First Four Years: A Case Study of Starting a Social System Design Lab

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Social System Design Lab

GEORGE WARREN BROWN SCHOOL OF SOCIAL WORK

- **Mission**
  - To develop the science and application of system dynamics in human services and communities
- **Research**
  - System dynamics computer modeling and simulation
  - Group model building
  - Social determinants of health
    - Obesity, cancer, early child and maternal health, domestic violence, mental health, child abuse and neglect, natural environment
- **Teaching**
  - System dynamics, group model building, field based summer and winter institutes for graduate students
  - High school internships, MSW/MPH practicums, & doctoral and post-doctoral fellowships
- **Professional development and training**
  - Topic specific design workshops and training institutes
  - Annual Systems Thinking in Schools
  - NIH Institute on Systems Science and Health 2011

Motivation

- *"*When might we expect to have universities of social system design?" (Forrester, 2007)

- Design matters (Sterman 2000)

- Relatively few accounts on how organizational units focused on using system dynamics were developed. Exceptions include reflections on:
  - MIT System Dynamics Group at MIT (e.g., Forrester 2007, 2007, 1968)
  - Internal consulting group at Shell (Lane 1992)
  - Work at PA Consulting (Lyneis, Cooper, and Els 2001).
  - Conference presentations by Ed Roberts, Jack Pugh, and David Packer in 2007, and Barry Richmond's accounts of the use of system dynamics at High Performance Systems.

Trends noted in 2009

- From “what is system dynamics” to “how to do system dynamics”
- New paradigms of collaboration
  - Understanding systems is about “collaborating out” vs. “collaborating in” (Scott Page, 2009, ISSH Ann Arbor, MI)
- More funding and push to support:
  - Transdisciplinary collaborations
  - Develop human capital
  - Address disparities

Systems thinking is also logically related to knowledge and computing infrastructures necessary to link networks of researchers in their collaborative work. ...A wide variety of methodologies are encompassed under systems science…some examples of the methodologies being sought under this PAR: agent based modeling, system dynamics simulation, network analysis…(2009 NIH PAR-07-379)

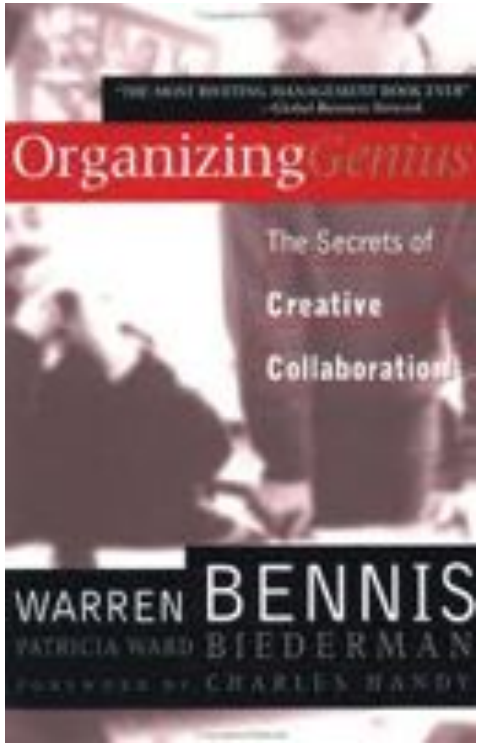
- New Freedom Commission on Mental Health. (2003). *Achieving the promise: Transforming mental health care in America. Final Report.* Rockville, MD.
- Reid, P. P., Compton, W. D., Grossman, J. H., & Fanjiang, G. (Eds.). (2005). *Building a better delivery system: a new engineering/health care partnership*. Washington, DC: The National Academies Press.

Need for New University Structures

"Now, think of some future time when students come to colleges already having 12 years of exposure to systems. They will be advanced far beyond what is now taught in the universities. What then are the universities to do in building on that foundation? I do not see universities preparing for that day. Nor do I see the universities even planning 4- or 6-year systems programs for students who have not had an earlier exposure to systems."

"When might we expect to have universities of social system design? What public background must be established to make a system dynamics profession possible? Who might be the people to lead creation of a powerful systems education?" (Forrester, 2007, 367)

Forrester, J. W. (2007). System dynamics-the next fifty years. *System Dynamics Review, 23(2-3), 359-370.*


Organizing Genius
The Secrets of
Creative
Collaboration
WARREN BENNIS
PATRICIA WARD BIEDERMAN

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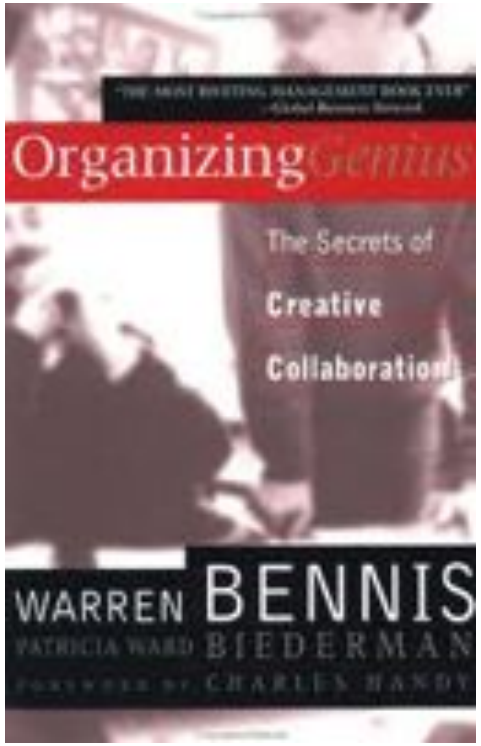

