber fluctuations co-vary with political surges.

Israel Moderate: $R^2 \approx 0.24$ → one-quarter of Israeli cyber variation aligns with geopolitical counts.

U.S. Outlier: $R^2 \approx 0.00$ → virtually no linear relationship, pointing to other drivers (e.g. industry targets, criminal hacks).

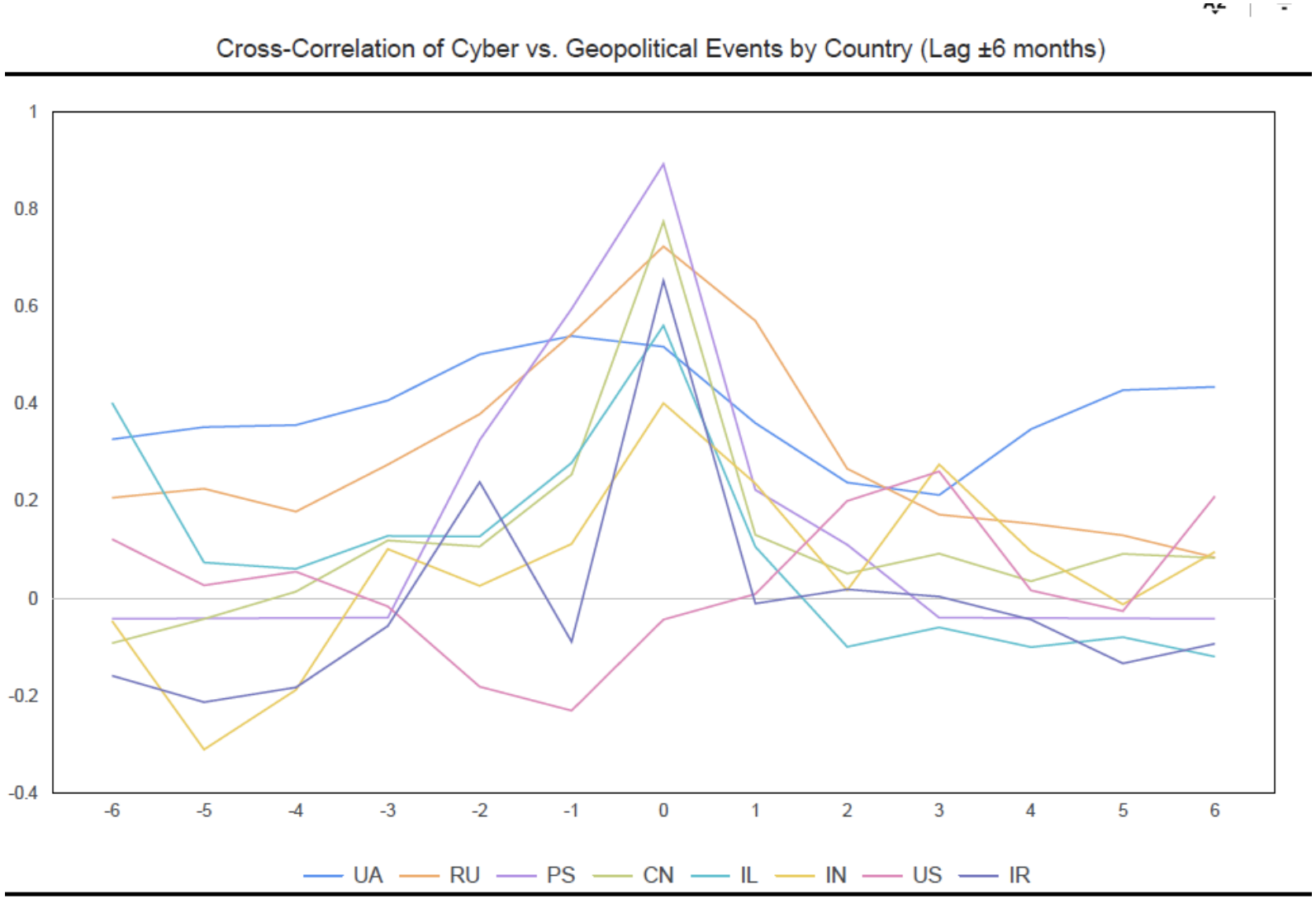


Cross-Correlation Profiles (Lag ± 6 Months)

