

# Social Dilemmas and Motivation to Participate in Social Software-based Communities: Lessons from Collective Action Theory in the Contemporary Online Environment

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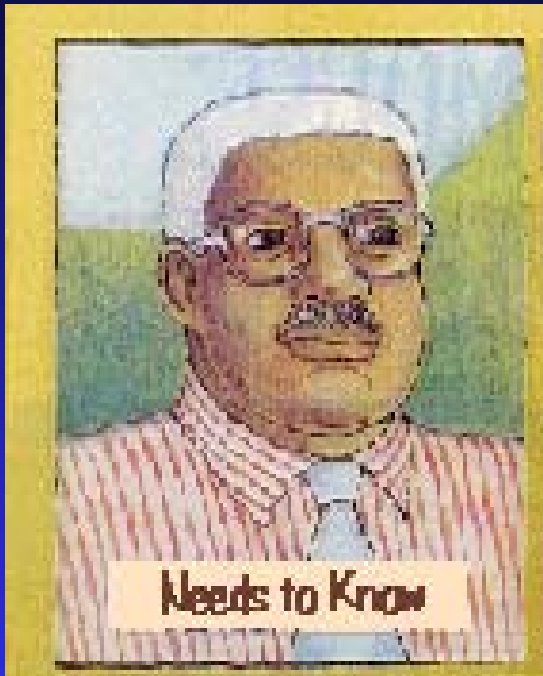
“unlike the traditional factors of production—  
land, labor, and capital—knowledge is a  
resource. . . that [cannot be] be forced out of  
people” (Kim and Mauborgne, 1997, p. 17).

# Discretionary Information

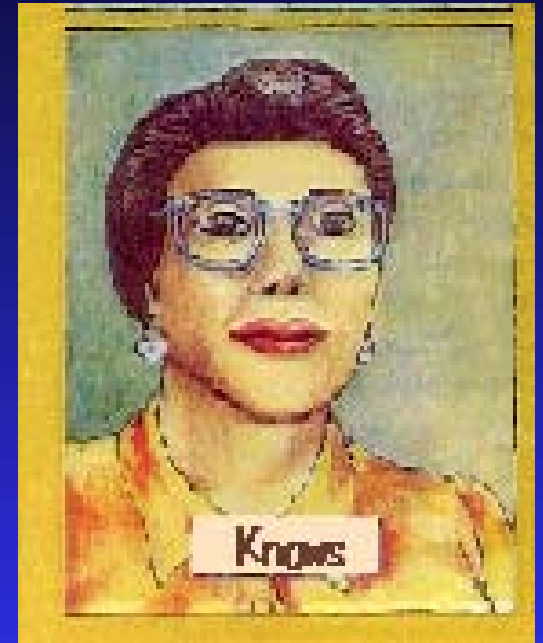
- Information that is under the private control of individuals who cannot be compelled to share with others, and who may or may not be motivated to voluntarily share it (Thorn & Connolly, 1990; Kalman, Monge, Fulk & Heino, 2002).

## Central Problem

- Creating viable data stores of “discretionary” information
- Motivating individuals to contribute their information to these data stores, given an incentive structure that typically favors withholding contributions and free-riding

