



Source: <https://www.newcybersource.com/network-solutions/>



# Digital Puerto Rico And Resiliency Innovation Network

June 2, 2020



# Digital Puerto Rico

Post-COVID-19, digital likely to be more important

- **Economy**
- **Education - distributed Learning**
- **Disaster response -- Comms, lift and power**
- **Telemedicine**
- **Social**
- **Engage diaspora**
- **Identity**
- **Governance**





# Prerequisites

- **Bandwidth**
  - Terrestrial
  - Space-based
  - International
- **Power (stable)**
- **Human Capacity**
- **Citizen buy-in**
- **Regulatory environment**
- **Financing**



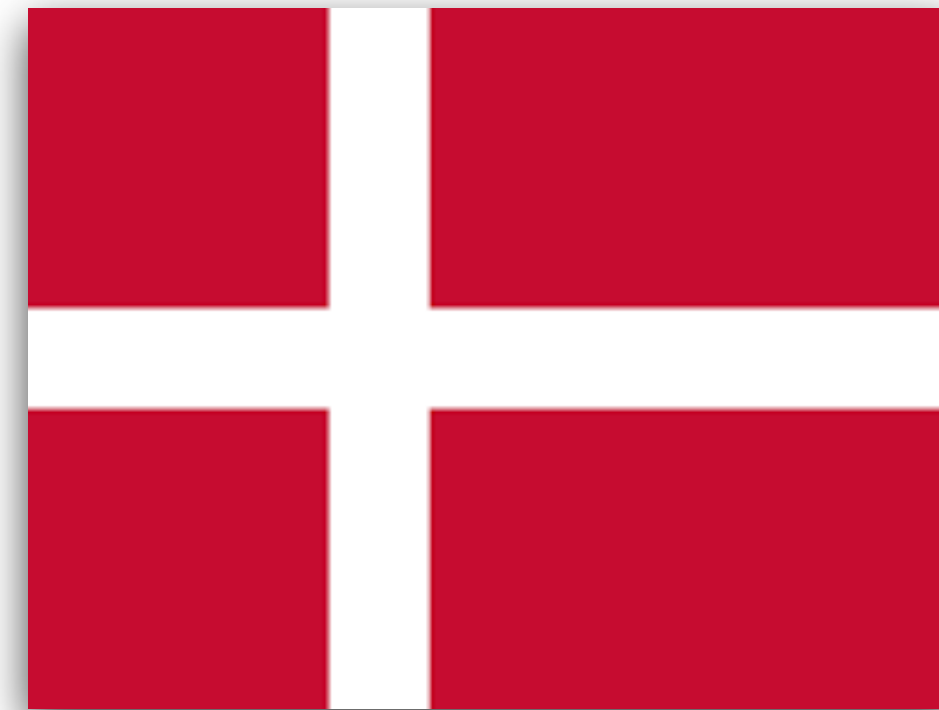


# Small State Examples



**Estonia**

Population: 1,329,000



**Denmark**

Population: 5,792,202



**Singapore**

Population: 5,850,342

# Small State Example (e-Estonia)

- **“The most advanced digital society in the world”—Wired magazine**
- **Sustained journey** < <https://e-estonia.com/> >
  - 1994 1<sup>st</sup> draft of “Principles of Estonian Information Policy
  - 2000 e-cabinet meeting
  - 2007 cyber security
  - 2014 e-residency
  - 2019 AI strategy
- **Digital Mode, Seamless State: Government as a platform**
  - Upholding ideals of democracy and personal privacy

# Small State Example (Denmark)

- **One of world's most digitalised countries**
  - Most transactions cashless
  - Almost all interaction with the Danish authorities take place online
- **“Digital by default” – paper only as last resort**
- **High-level broadband penetration**
- **Data security is high priority**
- **Set up business online in 24 hours**
- **Most public health services online**
- **Digital payments transfers directly to citizens**

**From information society to network society**

<https://denmark.dk/innovation-and-design/digitalisation>

# Small State Example (Singapore)

## Singapore Smart Nation Key Pillars

- Digital Economy
- Digital Government-- Digital to the Core, and Serves with Heart”
- Digital Society



