

Leveraging Smart Technologies and Managing Community Resilience through Networked Communities and Cross-Sector Partnerships

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Project Focus

Social

Cyber/
Technological

Community
Engagement

Evaluation

Community-identified Problems

- Community resilience is a shared responsibility of stakeholders among all sectors through partnerships in the networked communities.
- Technological advances in the big data era have enabled effective preparedness for and timely responses to the adverse impacts from natural disasters.
- This project leverages existing community partnerships and resources and evaluates the information technology (IT) applications aided by artificial intelligence (AI) in enhancing community resilience management and timely, effective, and collective decision making to strengthen community capacity.
- The east central Florida (ECF) region is selected as a testbed.

Intellectual Merits

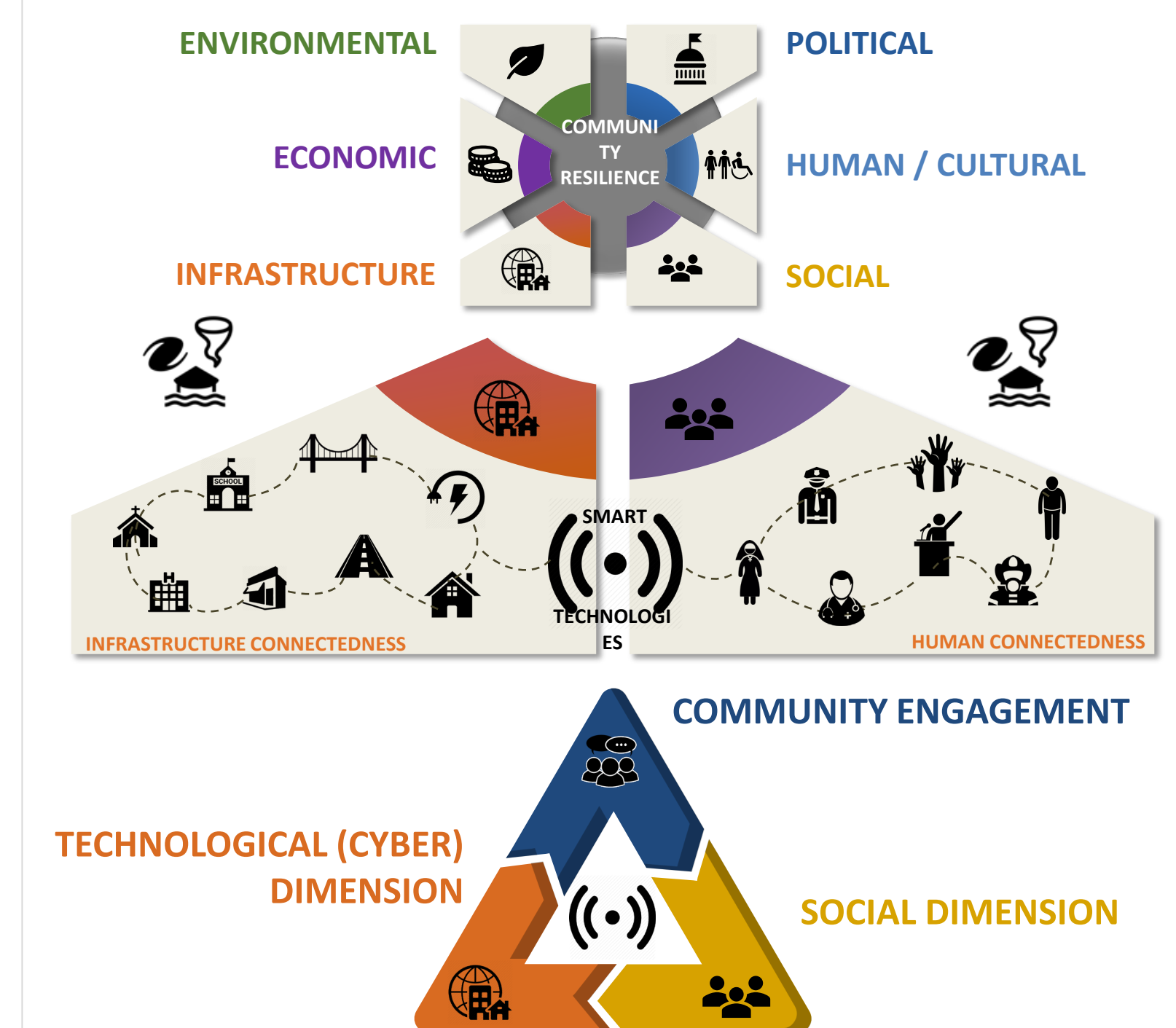
The research involves

- Developing an integrative framework to evaluate smart technology advances that foster community partnerships and enhance community connectedness in resilience management
- Filling research gaps in modeling community partnership characteristics and examining design and implementation networks among cross-sector partners for community resilience efforts
- Creating a holistic approach to comparing community resilience functionality changes by research intervention and an actual hazard event
- Building CoRD² for resilience data sharing and integration among public, private, and nonprofit sectors to support real-time collective decision making

The novel methodologies include

- Collecting and calibrating multi-dimensional data from behavioral surveys, policy and plan documents, social media posts, and an in-house drill with pre-/post-surveys
- Creating converged metrics for evaluating community resilience from an organizational perspective; providing next-generation computational solutions for processing disaster response data flowing in the CoRD² as peak influxes
- Developing real-time machine learning algorithms and software capacities for social media big data analytics (texts and images)
- Modeling organizational resilience capacity and multidimensional community resilience functionality

Conceptual Framework



Project Activities and Outcomes to Date (Informed by Community Needs)

- **Emergency Managers/Operators Web Survey.** Conducting literature review, designing the web survey questionnaire, and preparing for an IRB application