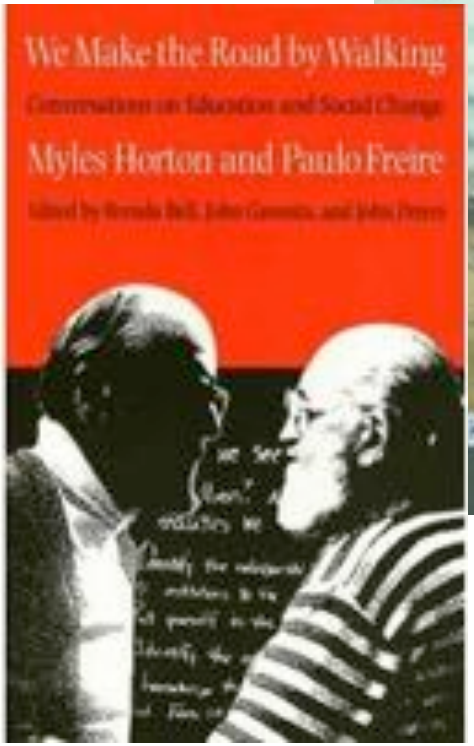

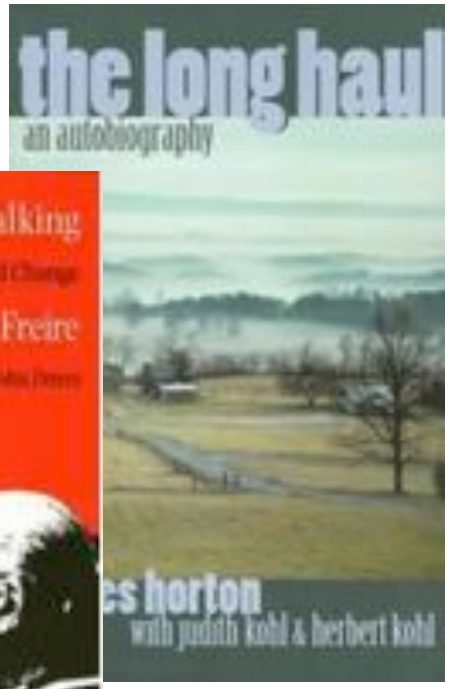

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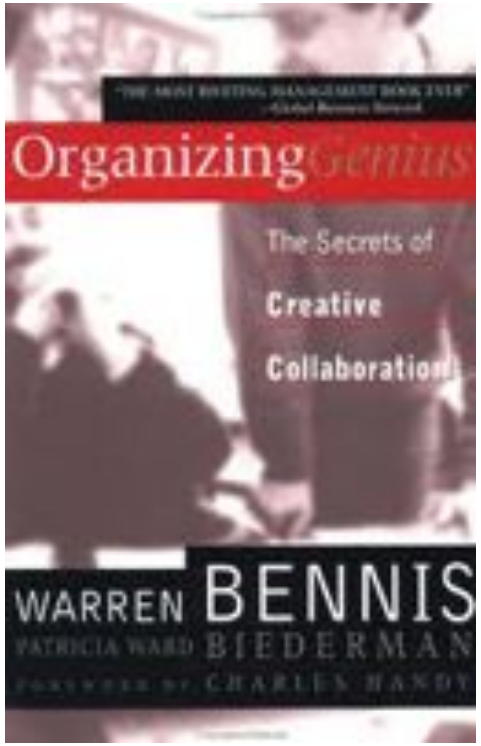

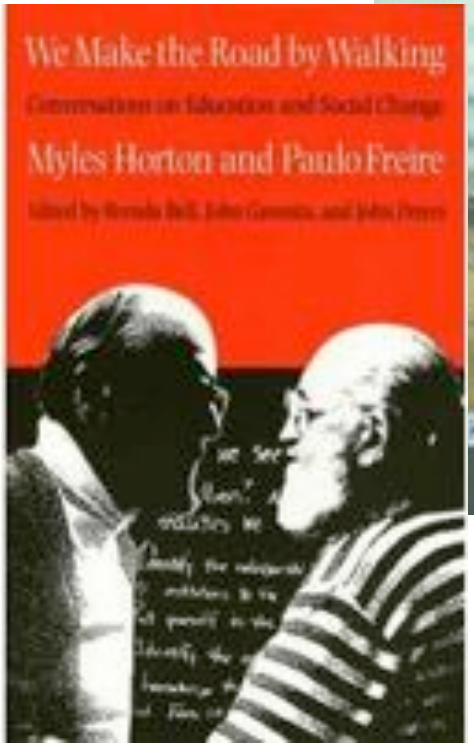

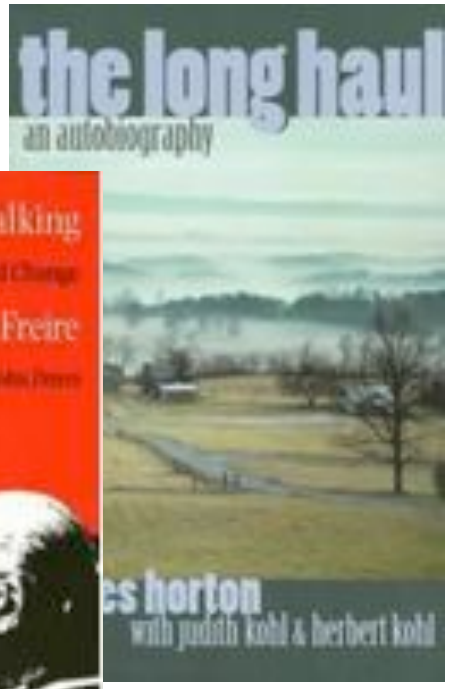

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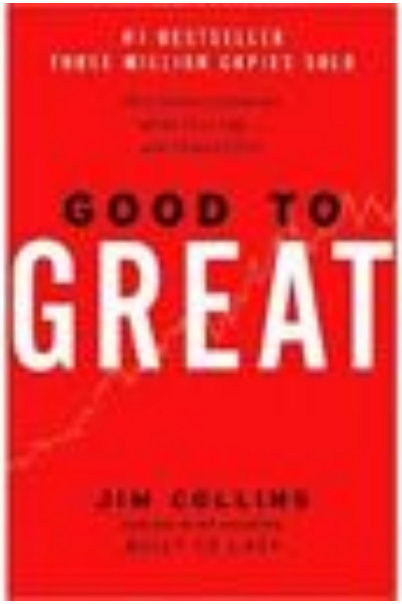
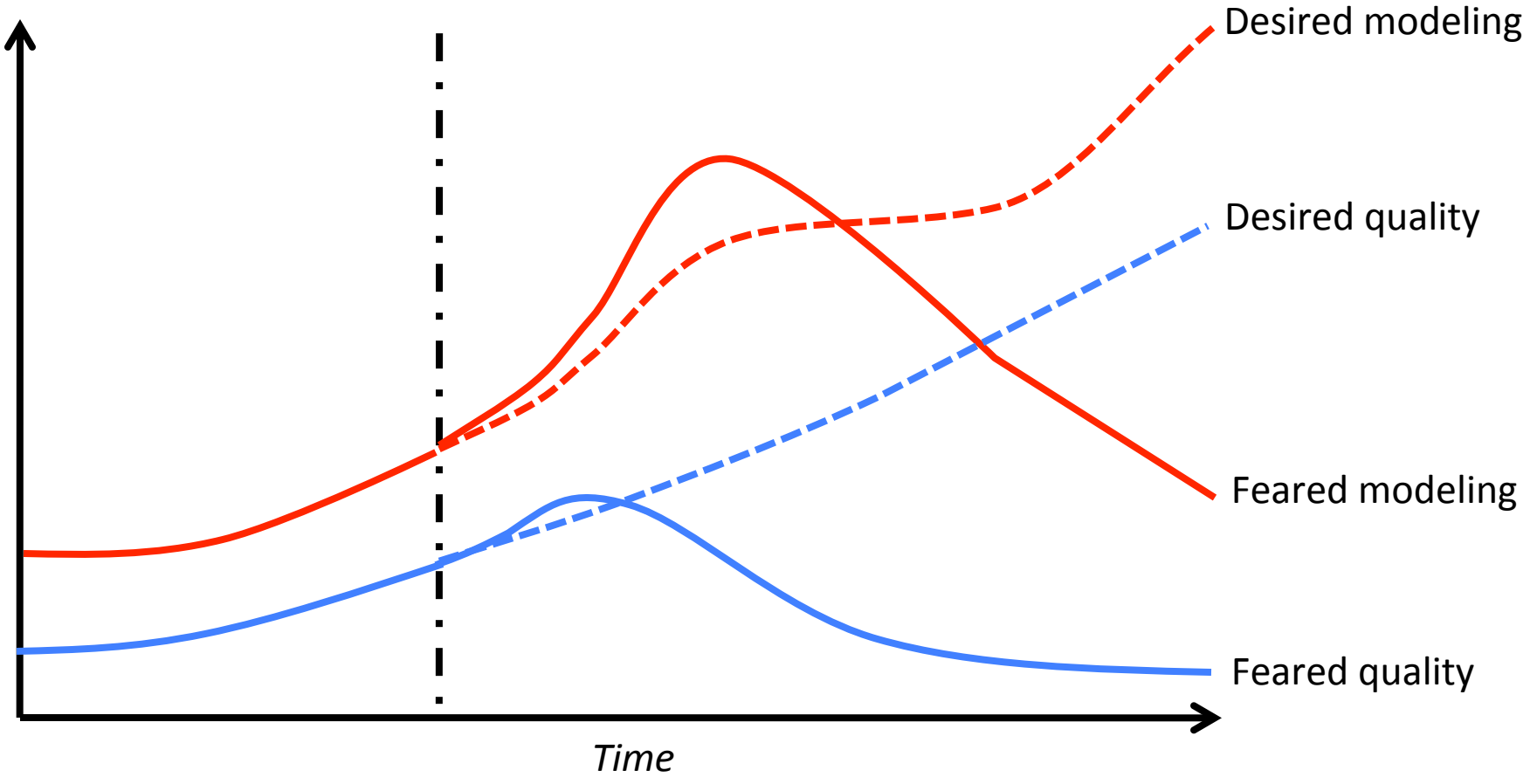
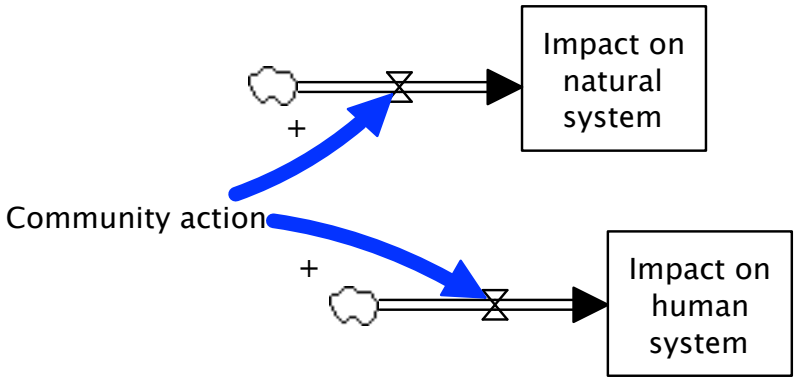
BANG & OLUFSEN