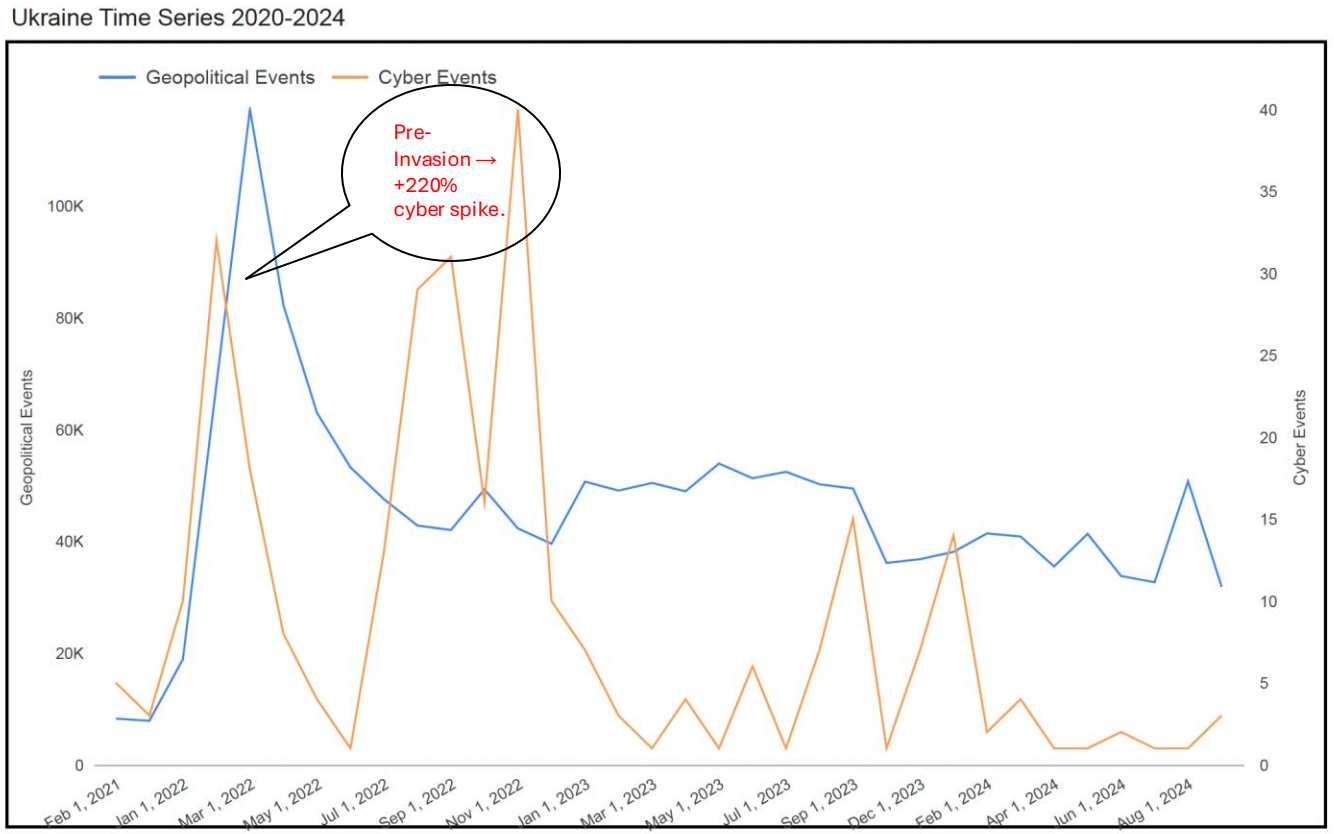
Peak at Lag 0: All top countries show their highest r (0.65–0.90) at month 0, proving cyber/political volumes move in lock-step.

Leads & Lags Matter: Ukraine peaks at –1 (cyber leads politics), U.S. at +3 (politics lead cyber).

Statistical Significance: Every peak is $p < .05$.

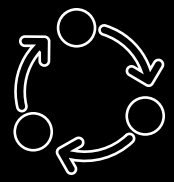


Ukraine Case Study (2020–2024)



- **Feb 2022 Invasion Spike**
  - Geopolitical events jumped from ~20 K to ~115 K (Δ+475%) when Russia invaded.
  - Cyber incidents surged from ~25 to ~80 (Δ+220%) one month **prior**, hinting at pre-conflict reconnaissance or probing.
- **Nov 2022 Cyber Resurgence**
  - Political counts had fallen back to ~50 K, yet cyber incidents peaked again at 90, suggesting a second wave of cyber operations even as frontline fighting stabilized.
- **Lagged Correlation Insight**
  - Peak cross-correlation at lag = –1 ($r=0.54$, $p<.001$) shows cyber activity often **leads** political events by ~1 month—a potential early warning signal.
- **Implication for Strategy**
  - Monitoring cyber-attack volumes could give advance notice of escalating kinetic conflict, improving crisis forecasting.

Conclusion

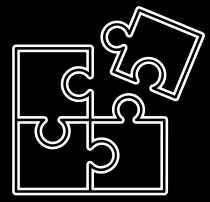


Synchronous Surges:

Russia & China cyber spikes align with political crises ($R^2 > 0.7$).

Early Warnings

In Ukraine cyber volume leads political spikes by ~1 month—potential for predictive monitoring.



Context Variance

The U.S. shows virtually no coupling ($R^2 \approx 0$), implying domestic cyber trends follow different drivers.