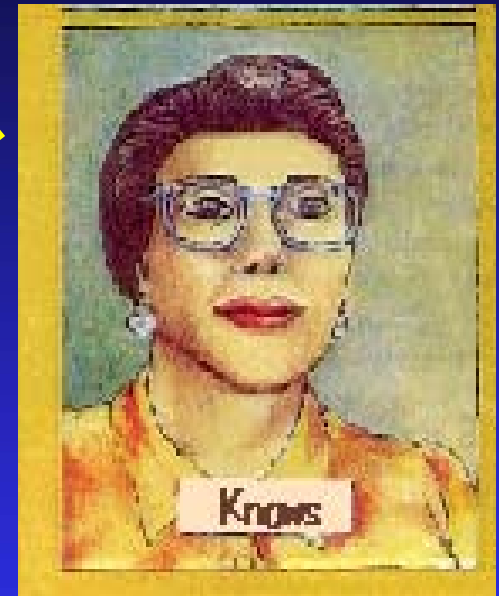
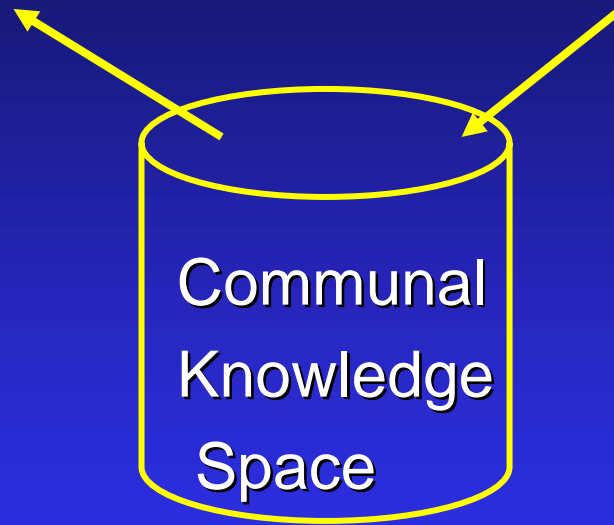
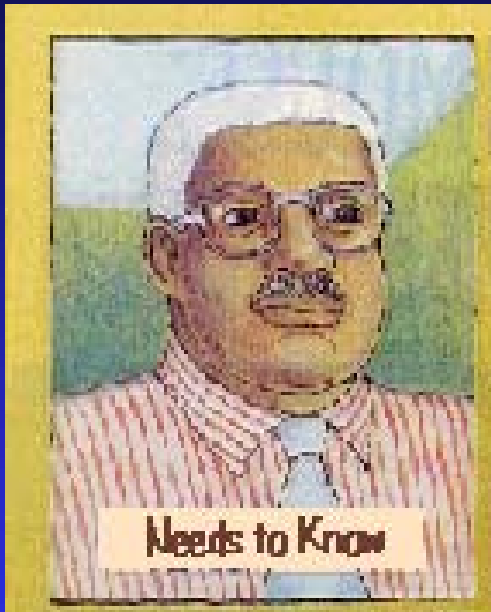


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# Communal Knowledge Spaces

- Web boards
- Intranets
- Project websites
- Bulletin boards (paper or electronic)
- In-process design storage (e.g., Metaphase)
- Lessons learned databases
- Pooled information databases (e.g. case management)
- Exception tracking databases (e.g., recording problems)
- Feedback databases (e.g., c|net)
- Distributed software development databases (e.g., Linux)
- Blogs
- Wikis
- Etc.

# Example: El Centro's Case Management System

- Federation of 48 local law enforcement organizations
- Computer database designed to facilitate sharing of information on drug trafficking collected by local officers
- Purpose was to pool distributed information from different jurisdictions in order to reduce the flow of illegal drugs in to the county and to build better legal cases against drug traffickers
- Result: law enforcement officers would **not** share their information with other officers except very selectively





# Example: Linux Community

(Moon & Sproull, 2002; Weber, 2004)



“Linux is a clone of the operating system Unix, written from scratch by Linus Torvalds with assistance from a loosely-knit team of hackers across the Net.”

([www.kernel.org](http://www.kernel.org))

- Linux is freeware
- Volunteers contributed code, documentation and technical support “just because they wanted to”
- Tens of thousands of individuals from all over the world

# Key Questions

- Why do some communal knowledge spaces succeed while others fail?
- Why are people motivated to participate in some communal knowledge spaces but not others?
- Are there generalizable theoretical mechanisms that underlie motivation to participate versus free ride?

# Overview

- Classical Collective Action Theory
- Critical Mass and Collective Action
- Theories of Transactions Costs and Transactions Value
- Theories of Social Capital

# Collective Action Theories

## Core Concepts: Samuelson; Barry & Hardin

- ◆ Defining features
  - ☞ *Nonrivalry*
  - ☞ *Inclusiveness*
- ◆ Assumptions
  - ☞ *Individual utility indices*
  - ☞ *Rational self-interest: everyone wants to maximize outputs and minimize inputs*
- ◆ Impossibility of spontaneous creation

