

MODELING SYSTEMS AND LOCATION SCIENCE



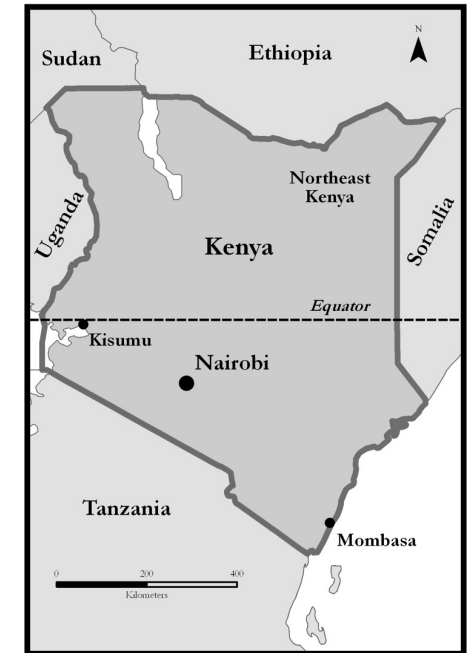
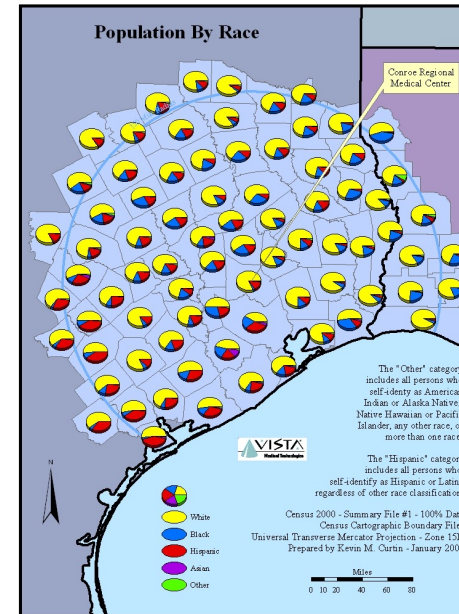


Location Science

How can it (and YOU!) contribute to reducing risk for the environment, people and animals?

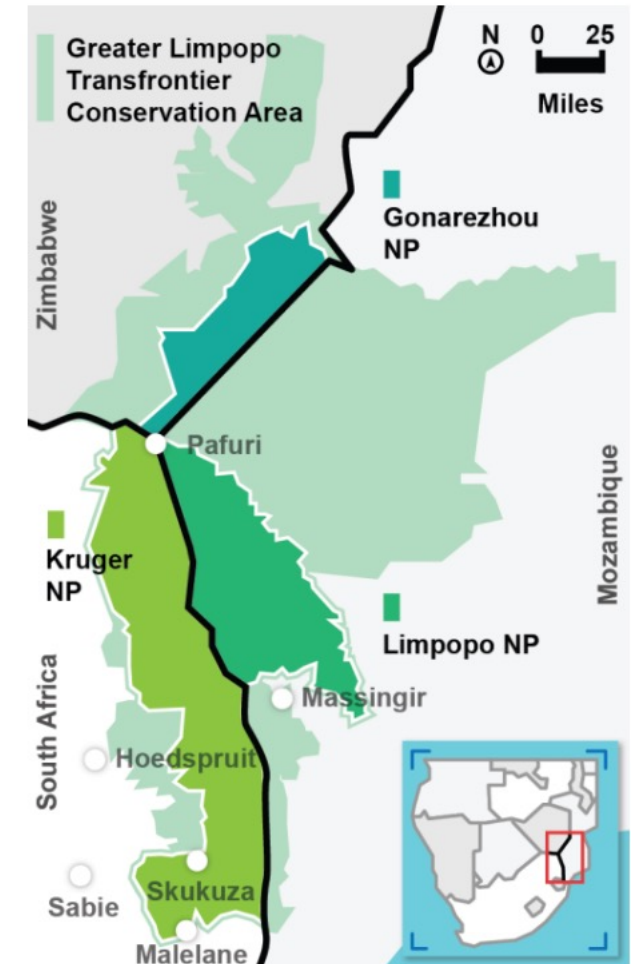
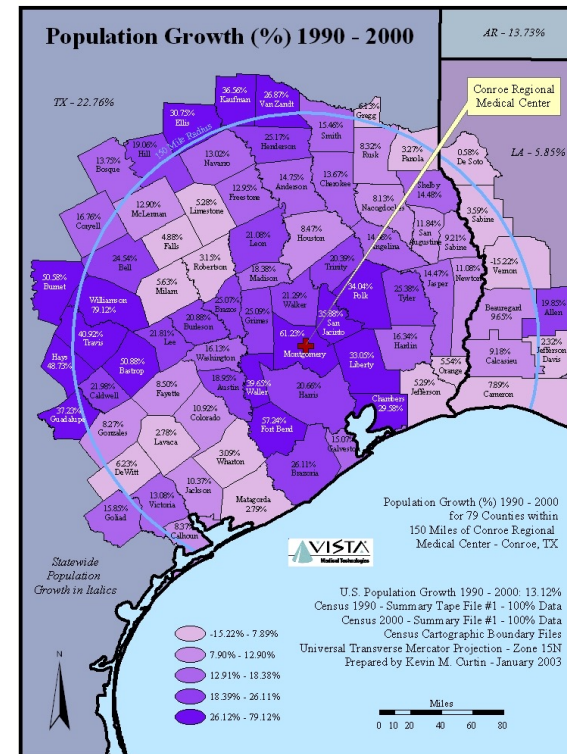
Think of Location Science in Three Ways

- Where stuff is.
- What is interesting about stuff where it is...and where is it in relation to other stuff?
- Where should stuff be?