SOUTHWEST AIRLINES



Strategic problem




Impact on natural system
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Community action
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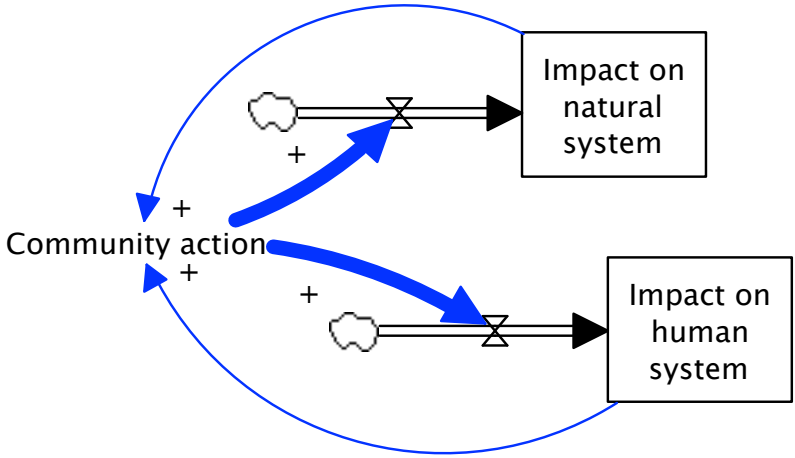
Impact on human system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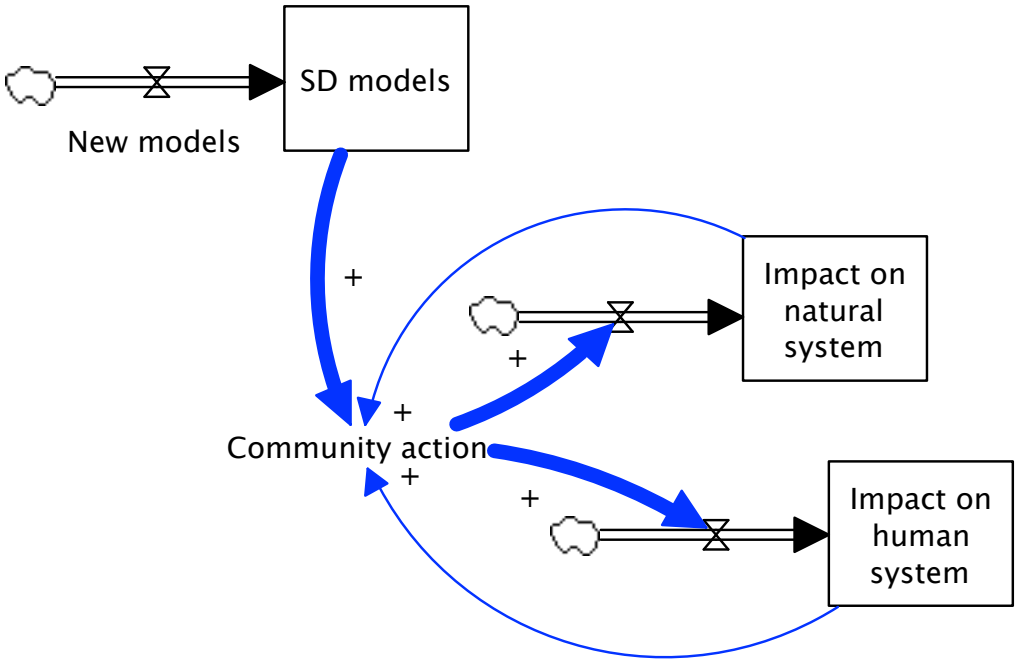
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Community action
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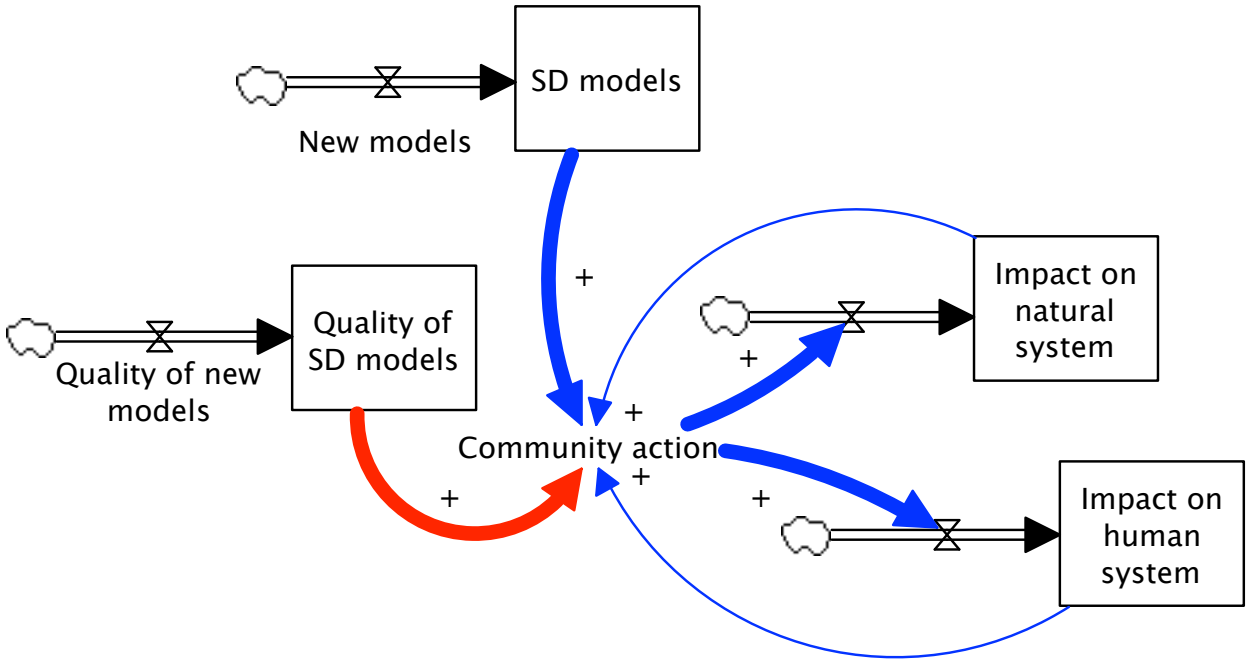
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Community action