## Game Theoretic Formulation: Olson

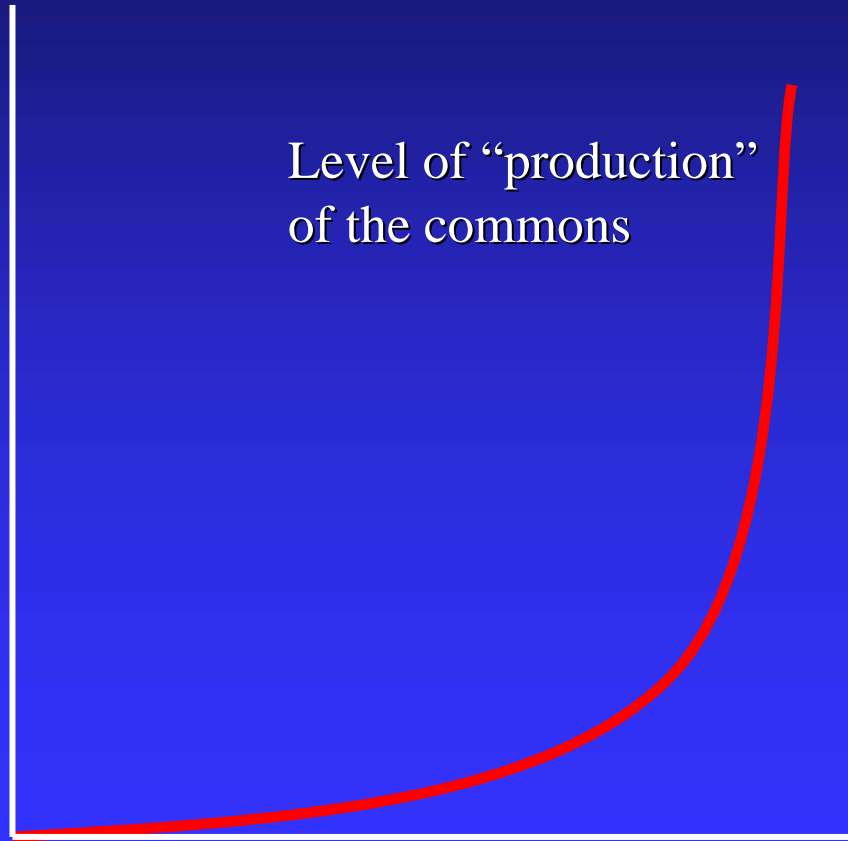
- ◆ n-player, iterated prisoner's dilemma game
- ◆ incentives to free ride
- ◆ Visibility (Thorn & Connolly, 1987; Cress & Kimmerle, 2008; Kollock & Smith, 1996)