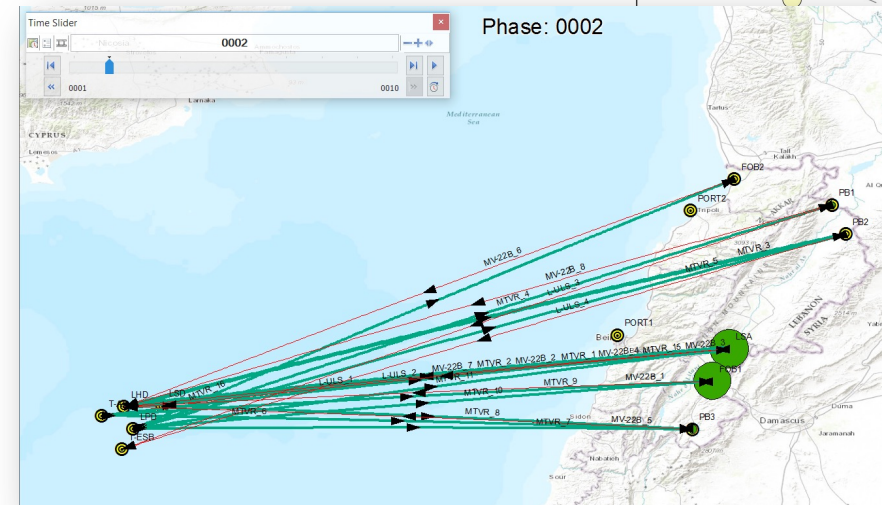
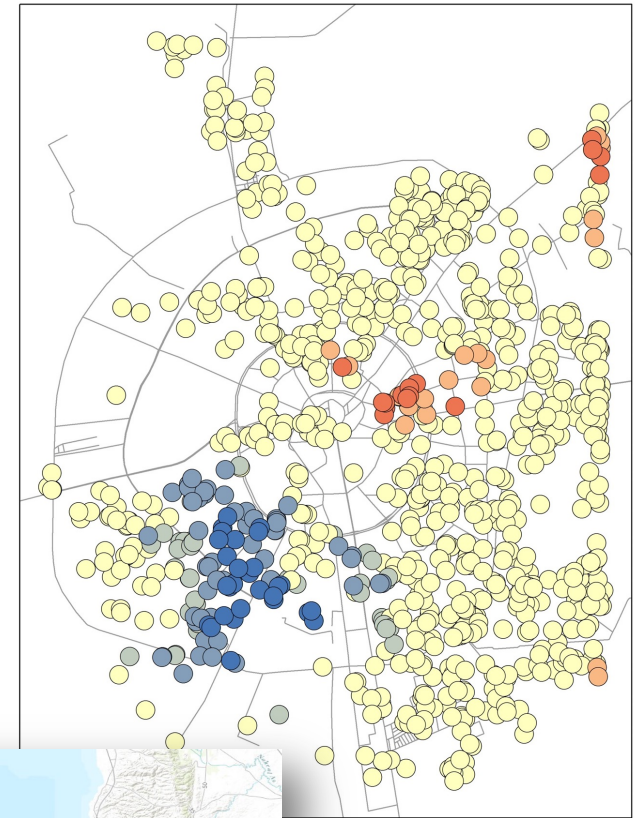
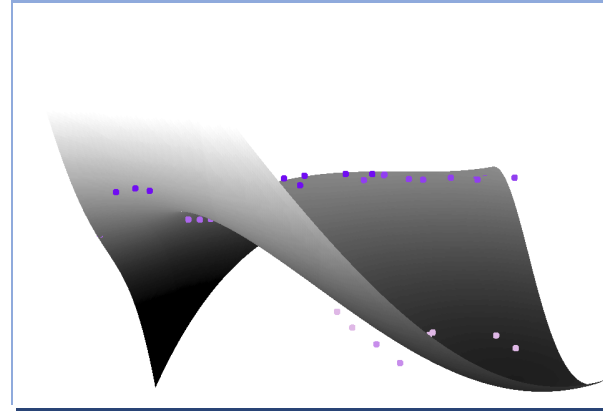
Where Stuff Is

- Spatial Analytics – Descriptive
- We've been talking about this during different exercises
 - “GIS Data”
 - Where are things that we care about
- Mostly descriptive
 - Where are things? People? Animals? Diseases?
- Can be comparative
 - How much of these things are in different places?