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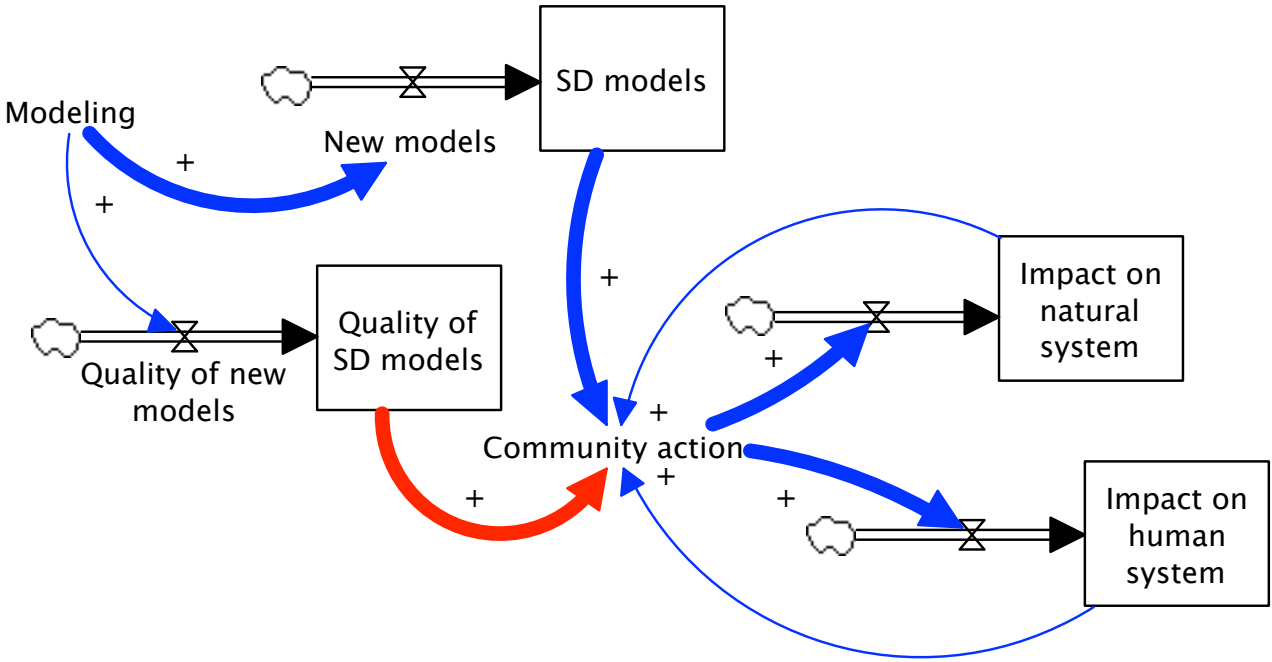
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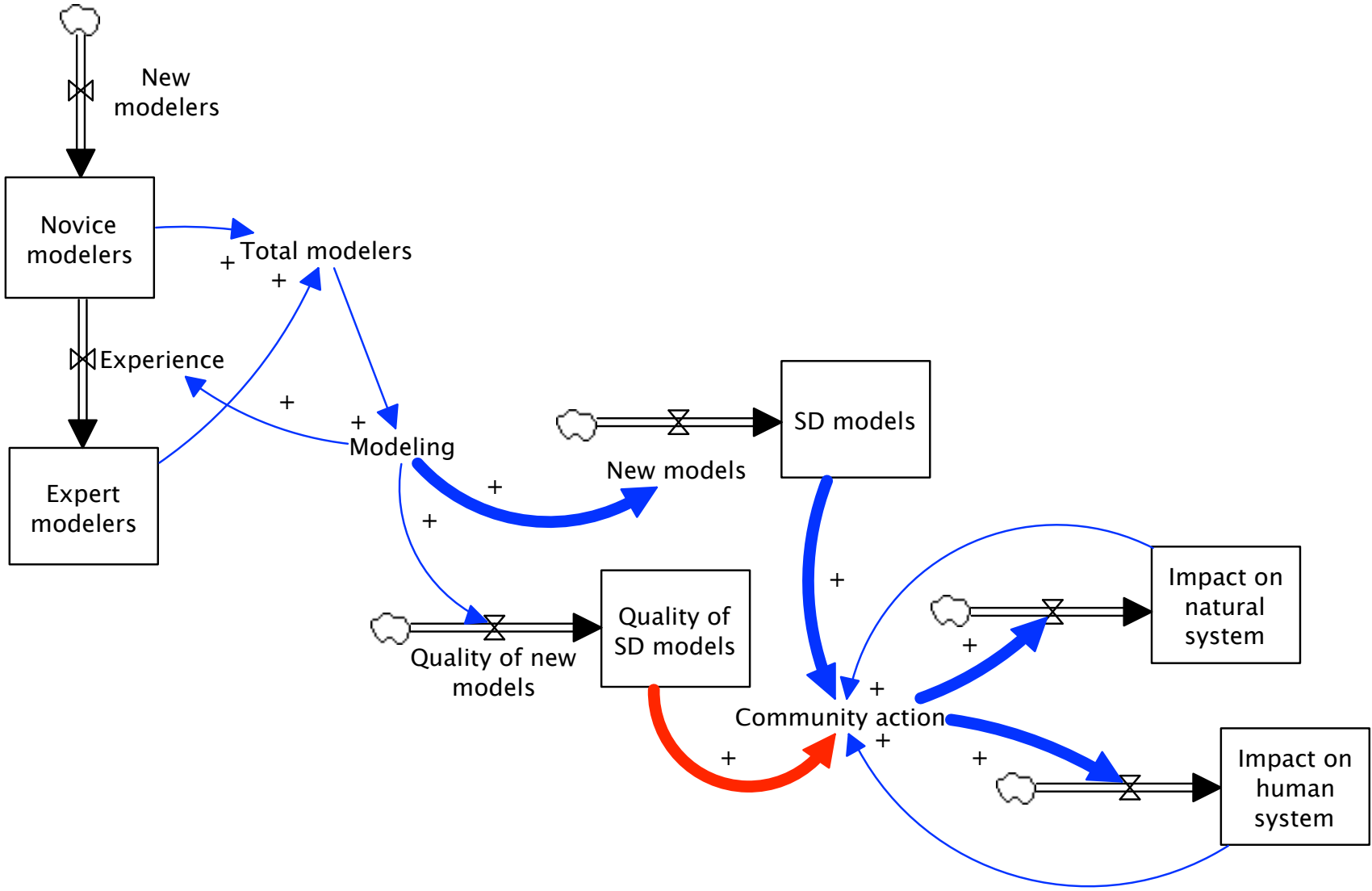
New modelers
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Community action
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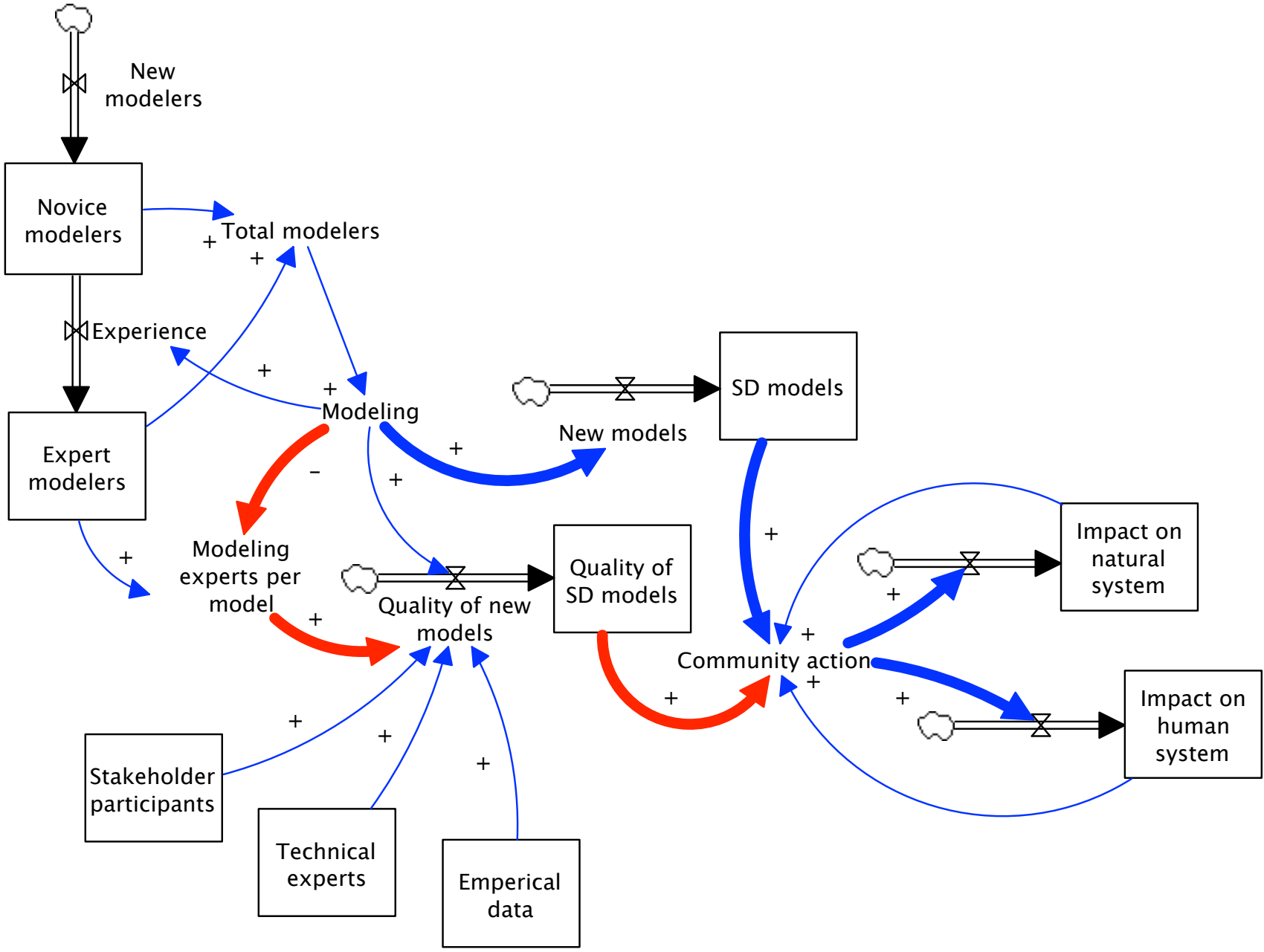
Impact on human system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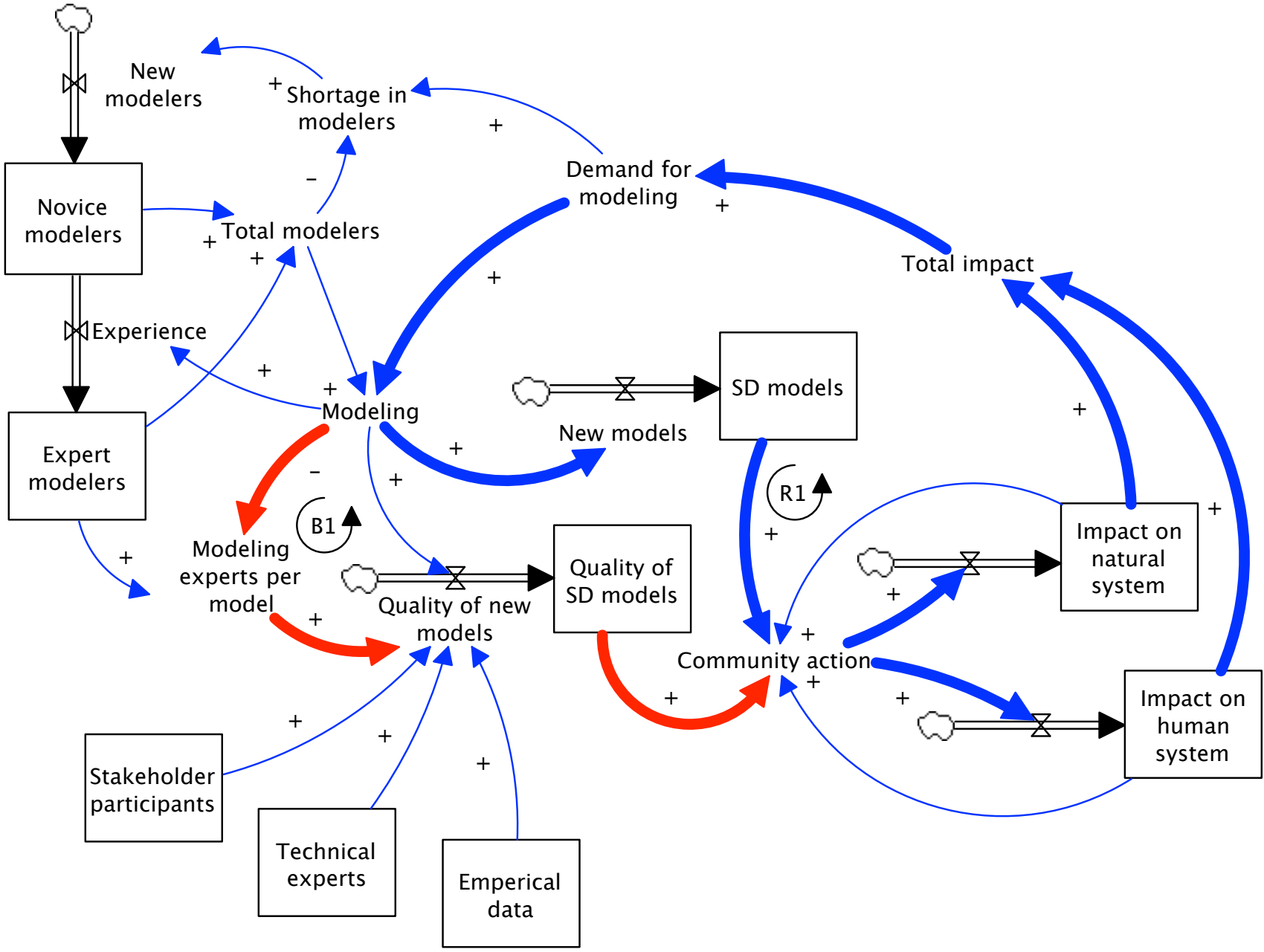
Modeling experts per model
Quality of new models
Quality of SD models
Impact on natural system
Community action
Impact on human system
Stakeholder participants
Technical experts
Emperical data