# Production Challenge (Oliver, Marwell & Teixeira, 1985)

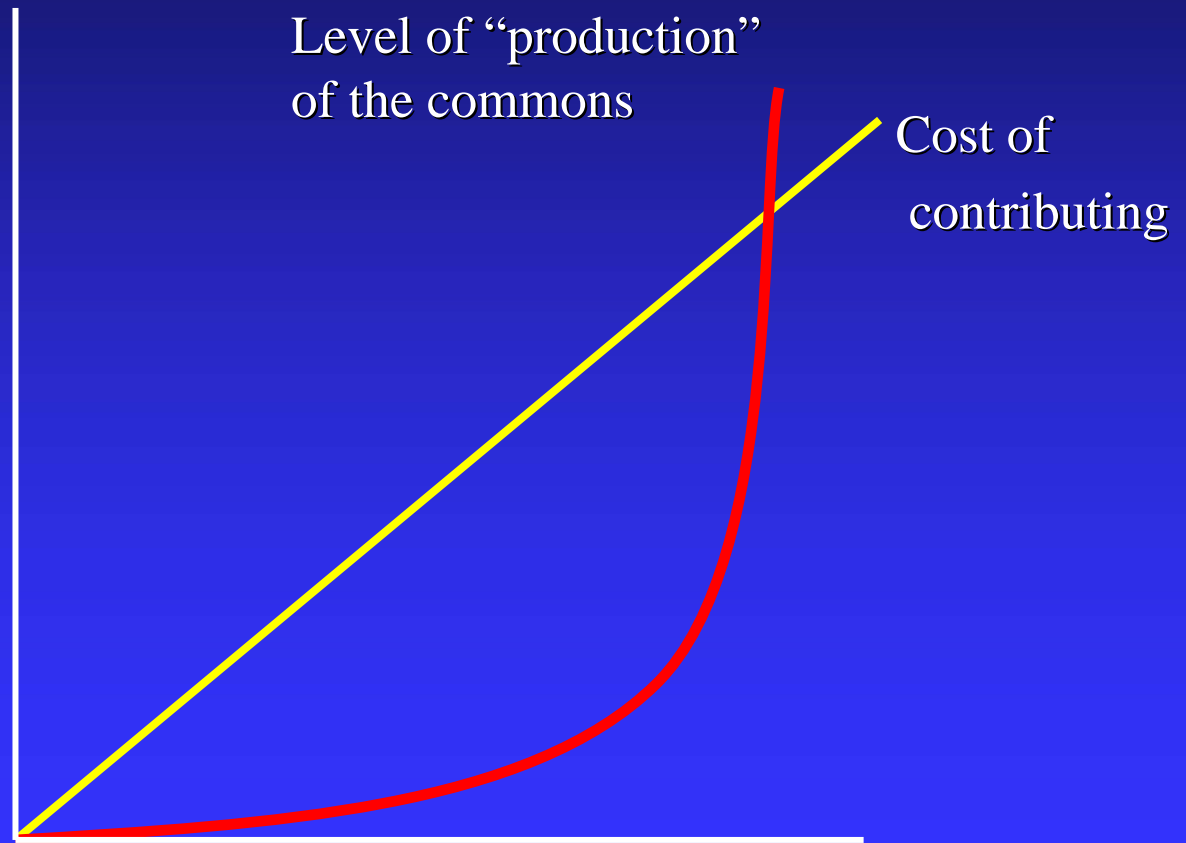
Benefit to the individual

Level of “production” of the commons

Collective resources contributed by all individuals



# Motivational Challenges: Cost vs. Benefit



# The Distribution Challenge



## Tragedy of the Commons

Overgrazing

Fouling

Poaching

Stealing

# Individual Issues in Distribution of Benefits of Communal Knowledge Spaces

(Kumar & Van Dissel, 1996)

- **Overgrazing:** degrading service levels by overusing for personal benefit (Kollock & Smith, 1996)
- **Fouling:** viruses, corrupt data, not following rules of decorum (Kollock & Smith, 1996), not staying on focus (Tochtermann & Granitzer, 2008)
- **Poaching:** diverting commonly held resources for private use. e.g., monitor and analyze transactions with a communal knowledge space to develop strategic information for private use
- **Stealing:** monitor transaction to get info on another's customers and use it to steal them away