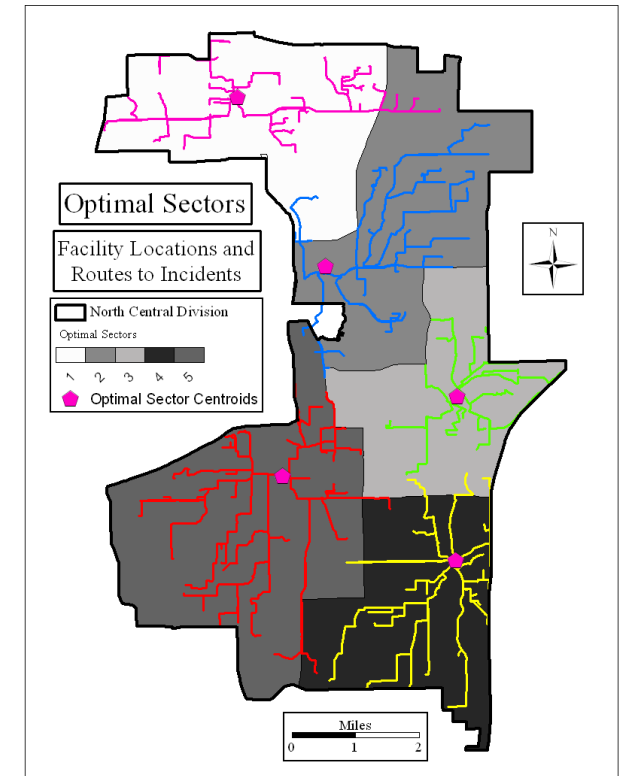
What is interesting about stuff?

- Spatial Statistics
 - Inferential
- What can we say about where things are?
 - Are they clustered together or spread apart?
 - Have they moved? If so in what ways?
 - Do they change over time? If so how quickly?
 - Often identifying a spatial process



Where Should We Put Stuff?

- Modeling and Spatial Optimization
- Where should things be?
 - What do we want to accomplish?
 - Objectives or Goals
 - What keeps us from accomplishing those goals?
 - Constraints or Limits
- We try to model Objectives and Constraints using mathematics
 - But they are inherently subjective...
 - That is why we need your input
 - What are your goals for reducing threats to the environment animals and people?
 - What keeps you from reaching those goals?



Systems Thinking Through Data- Driven Models for Decision Support

Community Participatory Action Research and
Intervention Codesign



TREPA

Threat Reduction for the Environment, People, and Animals

Systems Thinking Through Data-Driven Models for Decision Support
Community Participatory Action Research and Intervention Codesign



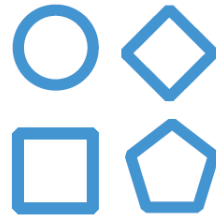
Thinking

Systems thinking to understand what we are doing as a system, be able to embrace and work with complexity



Inquiry

Make a holistic inquiry to map out the structure and dynamics of the current system



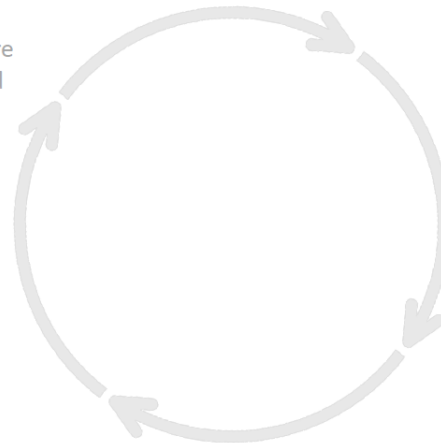
Building

Develop platforms for connecting people and resources in new ways and scaling change



Changing

Envision alternative futures and points to intervene in the network for effective influence



Source: <https://www.systemsinnovation.network/>



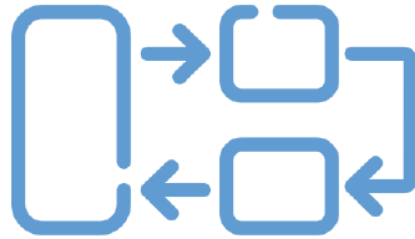
TREPA

Threat Reduction for the Environment, People, and Animals



System Models

We start to try and model what we are dealing with as a system



Mapping

We now learn about systems dynamics and start to build a systems map



Actor Maps

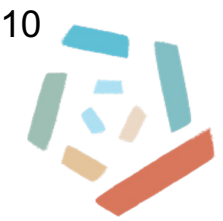
We here map out the actors, their values, models and incentives



Multi-level Maps

For mapping out the many levels of a system, from micro to macro

Source: <https://www.systemsinnovation.network/>



TREPA

Threat Reduction for the
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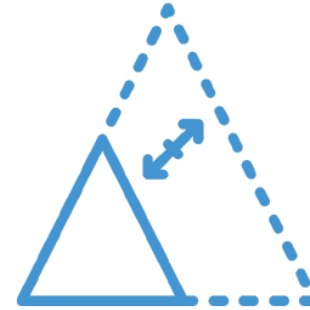
Networks