- **Resilience Policy and Plan Analysis.** Collecting resilience policy and planning documents at the federal, state, and county levels for content analyses based on several federal frameworks
- **CoRD²- Land Overlaid on Transportation Information System (LOTIS).** Having meetings with community partners for creating plans to develop the CoRD² (Community Resilience Data Depot) website based on the existing geocoded resilient data at the county and municipality levels in the ECF region and the integration of LOTIS into the CoRD² data depository
- **3-1-1 Data Analysis.** Collecting 3-1-1 data to analyze residents' behavior in response to non-emergency events in the Orlando metropolitan area before and during the COVID-19 pandemic and hurricane seasons
- **Project Progress and Community Engagement Evaluation.** Documenting monthly whole-team and smaller group meetings, work plans and outcomes for subprojects, and community outreach activities

Broader Impacts

(Immediate Impact on Society)

- By leveraging the existing community resilience resources and partnerships, the CoRD² will augment the information and communication capacity of the ECF region and the Orlando metropolitan area to the next level via a sustainable partnership.

Broader Impacts

(Sustainability and the Lasting Impact on Communities Beyond This Project)

- The proposed metrics to assess the extent and speed of achieving appropriate post-event functionality will help address a nationwide community capacity building need to quantitatively evaluate resilience increases by public-private partnerships.
- The research design assessing resilience changes will help decision makers in government, businesses, and nonprofits to obtain a deeper understanding of how AI-aided information technologies can advance collective decision making to reduce community vulnerability and enhance resilience.

Next Steps

- Distributing the web survey among emergency managers and operators across sectors in the ECF region; focusing on the Florida Emergency Preparedness Association (FEPA) members as the main population for this study
- Conducting cross-sectoral social network analyses on collected resilience plans and policies
- Creating a Community Resilience Data Depot (CoRD²) website to store, retrieve, and share resilience data among all sectors; integrating some features of the LOTIS, a GIS database at ECFRPC, into CoRD² to develop an app for smartphones or tablets for processing simulated or real-time disaster response data
- Analyzing the longitudinal 3-1-1 data in response to a certain event, such as COVID-19 and a hurricane, in the ECF region to determine the resilience level of communities