# Proposed solutions for disincentives for individuals to contribute to nascent collective action (Kerr, 1992)

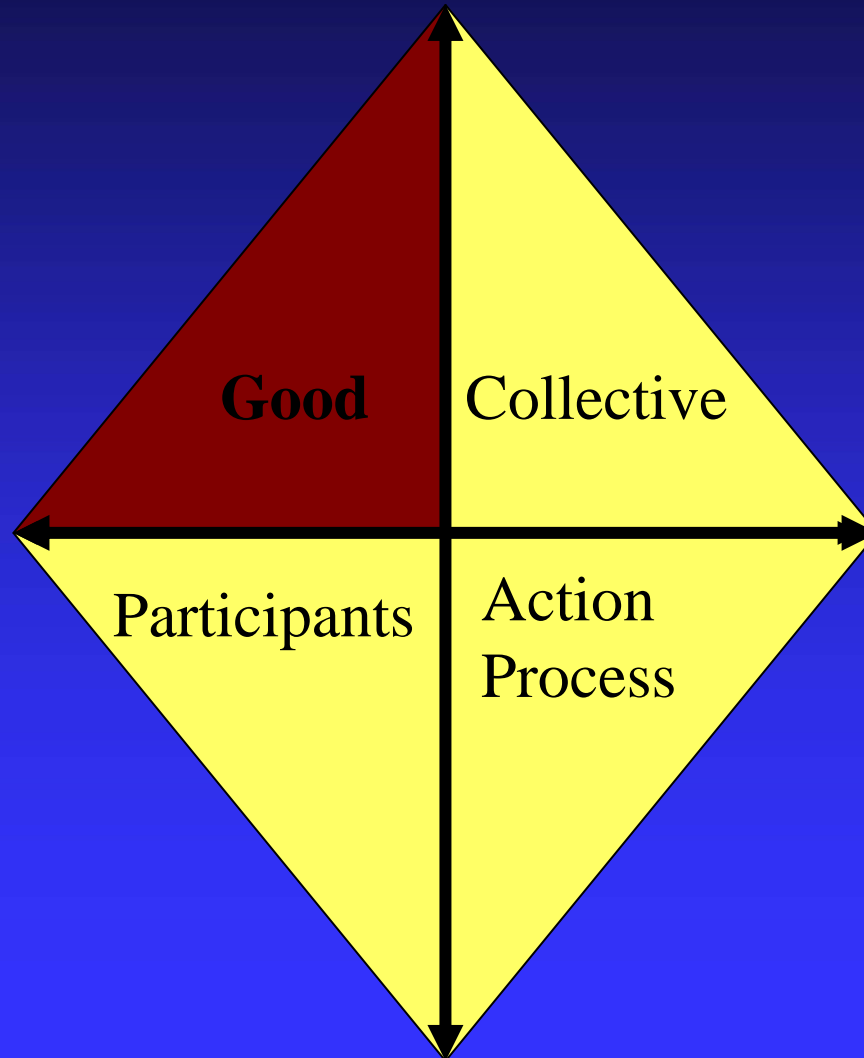
- ◆ *Cooperation contingent transformation*: selective supplemental incentives (rewards or punishments) make it in the individual's private interest to do what is good for the collective (Thorn & Connolly, 1987; Cress, Kimmerle & Hesse (2006))
- ◆ *Public goods transformation*: the individual comes to place high value directly on collective gain (Brunsting & Postmes (2002); Kalman, Monge & Fulk, 2002)
- ◆ *Building common identity* (Wodzicki, Schwammlein & Cress, 2008; Sassenberg, 2008)

# Case Example: Individual Participation in El Centro's Deconfliction Database

- Purpose: prevent conflicts due to lack of coordination in planned law enforcement actions (e.g., stake-out ruined by police activity next door)
- History: conflict and post-it failure
- Nonspontaneous creation
  - ◆ One chief with IS expertise took the lead
  - ◆ Pre-existing social and organizational network among chiefs
- Pre-existing model of cooperation existed (post-it version)
- Cooperation-contingent transformation: MOA
- Public goods transformation: goal of repository was officer safety
- Visibility of noncompliance: not pre-execution, but post-execution

# Critical Mass and Collective Action

(Marwell & Oliver, 1993)



# Characteristics of the Public Good

- Divisibility (software help versus public park)
- Heterogeneity, especially in Web 2.0 environment
  - ◆ E.g., connectivity, communality, sense of community