How to foster and develop networked organizations through platform design



Value

Create new value models that work to align actors across a whole ecosystem



Scaling

How to scale faster, farther and remain agile through a network approach



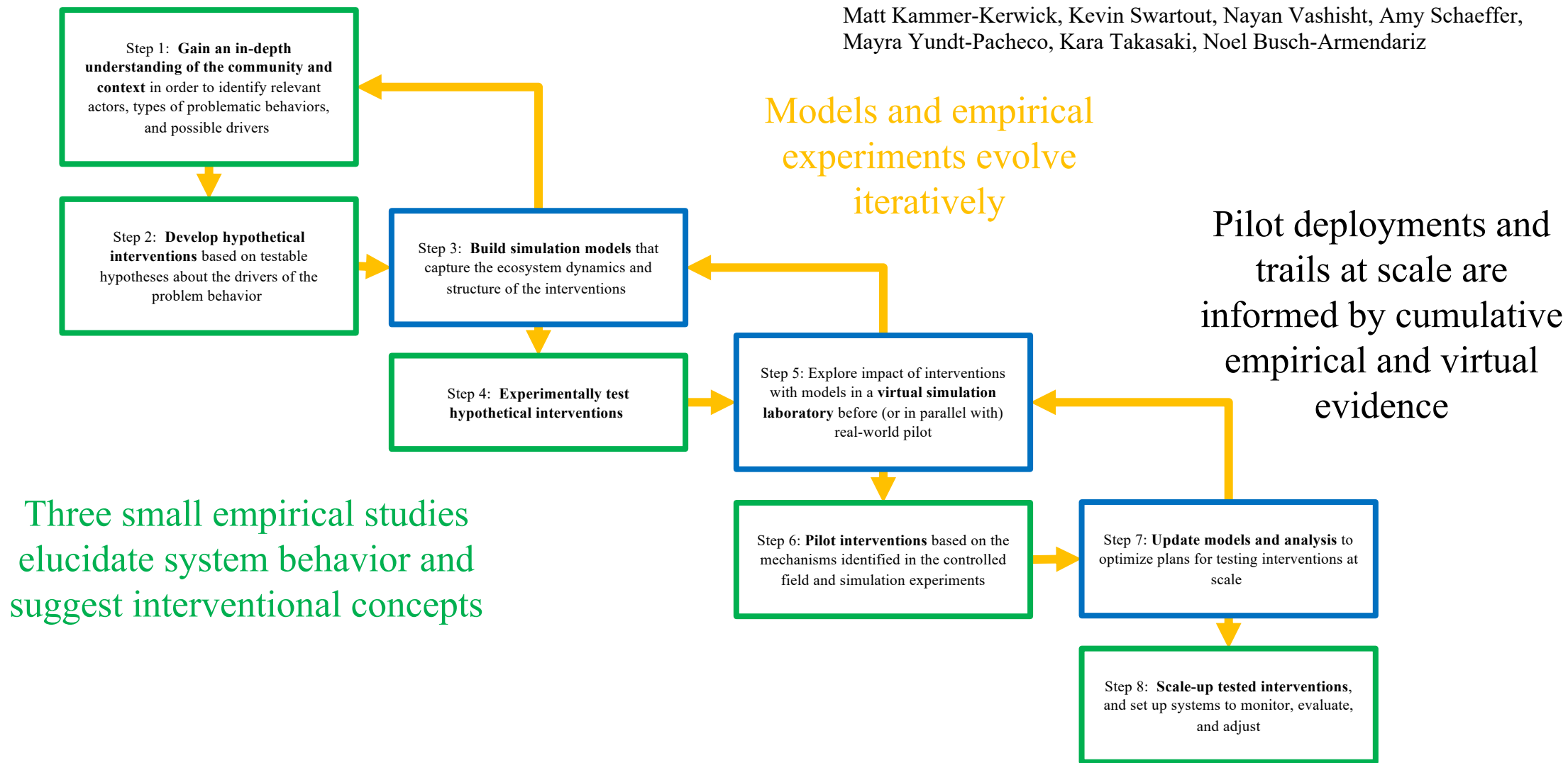
Impact

Assess for systems-level impact and invest for systems change

