

An Overview of Resilience Measurement Frameworks

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Why measure resilience?



Opportunities

- Supports targeted and data-driven decision-making
- Simplifies complex systems
- Increases transparency
- Drives targeted reduction in disaster vulnerability and exposure

Quinlan et al. 2016



Challenges

- Can block deeper understanding of system dynamics
- Inherently reductive
- Can incentivize “teaching to the test” rather than underlying resilience goals

No Direct Measurement

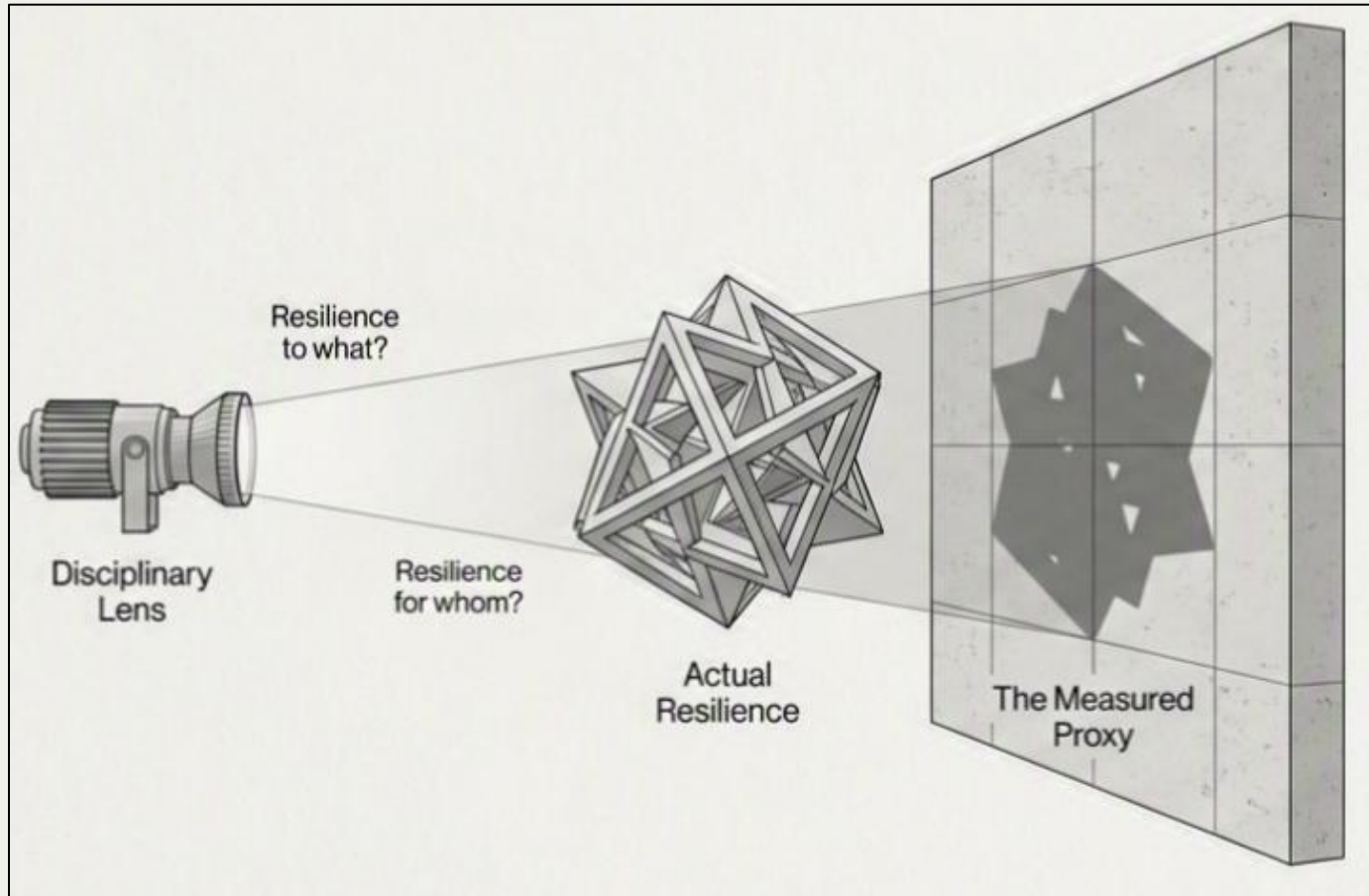


Figure made with Google Notebook LM

Resilience of what and to what?

Resilience for whom?

Subjective or Objective definition and evaluation?

