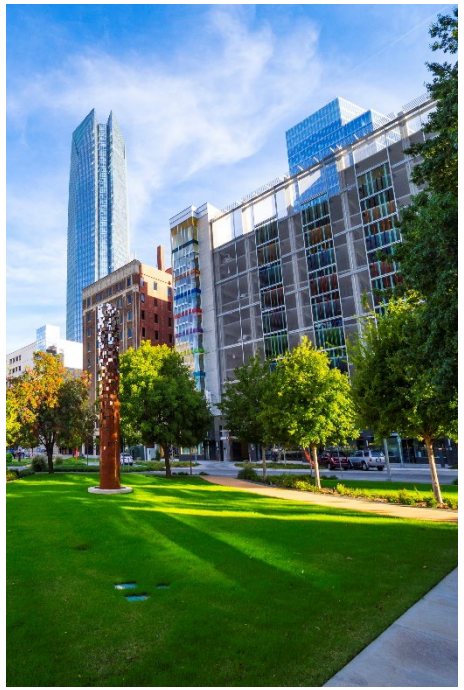
OKLAHOMA EPSCoR S3OK

Socially Sustainable Solutions for Water, Carbon, and Infrastructure Resilience in Oklahoma

NSF Award No. OIA-1946093



Oklahoma NSF EPSCoR 2022 S3OK Annual State Conference

April 28, 2022 Tulsa, OK

The Social Dynamics (SD) Research Framework

Presenters: Hank Jenkins-Smith & Carol Silva
Co-Directors, Institute for Public Policy Research & Analysis
University of Oklahoma

THE SOCIAL DYNAMICS (SD) RESEARCH FRAMEWORK

Goals and Objectives

GOAL: Understand Narratives, Address Polarization, and Find Socially Sustainable Solutions

Objective SD 1: Measure and model Oklahoma public's perceptions and beliefs underpinning the social narratives

Objective SD 2: Measure and model Oklahoma Opinion Leaders' perceptions and beliefs underpinning the social narratives

Objective SD 3: Measure and model Extended Peer Science Communities' perceptions and beliefs underpinning the social narratives

Objective SD 4: Measure social valuation for solutions using willingness-to-pay for potential SSWPs

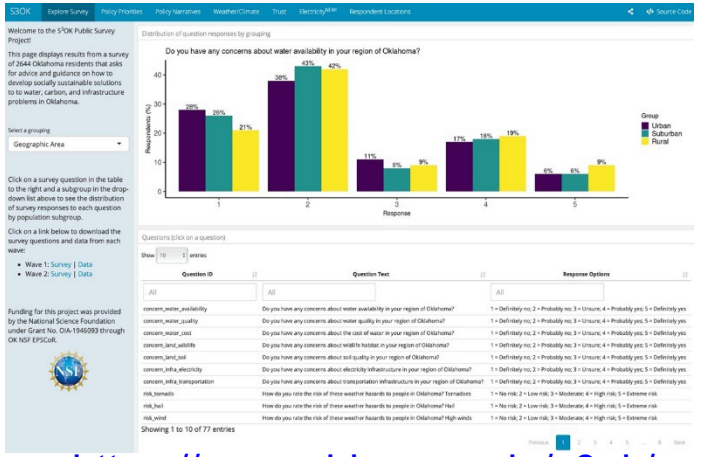
Objective SD 5: Evaluate how widely shared narratives have undermined collective action to pursue SSWPs

THE SOCIAL DYNAMICS (SD) RESEARCH FRAMEWORK

Highlighted Progress to Date

Objective SD 1

- Public survey sample frame designed, recruitment complete
  - Collaborated across S^{3}OK teams to design surveys
- 2 public surveys implemented to measure perceptions and beliefs
  - 3rd survey planned for Spring 2022
- Web-based, interactive data dashboard designed and published
- Preliminary models constructed regarding beliefs that underpin narratives
  - Collaborative belief model development; refinement in-progress



https://crcm.shinyapps.io/s3ok/

Objective SD 2

- Opinion Leader Advisory Network (OLAN) members recruited (~55 to-date)
  - Significant increase in membership from tribal and intertribal groups
  - Regular communication regarding project progress via Slack Channel and emails
- OLAN survey instrument fielded, 2nd survey in development for Summer 2022
  - Additional OLAN focus groups planned (Summer 2022) to further refine models and understand narratives
- 1st Academy successfully planned executed, 2nd Academy scheduled for May 2022
  - Summary report compiled and distributed to all researchers and participants

THE SOCIAL DYNAMICS (SD) RESEARCH FRAMEWORK

Highlighted Progress to Date

Objective SD 3

- Recruitment for Extended Peer Science Advisory Network is ongoing
  - ~60 members to date, primarily internal to the project
  - Plans in place to expand external EPSAN membership in Summer 2022

Objective SD 4

- Willingness-to-pay experiment designed, payment mechanism determined and fielded
  - Wave 2 public survey instrument (electric infrastructure focus) implemented
  - WTP experiment planned for Wave 3 survey, Spring 2022 (water re-use focus)
  - Policy scan of existing local water quality programs and credible payment mechanisms in progress