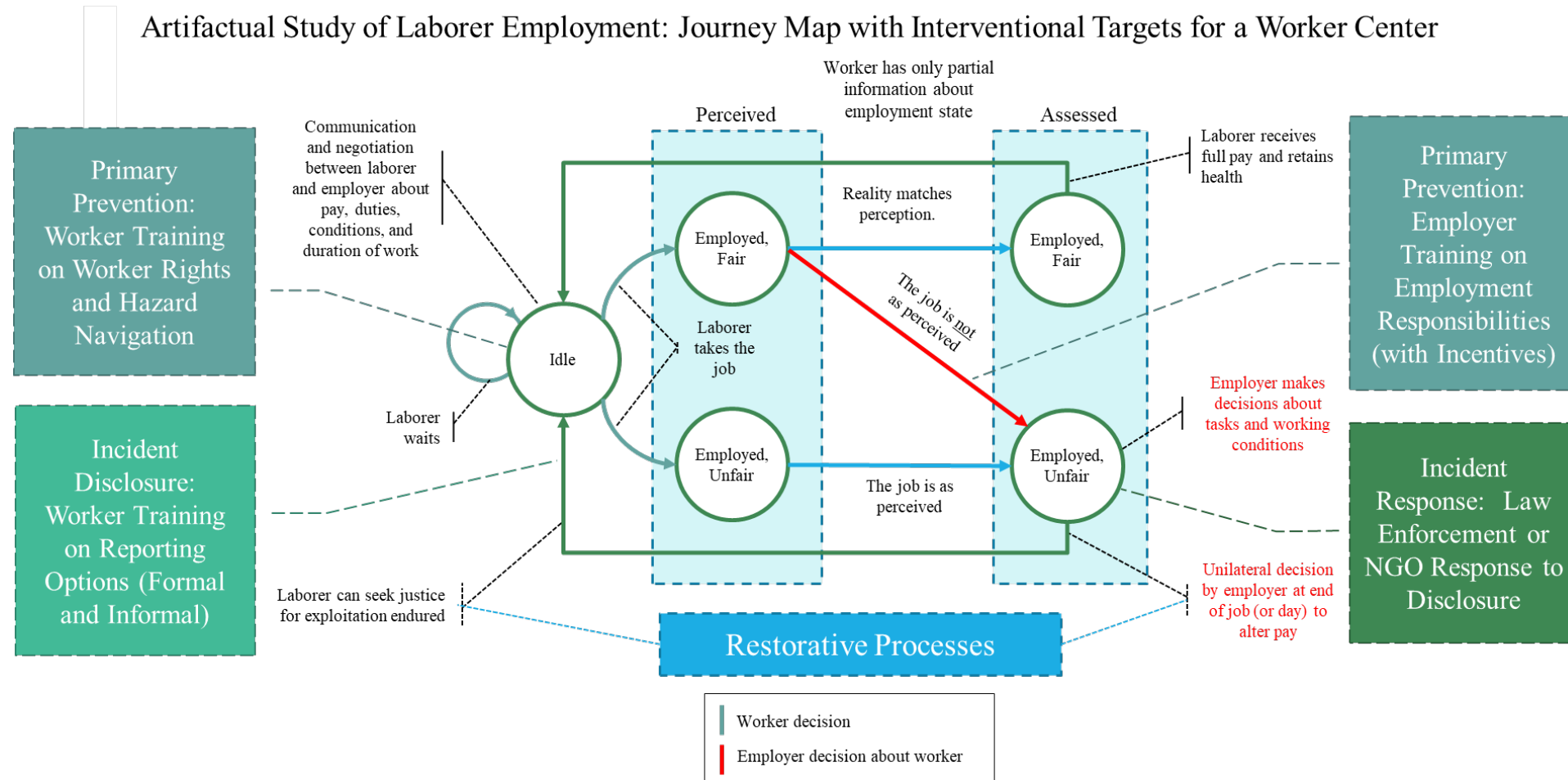
Source: <https://www.systemsinnovation.network/>

An Example: A Framework to Develop Interventions to Address Labor Exploitation and Trafficking: Integration of Behavioral and Decision Science within a Case Study of Day Laborers

Matt Kammer-Kerwick, Kevin Swartout, Nayan Vashisht, Amy Schaeffer, Mayra Yundt-Pacheco, Kara Takasaki, Noel Busch-Armendariz