People, companies and public agencies

- Singapore < <https://www.smartnation.gov.sg/> >



# Enabling Technologies

- 5G→6G
- LEO/MEO Internet
- Iot/IIoT
- Hybrid Clouds
- Quantum computing



IMAGE SOURCE: <https://www.forbes.com/sites/bernardmarr/2019/10/25/what-is-5g-technology-and-how-must-businesses-prepare-for-it/#6cb0ec11758b>



# People-Centered Internet (PCI)

## Working For An Internet That Works For People



- 501(c)3 nonprofit
- Goal: Internet is a positive force for good, improving the lives and well-being of people around the world
- Initiatives include:
  - Promoting connectivity
  - Fighting disinformation
  - Contributing to the discussion about technology ethics
  - Supporting the development of people-centered applications and initiatives
  - Advising policymakers
  - Leveraging technology to help communities be more resilient



# PCI “Digital Puerto Rico” 2018



- **3-month engagement**

- **With California Health Medical Reserves Corps (CH-MRC) & RAND Corporation**
- **Provide policy proposals for “Digital Puerto Rico”**
- **Submitted with other proposals to Governor’s office**
- **For submission to FEMA and U.S. Congress**



# PCI 2018 Recommendations Included

- **Resiliency Innovation Network Leading to Development of a Resiliency Industry**
- **Hotspots: (1) Municipal, and (2) in Public Housing**
- Roadmap for digital transformation
- Data Collection and Standardization for Disaster Preparedness and Emergency Response
- Study Feasibility of Digital Identity
- Innovation Economy/Human Capital Initiative
- Health Care Connectivity
- Resiliency/e-Construction Learning Lab
- Digital Citizen Services
- Government Digital Process Reform





# Resiliency Innovation Network (RIN)

## Establish RIN across Puerto Rico to:

- **Create businesses** that could enhance Puerto Rico's Resiliency
  - Build on existing PRSTRT and university facilities
  - PRSTRT leads in conjunction with local institutions
- Next step is **resiliency industry** with
  - Maturity models, insurance ties and volunteer engagement
  - In parallel, facilitate resiliency in the communities:
- **Institutionalize progress** through a Resiliency Center of Education and Innovation (RCOEI)



# RIN Approach

- Apply well-understood network technologies to Puerto Rico's needs in innovative ways
- New local companies and jobs
- Encourage established companies
- Empower Puerto Ricans
- Facilitate resiliency innovation cluster
- Lead to resiliency industry



Image source: <https://networkencyclopedia.com/what-is-networking/>



# Network Contributions (1)

- Set research priorities
  - Comparative advantage of Puerto Rican researchers
  - Resiliency innovation in telecomms, energy, water, etc.
- Roll out community model
  - Leverage best practices
    - Bottom up, begin by **listening**
    - Bi-directional **learning**
    - Build **lasting** capacity



- Establish two resiliency innovation labs in Trust's facilities
  - **San Juan** headquarters
  - Guanajibo Research and Innovation Park (GRIP) in **Mayaguez**



# Puerto Rico



Area: 5,328 mi<sup>2</sup>

Population: 3.194 million





# Network Contributions (2)

- Establish RCOEI to institutionalize progress
- Lead to resiliency industry in Puerto Rico, including
  - “Resiliency maturity models”
  - Ties to insurance and re-insurance industry
  - Ways to engage volunteers
- **PRSTRT develops and tests technologies in 90-day cycles**
  - Benefits will accrue quickly



# Resources Available to RIN

- **Leverage PRSTRT's existing resources:**
  - Entrepreneurial programs
  - Existing corporate ties
  - Existing government ties to Fomento
  - Technology Transfer Office (TTO)
- **Field experimentation sites throughout the archipelago**
  - Test in varied micro-climates and topographies
  - PRST could use Ciencia Puerto Rico (CienciaPR) network to ID SMEs