New modelers
Shortage in modelers
Demand for modeling
Total impact
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Modeling experts per model
Quality of new models
Quality of SD models
Impact on natural system
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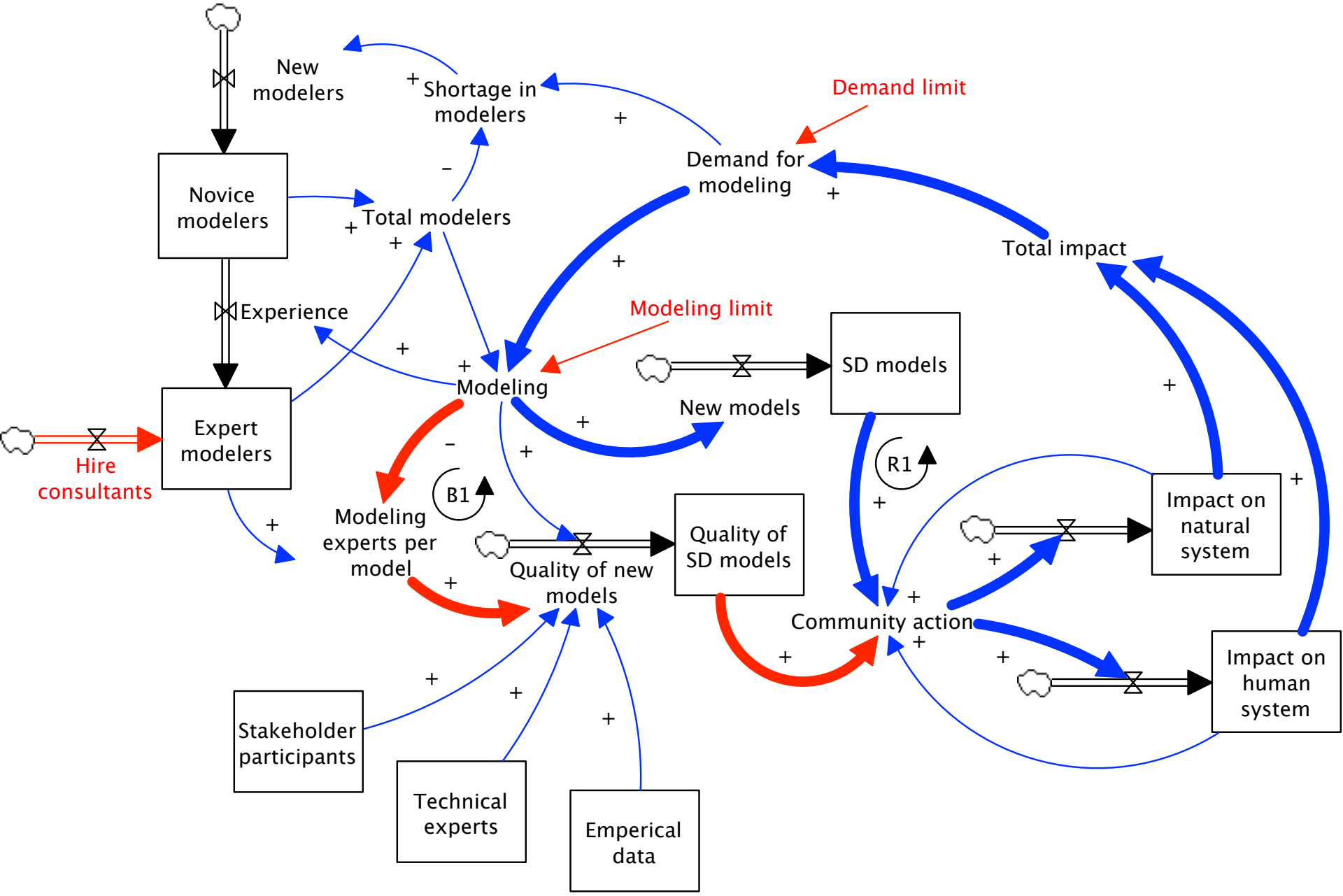
Emperical data