Sustainability and climate adaptation

Process vs. Outcome

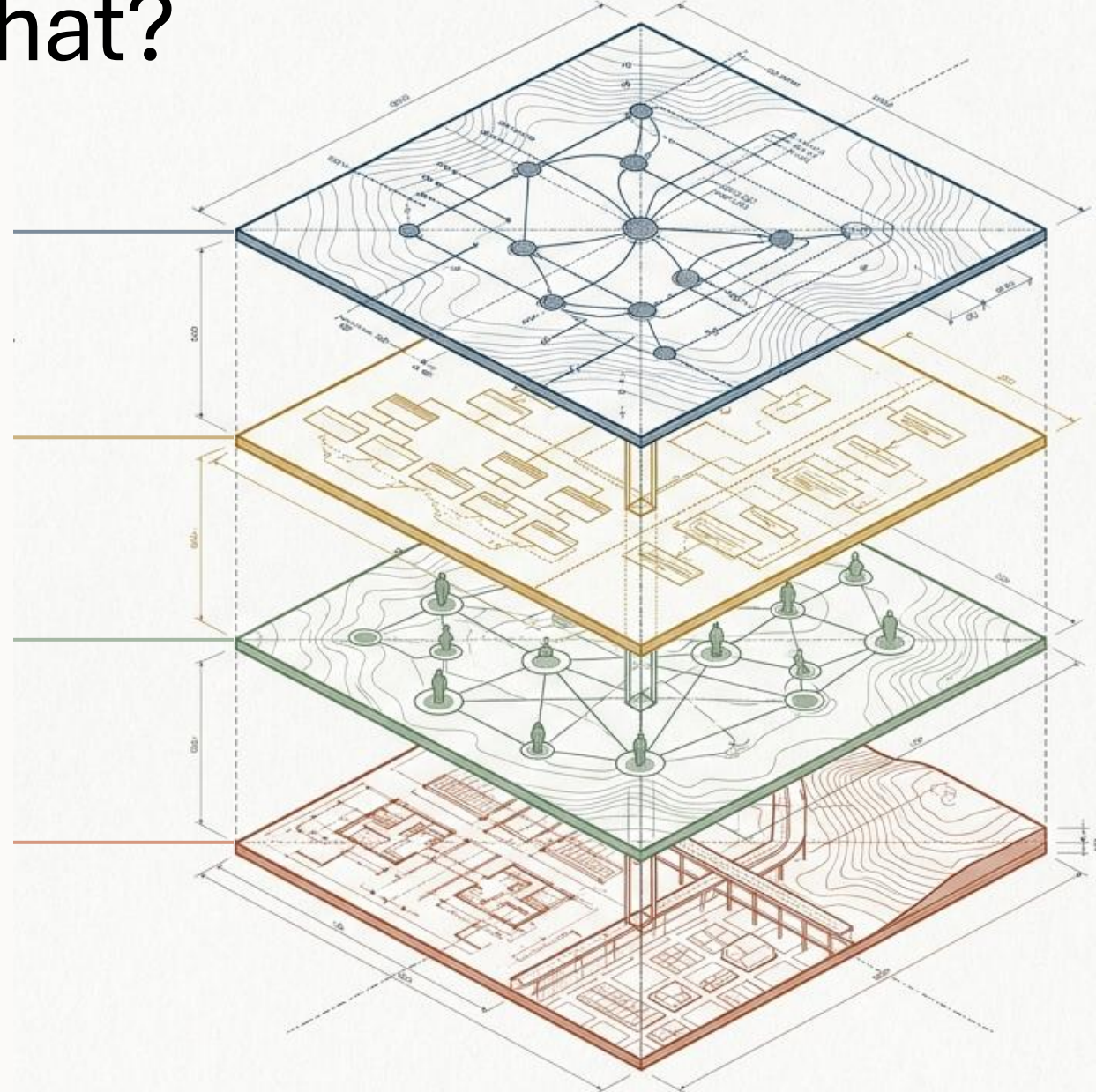
Resilience of What?