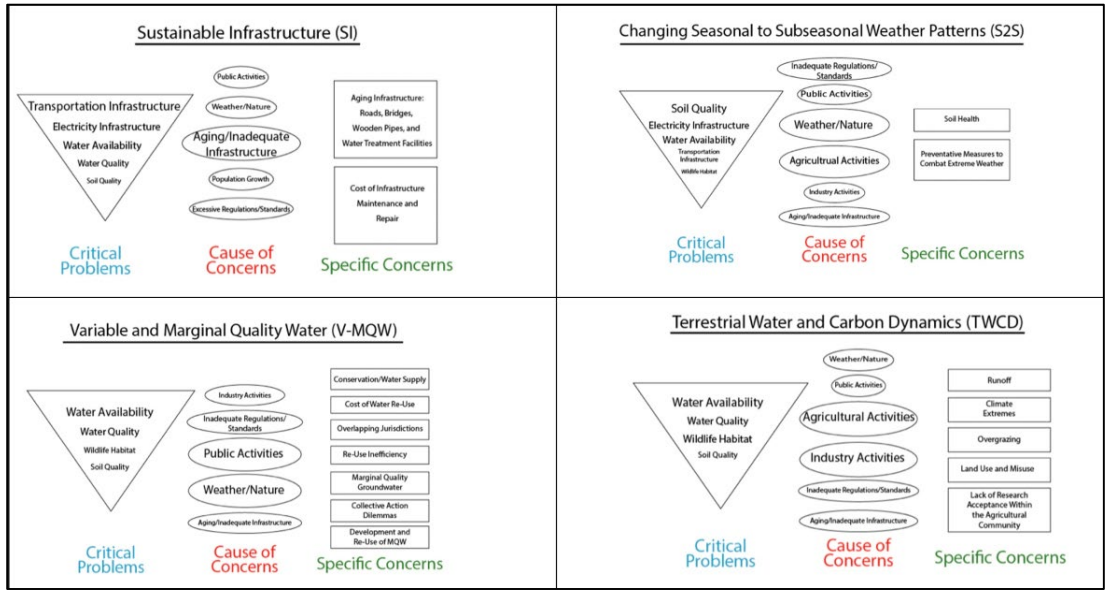
Objective SD 5

- Year 1 and 2 focusing on capturing detailed narratives for infrastructure and water-reuse
  - Structural Equation Model designed and under refinement regarding infrastructure
  - Opinion leader discussions coded for narratives & mental models analysis
  - Literature review and analysis will improve methodology for measuring narratives

OKLAHOMA EPSCoR

THE SOCIAL DYNAMICS (SD) RESEARCH FRAMEWORK

Highlighted Results and Outcomes



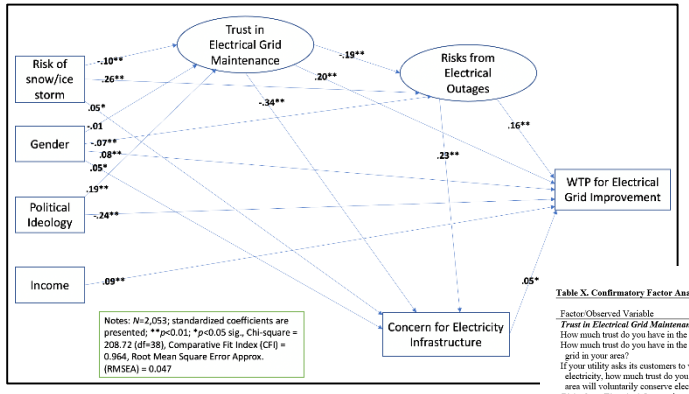


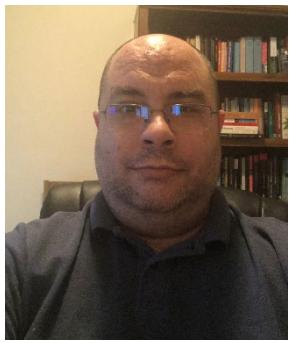
Table X. Confirmatory Factor Analysis Results for the Measurement Model

Factor/Observed Variable	Mean	St. Deviation	Standardized Factor Loading	α
Trust in Electrical Grid Maintenance [a]				0.68
How much trust do you have in the electric utility that maintains the grid in your area?	3.42	0.86	0.75	
How much trust do you have in the government agencies that maintain the electric grid in your area?	2.83	0.85	0.67	
If your utility asks its customers to voluntarily reduce electric consumption/conserve electricity, how much trust do you have that these people and businesses in your area will voluntarily conserve electricity to maintain grid operations?	2.59	0.81	0.50	
Risks from Electrical Outages [b]				0.86
How would you rate the risk of severe electricity outages to you and the people you live with?	2.78	0.87	0.75	
How would you rate the risk of severe electricity outages to economic well-being in Oklahoma?	3.09	0.88	0.83	
How would you rate the risk of severe electricity outages to public safety in Oklahoma?	3.13	0.88	0.86	

Notes: All standardized factor loadings are statistically significant at $p<0.001$. [a] items scored on a scale where 1=no trust to 5=complete trust; [b] items scored on a scale where 1=no risk to 5=extreme risk.