Traditional strategies

1. Hire expert modelers as consultants
2. Limit demand
3. Limit modeling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R1
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Modeling experts per model
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Traditional strategies

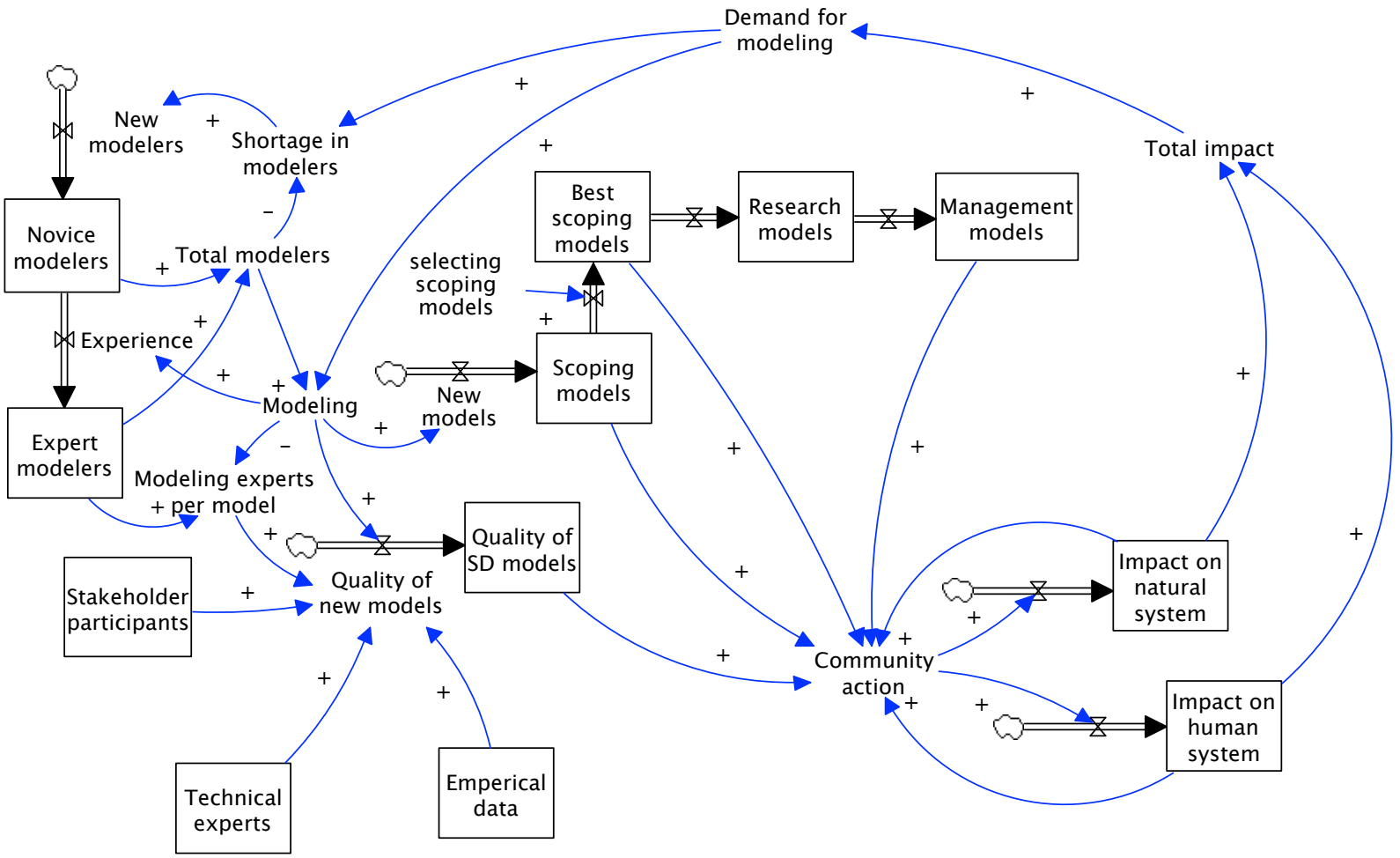
1. Hire expert modelers as consultants
   Limited experts, too expensive
2. Limit demand
   Limits new modelers
3. Limit modeling
   Limits developing internal capacity

Need to restructure the system and/or expand the model boundary !

Three stages of modeling

- Scoping models:
  - "High-generality, low-resolution scoping and consensus building model involving broad representation of stakeholder groups affected by the problem" (Costanza and Ruth, 1998, p. 187)
  - Maximize perceived representativeness of model
- Research models:
  - "More detailed and realistic attempts to replicate the dynamics of the particular system of interest" (p. 187)
  - Maximize quality of analytic insights
- Management models
  - "Producing scenarios and management options in this context of adaptive feedback and monitoring and is based on the earlier scoping and research models" (p. 188)
  - Maximize perceived effectiveness of intervention
  - Implementation stage

Costanza, R., & Ruth, M. (1998). Using dynamic modeling to scope environmental problems and build consensus. *Environmental Management, 22*(2), 183-195.