Cyber & Security
Systems

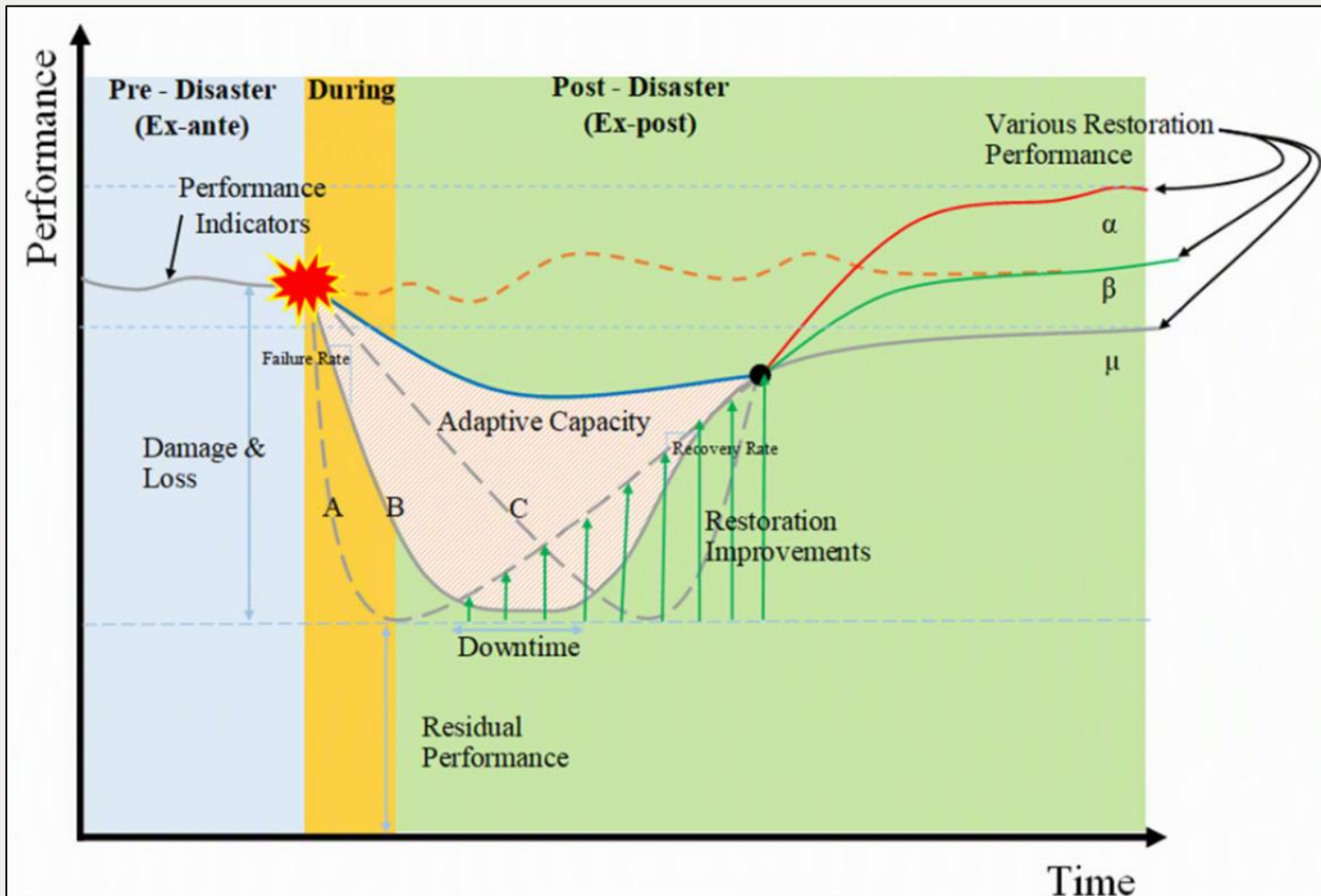
Institutional &
Organizational Systems

Social & Community
Systems

Engineering & Physical
Infrastructure



Physical and Infrastructure Systems



Primary Focus

Structural capacity, network science, damage thresholds, and restoration time

Core Frameworks

4Rs (Robustness, Redundancy, Resourcefulness, and Rapidity)
Multi-criteria assessment frameworks

Measurement Tools

Resilience curves, degradation models, and indicator-based assessments

Socio-Ecological and Community Systems

Primary Focus

Place-based characteristics, Thresholds and tipping points, capacities and capitals of resilience