# Information vs. Material Contributions (Fulk et al. 2004)

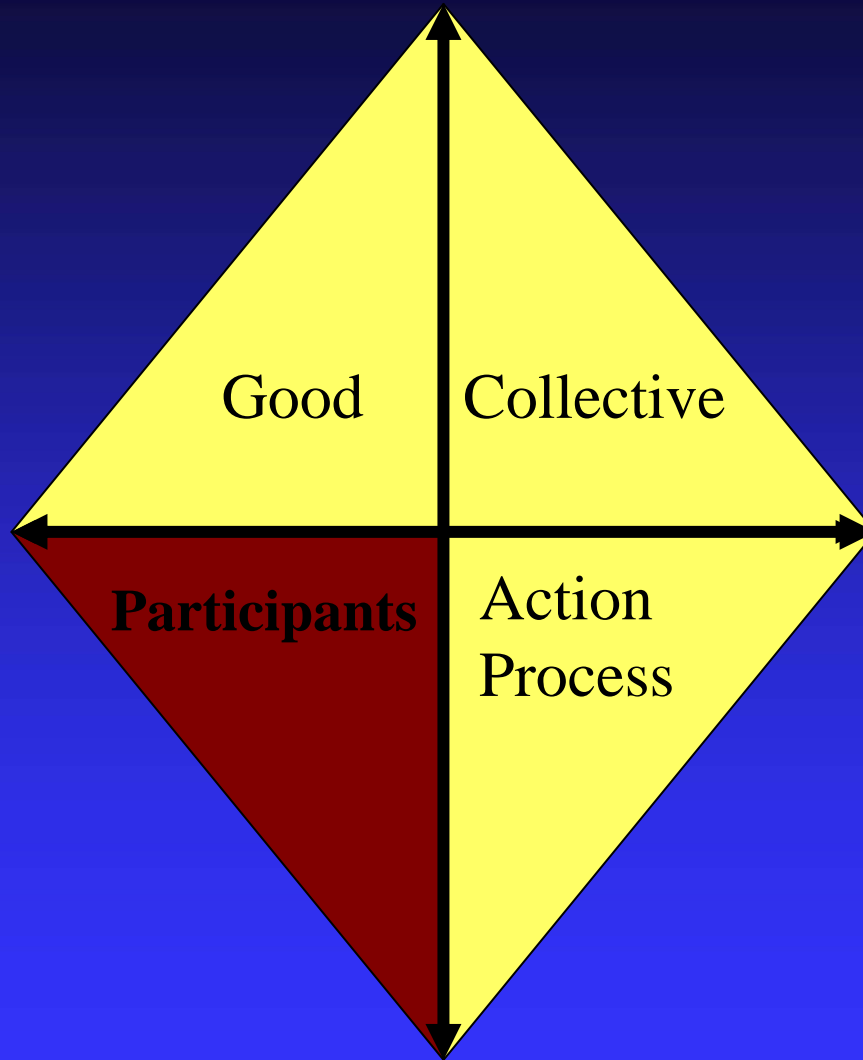
## ■ **Securing the benefits of ownership**

- ◆ Information is reproduced rather than surrendered when it is contributed
- ◆ Thus, participants in information goods don't benefit from their own contribution directly
- ◆ Replicability means that it is easier for others to acquire it once it is contributed

## ■ **Relative invisibility**

- ◆ “Creating and sharing knowledge are intangible activities that can neither be supervised nor forced out of people.” (Kim & Mauborgne, 1997, p. 67)
- ◆ Unless people cooperate, it is hard to know who knows what
- ◆ Free-riding can be more difficult to observe

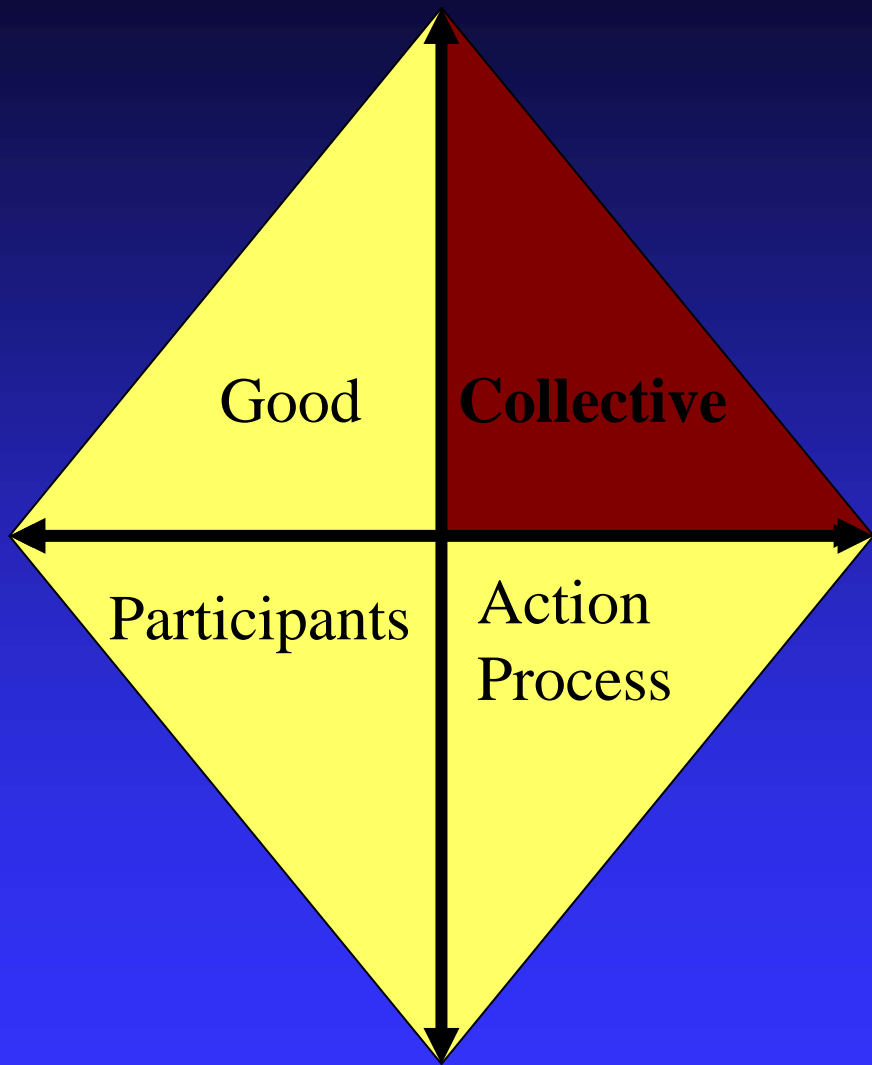
- **Assessing value ex ante of “experience good”**
  - ◆ Information must be experienced to be valued, and must be consumed to be experienced.
  - ◆ Many types must be kept up-to-date in order to maintain value
  