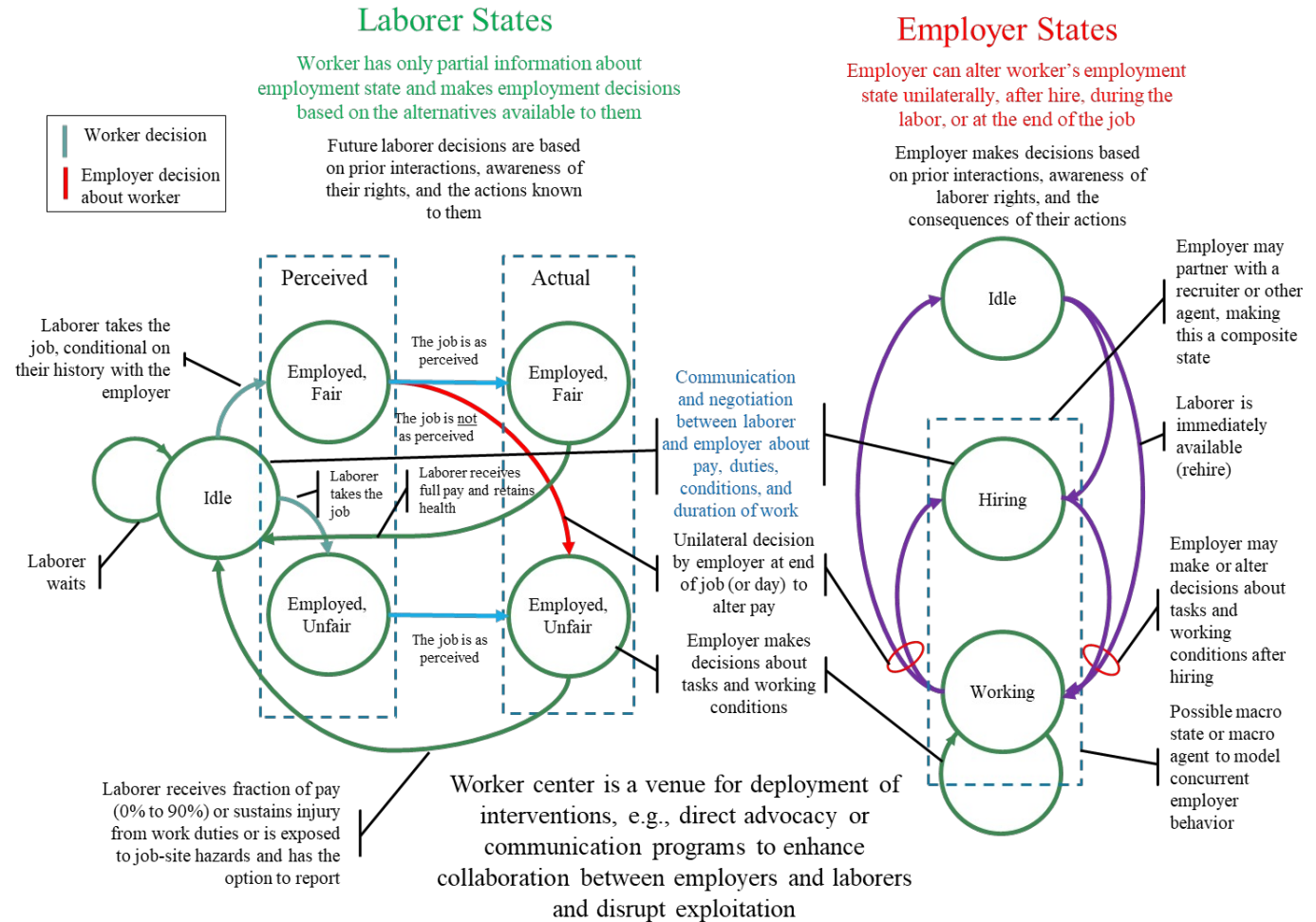


Three small empirical studies elucidate system behavior and suggest interventional concepts

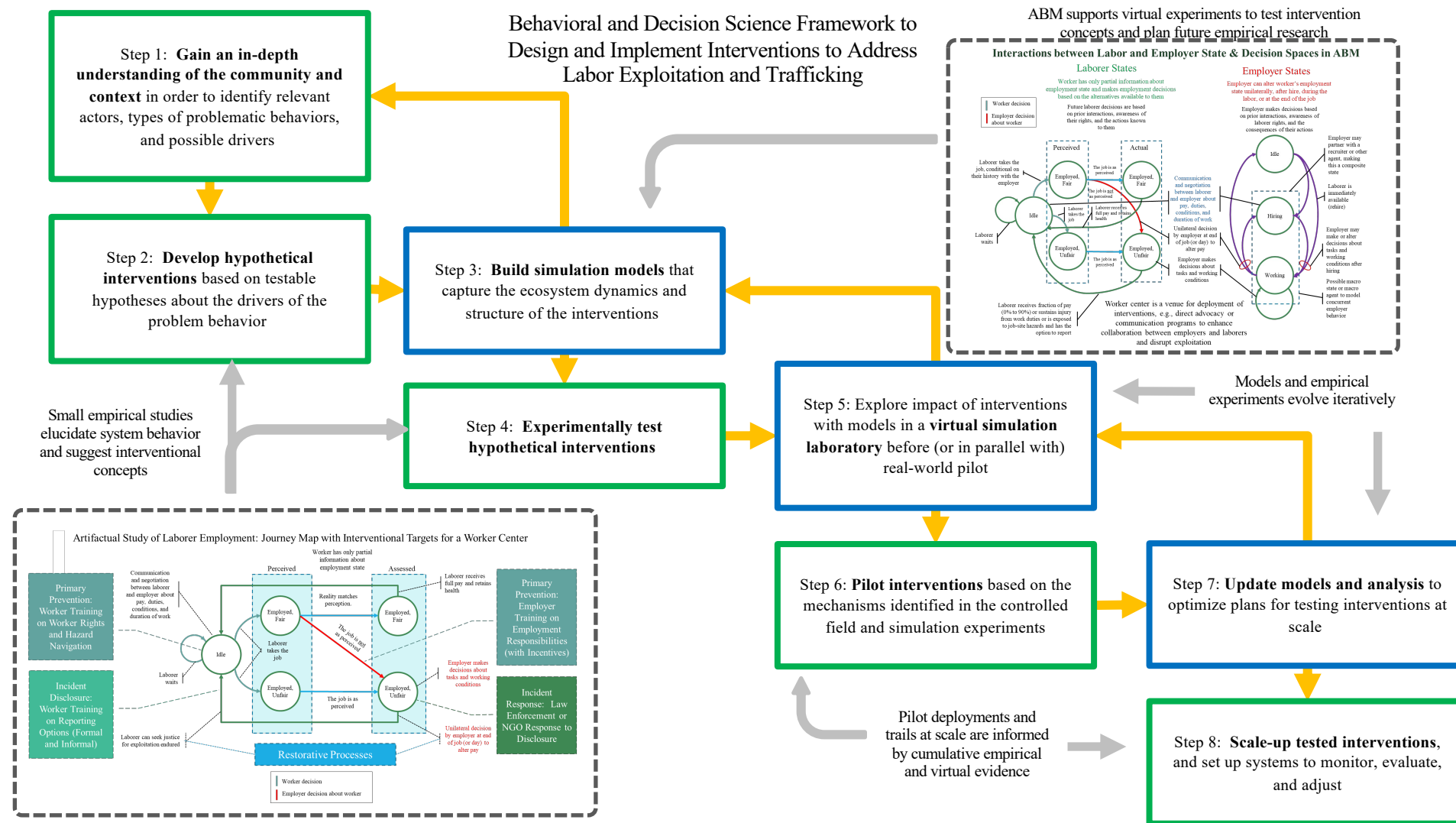


ABM supports virtual experiments to test intervention concepts and plan future empirical research