Core Frameworks

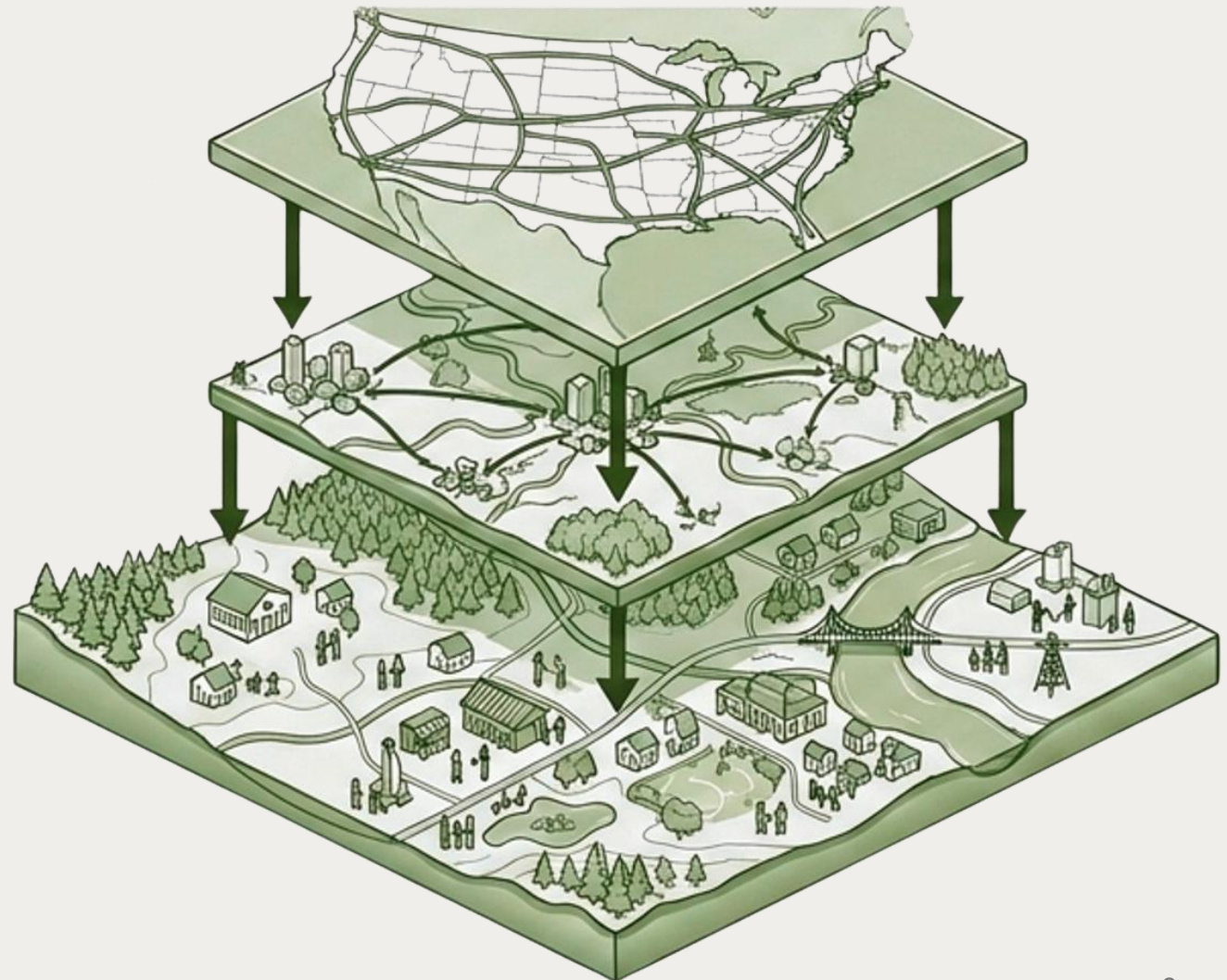
Disaster Resilience of Place (Cutter et al. 2008)

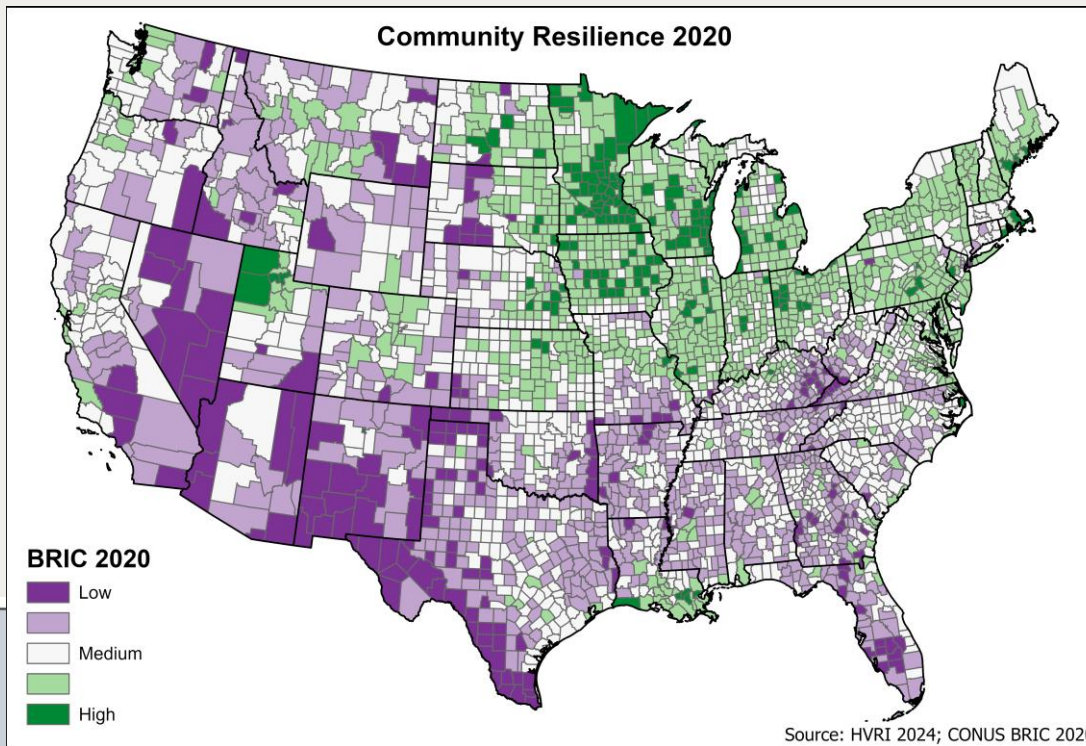
Norris et al. (2008) Networked adaptive capacities