# Resiliency Innovation Cluster

- **Resiliency innovation cluster in Puerto Rico is expected mid-term outcome**
- **Cluster is a geographically proximate group of interconnected companies and associated institutions in a field**
  - Promote competition
  - Use RCOEI to institutionalize progress
  - Enroute to resiliency industry
- **Begin with well-understood tech to meet existing needs**
  - Where applicable, leverage R&D to spur economic growth
  - R&D dollars typically generate high ROI



# **Targets for Resiliency Innovation Network**

- **At least 30 new local companies and 300 local jobs in first year**
- **Spur economic returns**
- **Induce import substitution**
- **Encourage established companies interested in resiliency technologies to set up new operations or expand existing operations in Puerto Rico**
- **Open new export markets and opportunities**
- **Increase Puerto Rico's resiliency to natural disasters**
- **Lower disaster relief and recovery costs**



# Wide-Ranging Sector Impacts (1)

- **Primary contribution in Telecoms/IT sector**
  - Provides an ecosystem for developing and testing
  - Contributes to Capacity Planning and Community Building (CPCB)
  - Helps build new skills in “resiliency” technology
  - In economics sector, RIN teaches planning and business development skills that would attract investment
  - Distributed, integrated network also should make more rural and municipal areas attractive to investors
  - RIN supports Financial Oversight objectives
- In the long run a “resiliency industry” could be an exceptionally valuable asset for Puerto Rico



# Wide-Ranging Sector Impacts (2)

- **RIN also useful to promote innovation in:**
  - **Energy** (ecosystem for developing and testing new resilient energy-related tech)
  - **Natural and Cultural Resources** (areas like remote sensing and data analysis, as well as field experimentation)
  - **Water** (water purification, transport and storage)
  - **Housing and Public Buildings** (ecosystem for developing and testing new resilient and sustainable housing-related tech and building)
  - **Health and Social Services** (skills supporting healthcare tools, services & delivery)
  - **Municipalities** (support local integrated services in cities and small communities)



# Wide-Ranging Sector Impacts (3)

- An annual resiliency innovation conference in Puerto Rico
- Resiliency innovation facilities on many universities
- New ventures form, local workforce educated and trained, and opportunities emerge for non-local investors to invest locally
- RIN also aligns with several Financial Oversight objectives

Image source:  
<https://campustechnology.com/articles/2016/02/17/how-to-launch-a-campus-innovation-center.aspx>





# Potential Costs and Funding Mechanisms

- **Low Cost (fraction of damage from Irma/Maria, also could improve resiliency to earthquakes and pandemics)**
  - **\$2.2 M up-front and \$2.4 M annually**
    - Expand testing, teaching, and applications
    - Leverage existing infrastructure of PRST, Fomento, and Puerto Rican universities
    - Start community resiliency model
    - Establish RCOEI
- **Potential Funding Mechanisms**
  - Initially PRST, Fomento, and U.S. federal programs
  - Private funding possible
  - Commercial successes could provide PRST revenues through IP licensing