- **Contribution costs variability**
  - ◆ Costs cannot easily be assessed on a single metric such as money
  - ◆ Costly to produce, inexpensive to reproduce



# Characteristics of Potential Participants

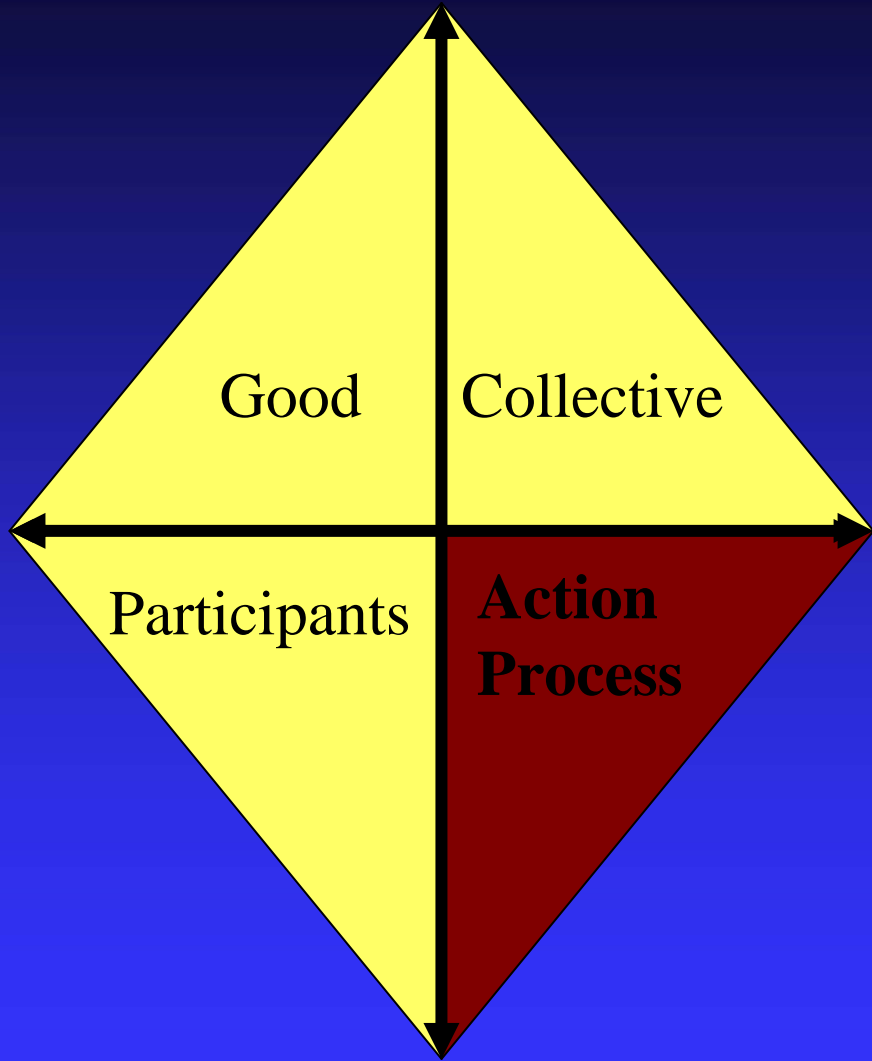
- Interests, resources, costs
- Cress & Kimmerle (2008): more “well endowed” people contributed more—but less than proportionately
- Monge et al. (1999): least contributions from those facing the greatest potential costs, regardless of potential benefit