Measurement Tools

Composite indices, framework-based scorecards, qualitative assessment

Example: Baseline Resilience Indicators for Communities (BRIC) index



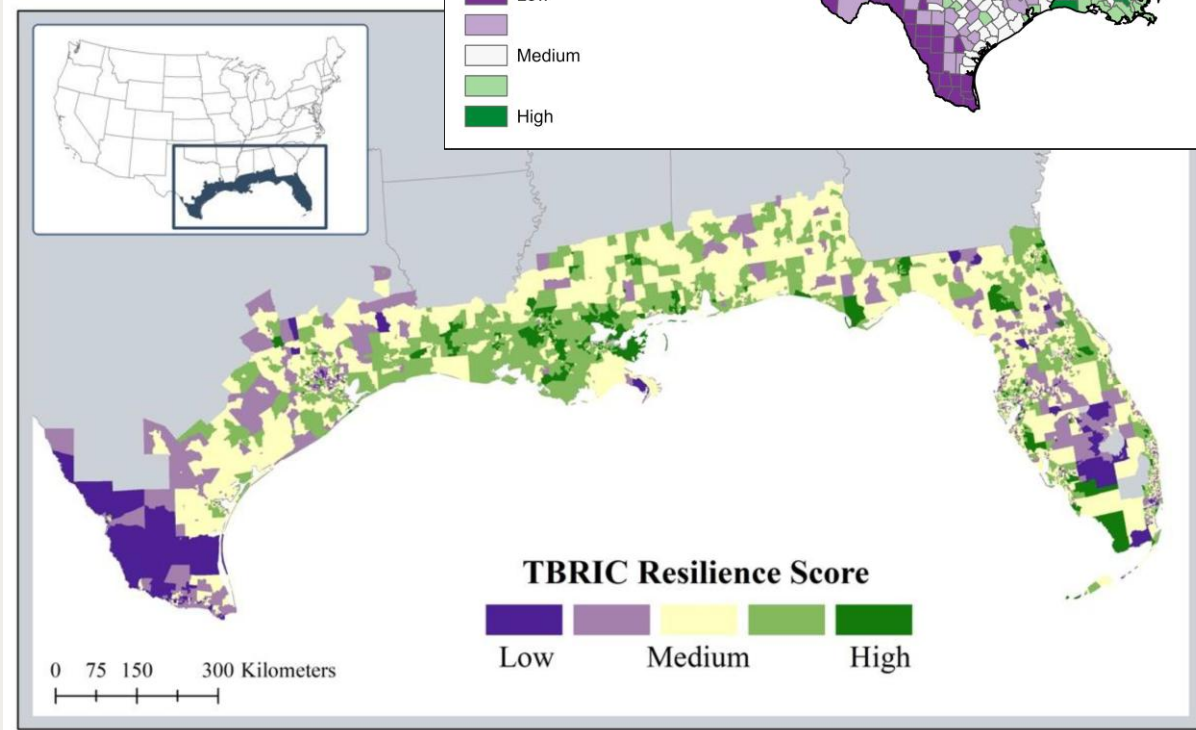


50 variables

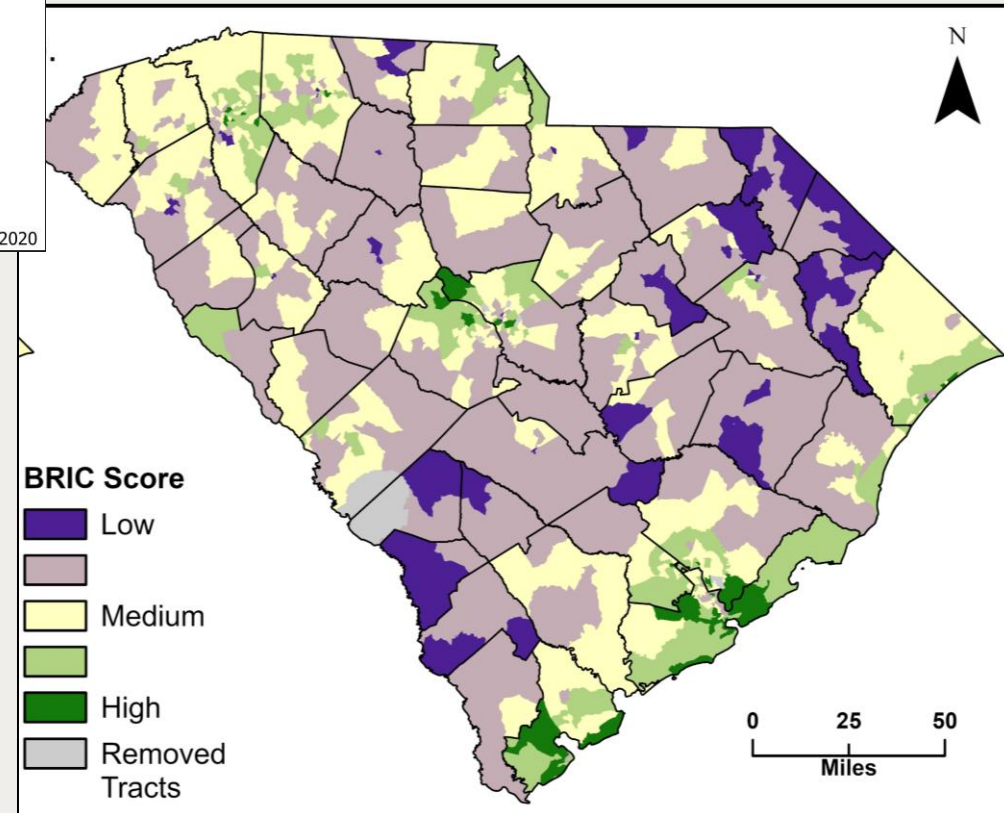
HVRI 2024

Derakhshan et al. 2020

Habets & Cutter 2025

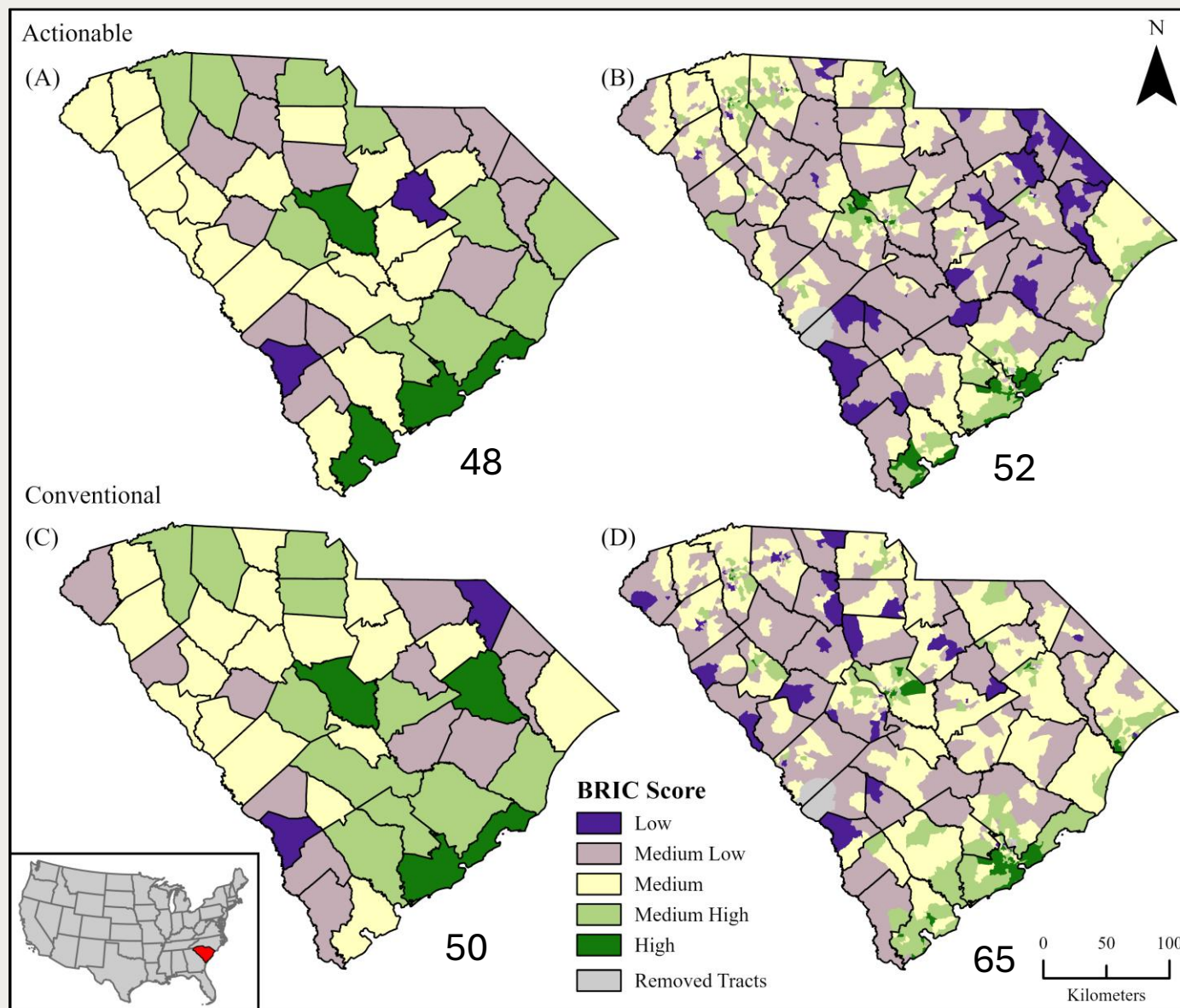


65 variables



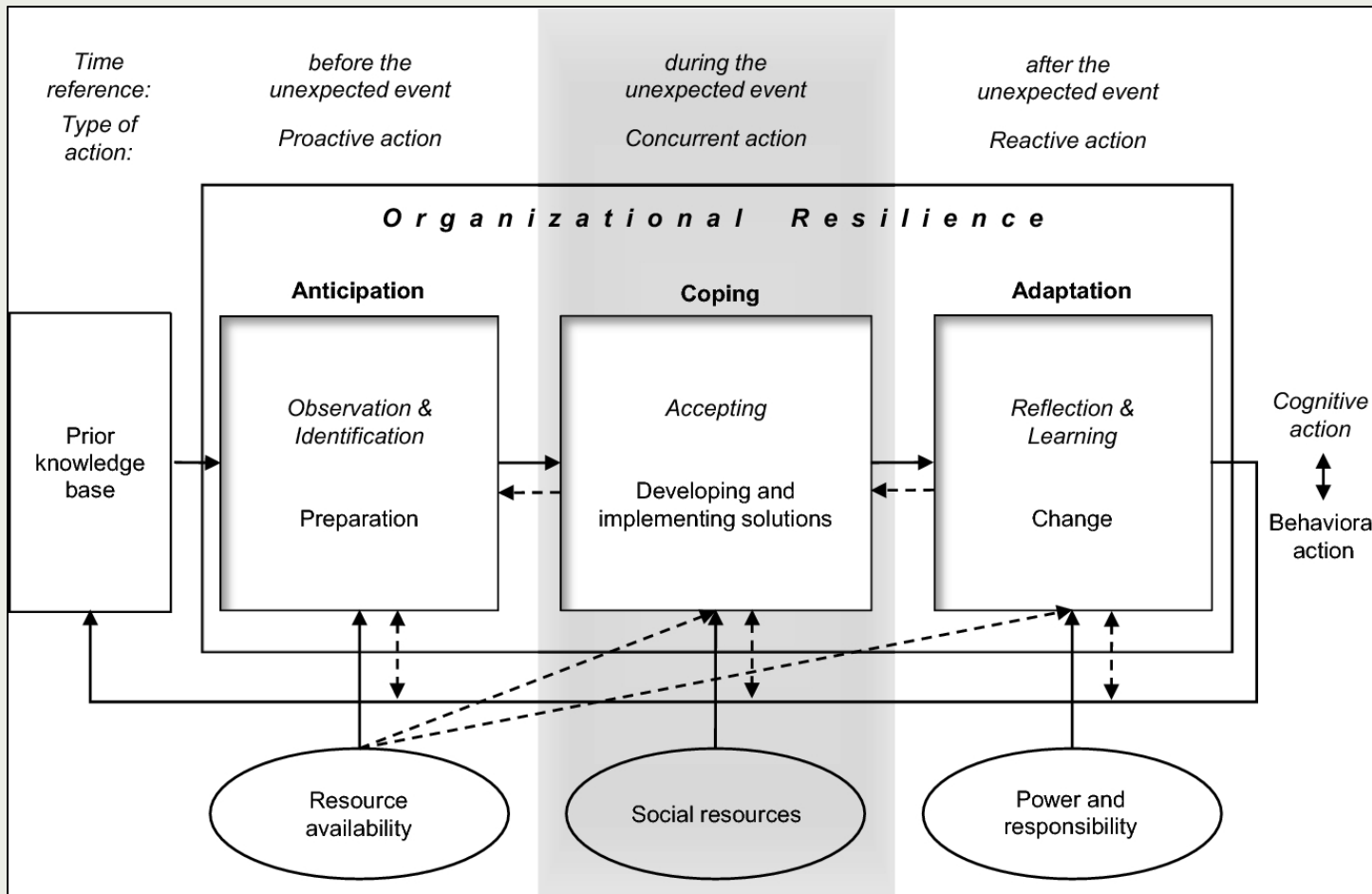