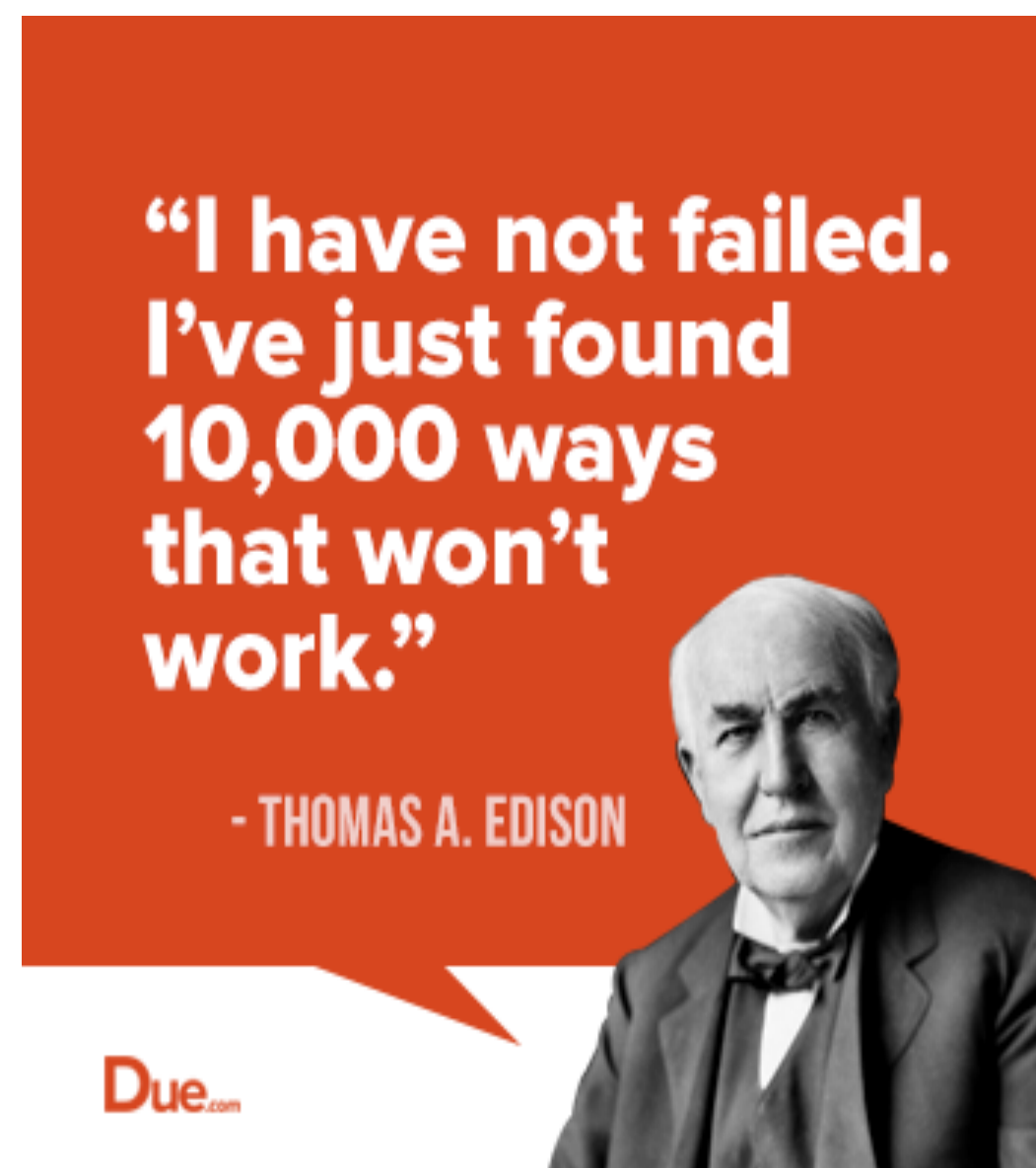
# Related Beneficial Initiatives

- RIN can benefit from related initiatives, but does not depend on them, e.g.
  - **Hotspots** support entrepreneurship and innovation
    - Being done in 66 of 78 communities in 2019
  - Digital workforce skills & rural mesh networks
  - Draw on past and present PRST and UPR research projects and existing resiliency labs

# Potential Pitfalls

- Investment could be limited by Puerto Rico's austere fiscal situation
- Participant pool could be restricted limited by "brain drain"
- New businesses could be dissuaded by barriers