Demand for modeling
New modelers
Shortage in modelers
Total impact
Novice modelers
Total modelers
Best scoping models
Research models
Management models
selecting scoping models
Experience
Scoping models
New models
Modeling
Expert modelers
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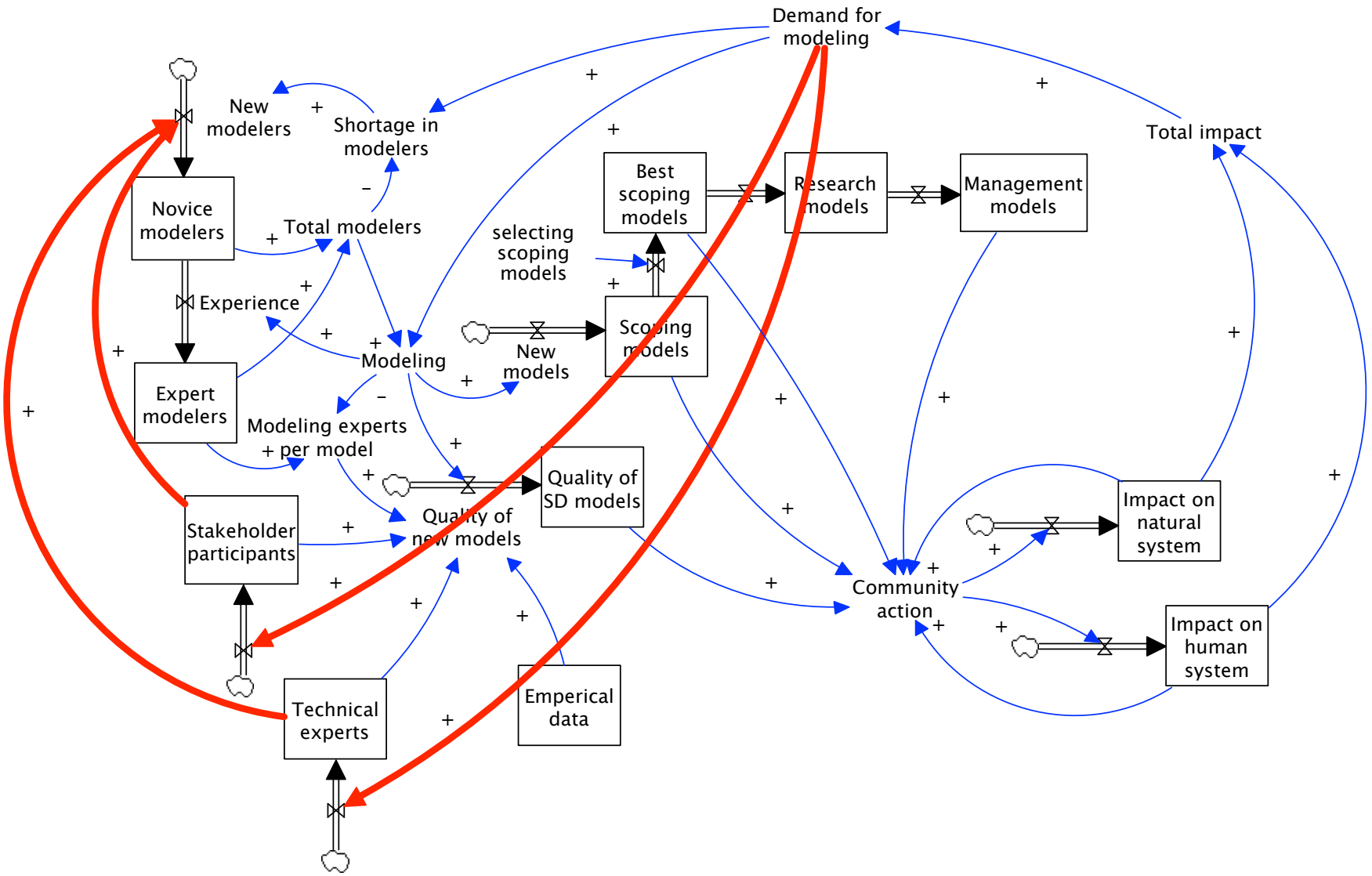
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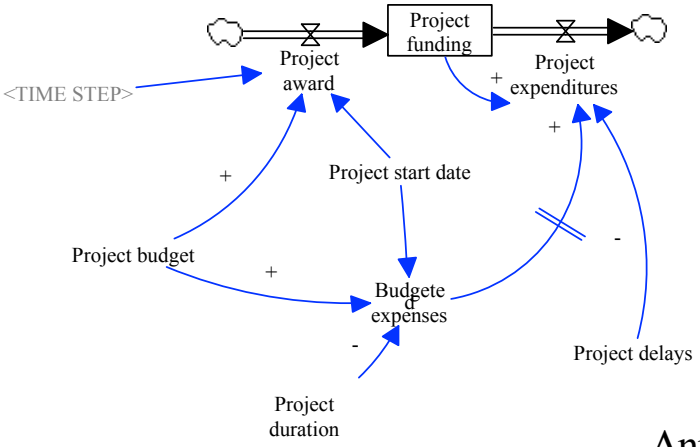
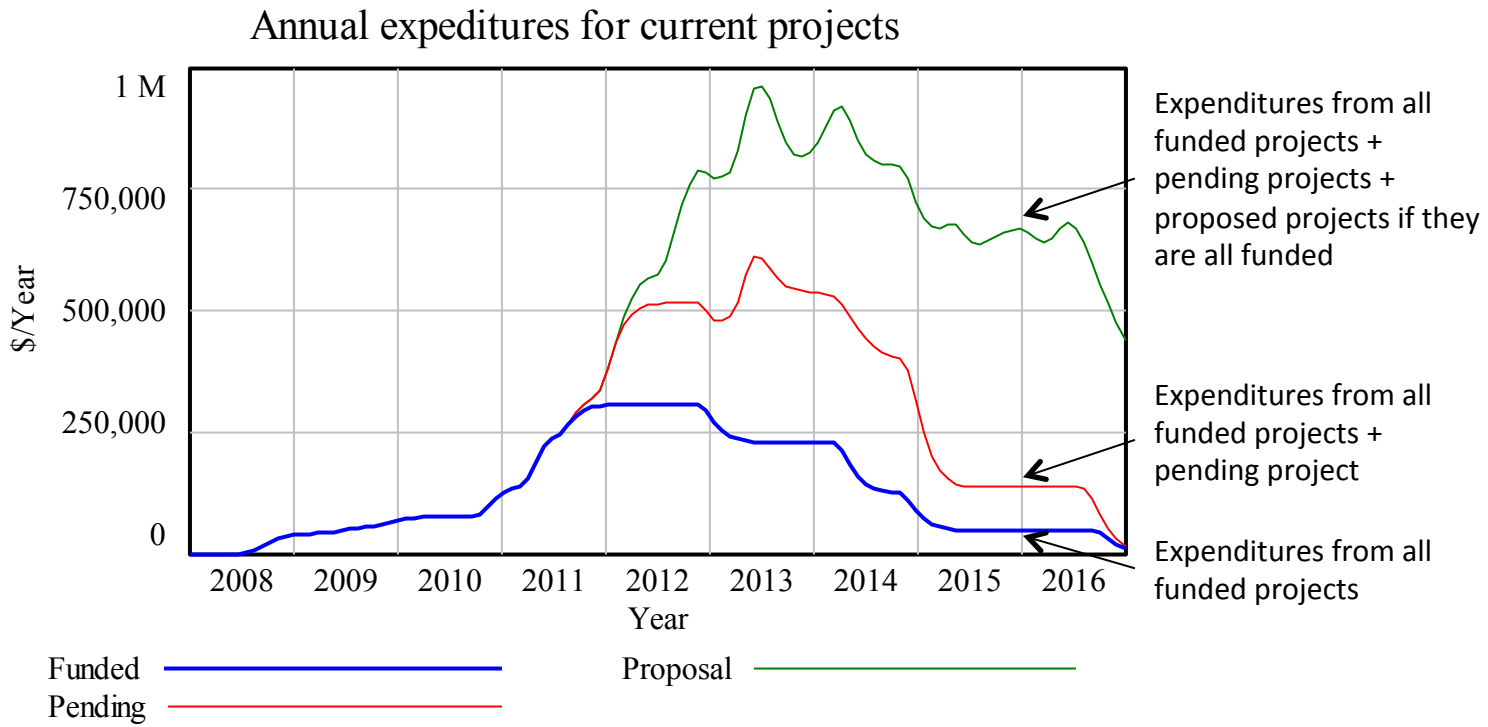
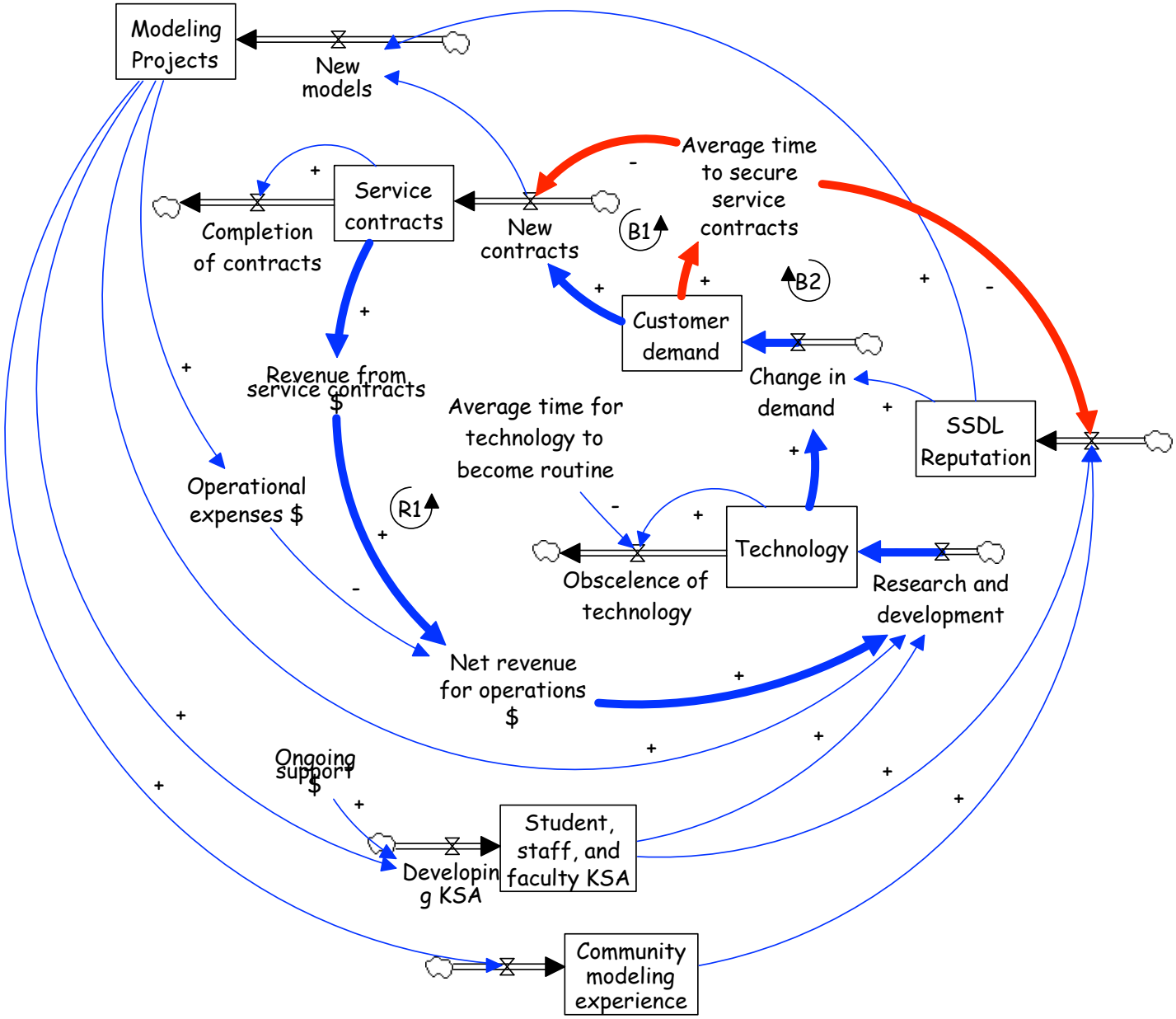
Health Services Research and Development (HRSD) Center Model