- Coding of OLAN Academy transcripts resulted in identification of content and causes of problem domains
- These findings refined science team foci for Year 2 work
- The data collection and use of resulting analysis is integrated across all project science areas

- M-SISNet WTP data were used to fit a structural equation model (SEM) to a WTP for electrical grid improvement dependent variable.



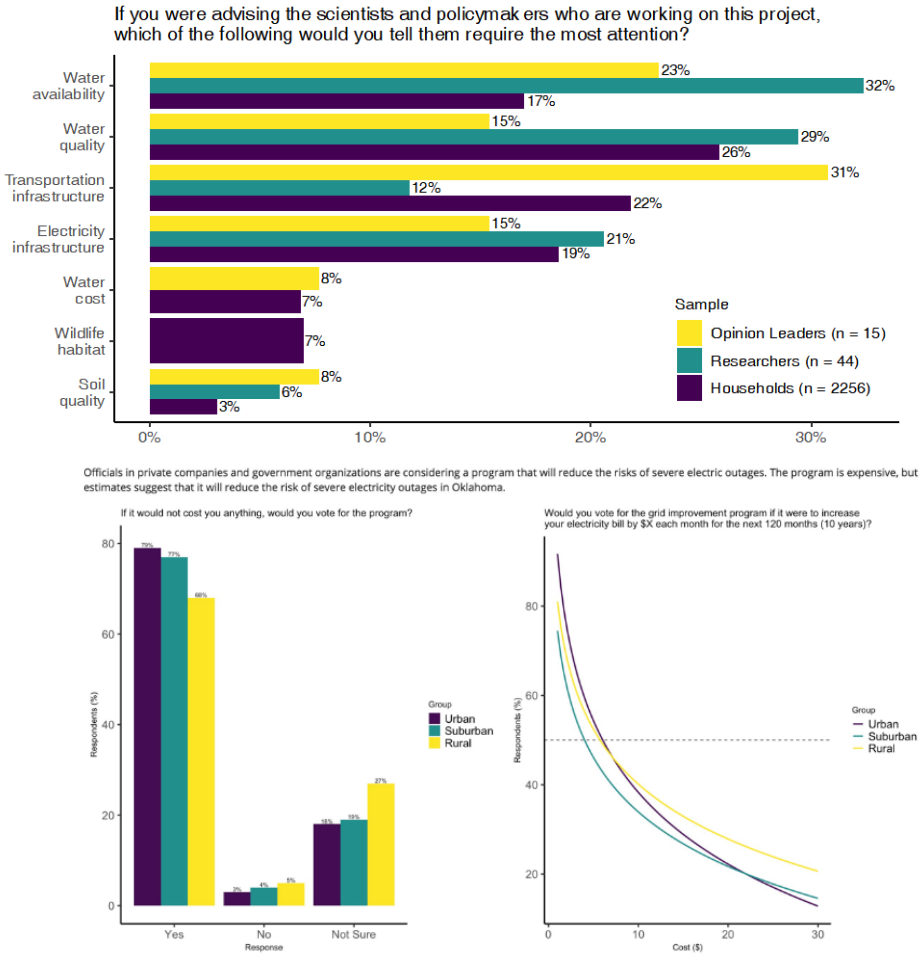
OKLAHOMA EPSCoR

THE SOCIAL DYNAMICS (SD) RESEARCH FRAMEWORK

Highlighted Major Findings

Analysis across data streams indicate that the public shows higher concern about water quality issues, while opinion leac and scientists rate water availability as a higher concern for Oklahoma

Initial analysis of the WTP experiment regarding electric grid infrastructure improvements shows significant public willingness-to-pay for these improvements, even in cases of marginal risk reduction



THE SOCIAL DYNAMICS (SD) RESEARCH FRAMEWORK

Impacts of the Research

- **The S^{3}OK project is inherently interdisciplinary.**
  - Both outputs from social science (surveys, coding of qualitative data, etc.) and outputs from physical science are used to iterate towards sustainable solutions in each focus area.

- **In particular, the M-SISNet continues to be a unique, publicly available, social science dataset, providing panel-based surveys measuring attitudes, beliefs and preferences about policy issues.**
  - This dataset, in conjunction with the EPSAN and OLAN survey data, is being used to advance key social science conceptual frameworks and methodologies.

- **The project is generating peer-reviewed publications and conference papers. Some examples:**

  - "Public Willingness to Pay for Farmer Adoption of Best Management Practices." *Journal of Agricultural and Applied Economics*. Accepted December 2021.
  - "Characterless Narratives: Using Mental Models within the NPF." Presented at the annual meetings of the Midwest Political Science Association, April 2022.

THE SOCIAL DYNAMICS (SD) RESEARCH FRAMEWORK

Future Plans

- Further identify linear connections between causes and narratives for each critical problem identified
- Further refine narratives and mental models across each identified problem area
- Implement further WTP experiments
- Integrate literature from research on mental models and narratives to identify a new approach to studying expert beliefs on complex issues

THANK YOU!