Interactions between Labor and Employer State & Decision Spaces in ABM

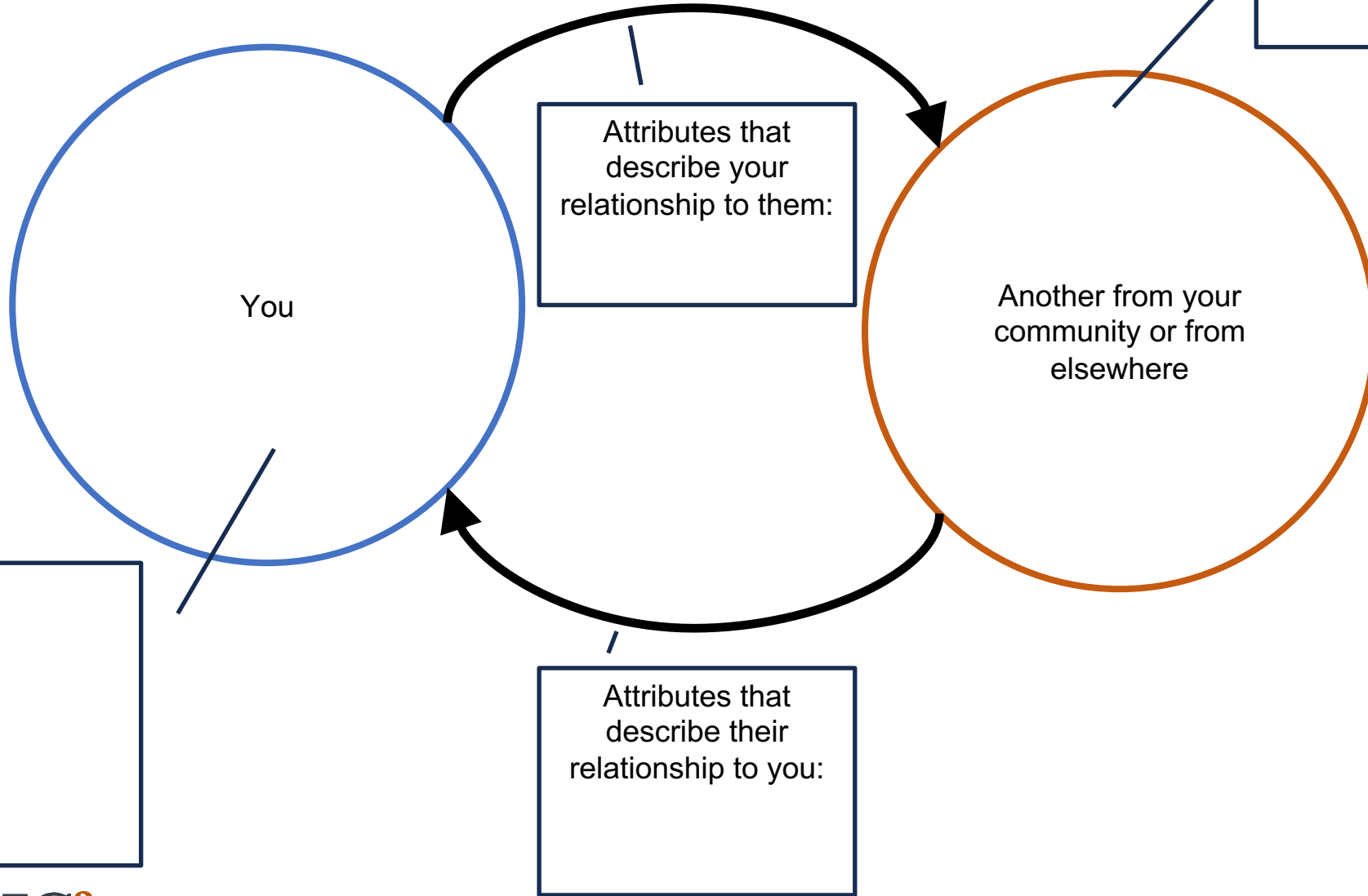


TREPA A Framework to Develop Interventions to Address Labor Exploitation and Trafficking: Integration of Behavioral and Decision Science within a Case Study of Day Laborers