Hovmand, P. S. (2010). *Better healthcare through better design of healthcare research and development.* Paper presented at the 2010 International System Dynamics Conference, Seoul, South Korea.

SSDL Business Model



Measures of growth from 2009 to 2012

Measure	2009	2012	2012:2009
Full time staff	3.25	3.5	1.1
Students per year	30	70	2.3
Active GMB projects	3	15	5.0
Research assistants	4	25	6.3
Annual budget	$85,000	$750,000	8.8
Office space	350 SF	2,700 SF	10.8

SSDL space in the Brown School in August 2009 (top), May 2010 (bottom), and July 2010 (right)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TRANSFORMATION
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Systems Thinking in Schools
Waters Foundation


Ritenour
School District
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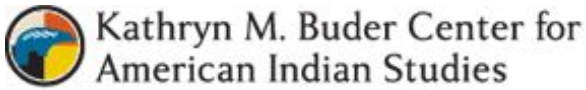
FES
FOUNDATION FOR ECOLOGICAL SECURITY

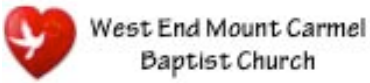

St. Louis Regional Asthma Consortium


The Lupina Foundation


ranstria
translate evidence
transfer skills
transform health


BJC HealthCare


Kathryn M. Buder Center for
American Indian Studies

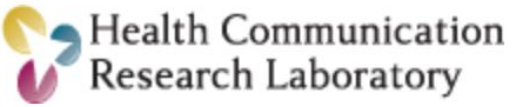

West End Mount Carmel
Baptist Church


NIH
National Institutes of Health
Office of Behavioral and Social Sciences Research


BILL & MELINDA
GATES foundation


Behavioral Health Network
of Greater St. Louis

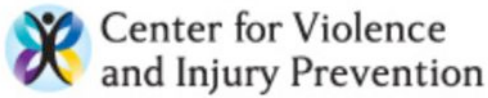

Youth
IN NEED


Health Communication
Research Laboratory


Save the Children
UK


mend


IDB


Center for Violence
and Injury Prevention


TREC


Ohio
Department of
Mental Health


Washington University School of Medicine in St. Louis


KIRWAN INSTITUTE
for the Study of Race and Ethnicity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KAISER PERMANENTE


CROSSROADS ANTIRACISM ORGANIZING & TRAINING
DISMANTLING RACISM, BUILDING RACIAL JUSTICE IN INSTITUTIONS


UNITED STATES
DEPARTMENT OF VETERANS AFFAIRS

“If they keep doing this, the program is sure to work”

Closing reflections

What we resisted…

- Strategic focus on getting started
- Continuous growth
- Marketing
- Making system dynamics easier for people to understand
- Grants
- "Low hanging fruit"
- Expanding into new methods

What we fought for…

- Strategic focus on "limits to growth"
- Staying small
- No marketing
- Helping people learn system dynamics and how to apply it appropriately
- Educating across the lifespan
- Hardest situations we could find
- Doing system dynamics better