**But don't forget:**



First  
Attempt at  
Iterative  
Learning



Potential Resource

# Listening, Learning, Lasting

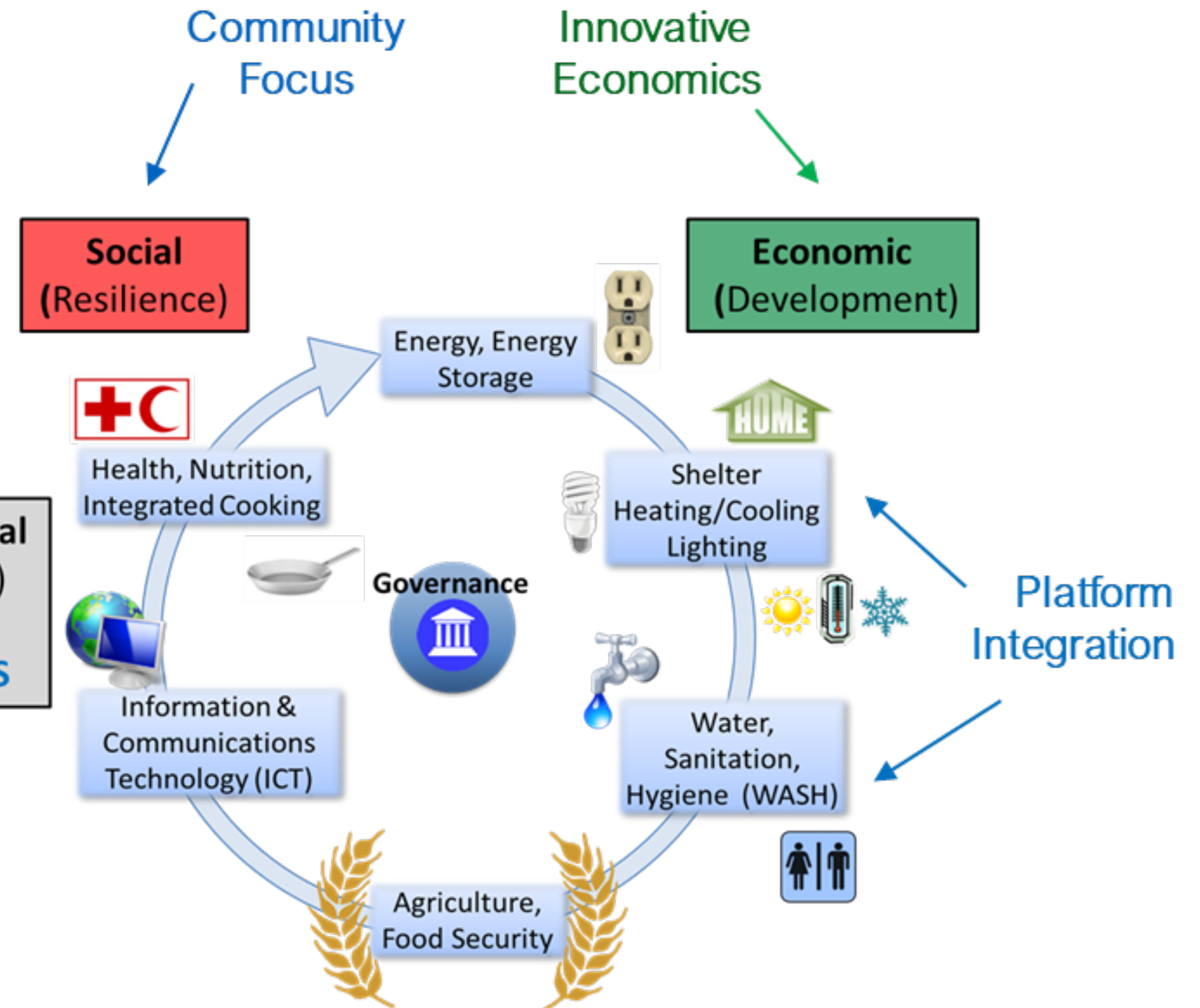
Trans-Disciplinary Research and Teaching are Key

Knowledge Sharing

via **STAR-TIDES** network



Technological  
(Platforms)  
From  
**STAR-TIDES**



**Keys to Success: Narrative; Systems Thinking; Shared Knowledge; Resources; Education; Logistics; Digital Enabling Technologies**

Stability/Security ↔ Sustainability



# Summary

- **Planning and execution of Digital Puerto could extend beyond political turnovers**
  - **Examples from countries in transition: Estonia, Rwanda, Colombia**
- **Exceptional benefits**
  - **Especially now**
- **Need ALL your help to pull it off**