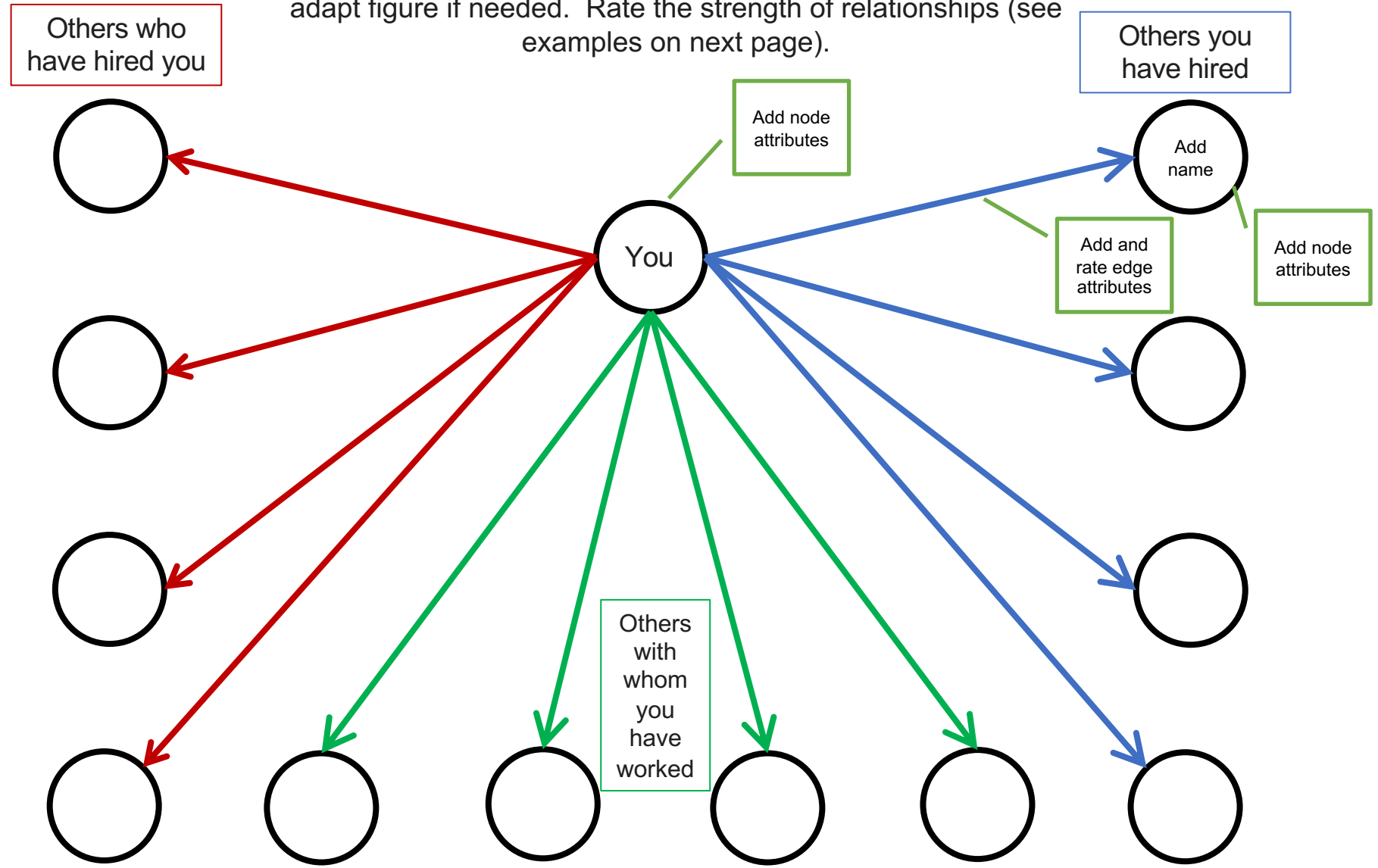
Community Participatory Action Research to Build Community Networks

Their Attributes:



Your Attributes:

Add names, personal attributes, and relationship attributes to Figure. Use paper or whiteboard. Use multiple sheets and adapt figure if needed. Rate the strength of relationships (see examples on next page).



Node Attributes (for Participant and Other Nodes)

- Years of Education
- Skills/Trades
- Current type of relationship with other
- Number of years known other
- Number of projects with other
- Age
- Gender
- Race/Ethnicity

Behaviorally Specific Node Attributes (for Participant)

- Ever experienced wage theft on a job? (If yes, how many times in the past year)
- Ever experienced physical abuse on a job? (If yes, how many times in the past year)
- Ever experienced verbal abuse on a job? (If yes, how many times in the past year)
- Ever experienced unsafe work site on a job? (If yes, how many times in the past year)
- Ever experienced any of the above on a job in the context of force, fraud, or cohesion? (If yes, how many times in the past year)
- Ever received a bonus
- Ever received an offer of an extended or full-time job

Trust

Do Not Trust at All						Trust Completely
1	2	3	4	5	6	7
Not at All Satisfied						Completely Satisfied
1	2	3	4	5	6	7

Satisfaction

Likelihood of Referral for Work

Not at All Likely						Completely Likely
1	2	3	4	5	6	7

Respect

Not at All Respectful						Completely Respectful
1	2	3	4	5	6	7
Not at All Safe						Completely Safe
1	2	3	4	5	6	7

Safety

Ability to Adapt to Changes

Not at All Adaptive						Completely Adaptable
1	2	3	4	5	6	7

Are These Categorical Edge Attributes or Other Node Attributes?

- Type of work (Most Common)
- Ever not paid in full
- Ever changed the scope unilaterally
- Ever requested/demanded unsafe work
- Ever paid a bonus

Behaviorally Specific Node Attributes (for Employers)

- Ever not paid someone the amount discussed on a job? (If yes, how many times in the past year)
- Ever had to utilize physical discipline with someone on a job? (If yes, how many times in the past year)
- Ever had to utilize verbal reprimands with someone on a job? (If yes, how many times in the past year)
- Ever had to ask someone on a job to work at an unsafe work site? (If yes, how many times in the past year)
- Ever had to utilize any of the above on a job in the context of force, fraud, or coercion? (If yes, how many times in the past year)