52 variables

indicates amount
of variables in BRIC
calculation



Habets & Cutter 2025

Organizational/Institutional Systems



Primary Focus

Availability of resources; Operational capacity for anticipation, learning, sensemaking, and coordination; Social relationships processes

Core Frameworks

Resilience Assessment Grid
Benchmark Resilience Tool

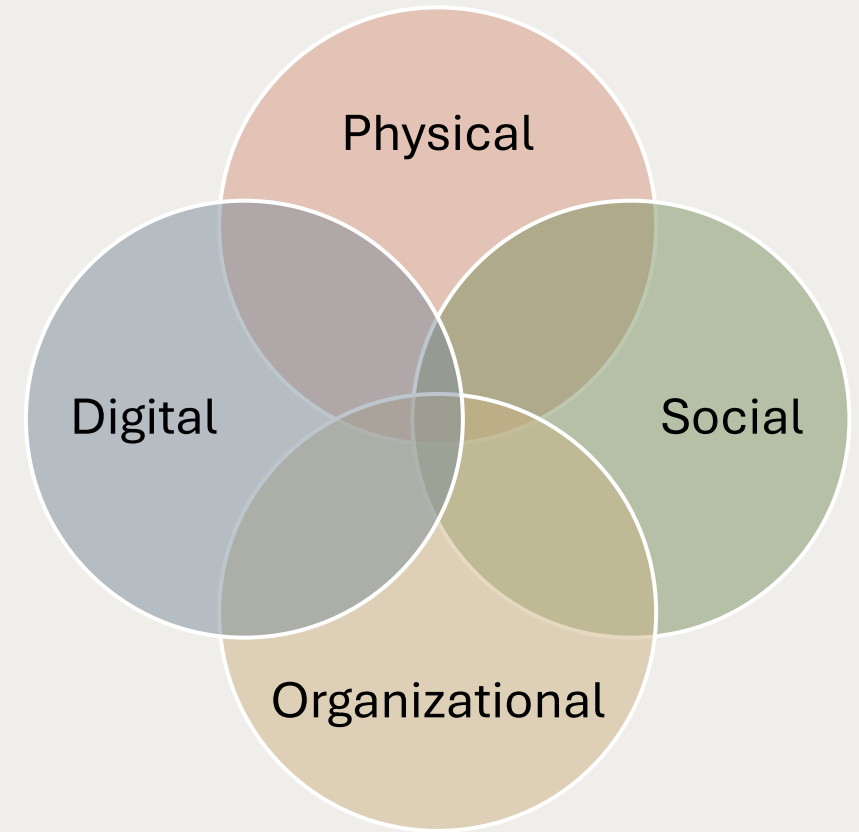
Measurement Tools

Capability measurements, structured surveys, planning checklists

Duchek 2020

Cyber and other emerging resilience systems

- Contemporary frameworks increasingly include:
 - Cyber/Digital Infrastructure
 - Multidimensional framing
 - Systems of systems or networked systems models
- Complementary rather than competing approaches
- Integration of complex hazards
- External validation – connecting resilience building to meaningful outcomes



Considerations for Future Development

- A unitary metric may not be the best approach
- Landscape of metrics is complex, messy, but not unhelpful
- Metrics are generally a snapshot in time, scale dependent, definition dependent
- Commonalities, intent, and evidentiary base of metric needs focus and further development

Sources and Other Reading

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