# Characteristics of the Collective

- Size
- Diversity of interests & resources (Marwell & Oliver (+), Cherry, Kroll & Shogren, 2005 (-), Bonacich, 1987 (0))
- Invisibility of information makes assessment of others' holdings challenging



# Characteristics of the Action Process

- Interdependence among participants
  - ◆ Common organization?
  - ◆ Information on others' contributions?
- Social network structure (e.g., centralization)
- Presence of champion
- Noncontribution has different meaning for information goods (e.g., deconfliction database)
  - ◆ Some positive contributions of lurkers (Nonnecke & Preece, 2003; Kalman et al., 2002)
    - ☞ Reduced “newby” questioning
    - ☞ Reduced conversation clutter
    - ☞ Contribution only from knowledgeable experts
    - ☞ Lurkers as audiences (Kalman et al.’s “information self-efficacy”)

# Relevance of new media to the action process (Bimber et al. 2005)

- Free ride versus contribute may not be a rigid dichotomy (e.g., P2P song sharing, APOSDLE)
- Less organization may be necessary (Kollock, 1999); e.g., meetups, flash mobs, viral movements
- Boundaries of public and private are more porous and involve less intentionality in boundary crossing

# Theory of Transaction Costs

(Coase 1937; Williamson, 1979, 1981)

- Transaction as fundamental unit of economic analysis
- Goal: cost reduction
- Governance structures: Market (acquire) vs. hierarchical (create)

# Theory of Transaction Costs (TC)

- Key elements of transactions:
  - ◆ Degree of uncertainty
  - ◆ Frequency
  - ◆ Degree of specificity
- Behavioral assumptions:
  - ◆ Bounded rationality
  - ◆ Opportunism vs. trust

# Theory of Transaction Value (TV)

- Zajac & Olsen (1993); Dyer (1997); Madhok (1997)
- Value maximization by both partners in an exchange vs. simply cost reduction by one partner
- Explains behavior that appears irrational within a TC framework
- Trust is central to value creation



# Extending TC & TV to Communal Knowledge Spaces

- Creation of communal knowledge spaces:
  - ◆ Availability of information on the market
  - ◆ Costs of:
    - ↳ Search
    - ↳ Verification
  - ◆ Initial costs vs. long-term value

# Extending TC & TV to Communal Knowledge Spaces

- Maintenance of communal knowledge spaces:
  - ◆ Minimizing costs:
    - ☞ Usability: reduce costs of search, verification, and contribution
    - ☞ Reputation Systems: reducing verification costs
  - ◆ Maximizing value:
    - ☞ Whole is greater than the sum of the parts
    - ☞ Building trust
    - ☞ Importance of norms

# Social Capital and Discretionary Databases

- Social capital is the resources deriving from a network of personal relationships
- Rational utility perspective: people make investments in other people when they expect to derive a net benefit from that investment
- Two perspectives:
  - ◆ Collective good
  - ◆ Private good

# Social Capital as Collective Good

- The resources attendant upon a network of mutual and relatively institutionalized relationships (Bourdieu, 1985) that flow to the benefit of the set of relationships as a whole
- Based on similar assumption of rational investment with expectation of return
- Embedded in structure and culture of the collective
- Density (sheer number of connections out of all possible) increases social capital (Coleman, 1998), but also consumes resources and accrues constraints (Aldrich, 1999)
- Density dependence for links (Monge, Margolin & Heiss (in press))

# Collective Social Capital and Communal Knowledge Spaces

- Optimal density vs. maximal density; viable coalitions (Fulk et al., 1996)
- Links are not all the same:
  - ◆ **Bonding** social capital: reinforcing interactions that reaffirm exclusionary relationships (e.g., fraternal organizations, fashionable country clubs offline; relationship-oriented communal knowledge spaces such as support groups and photosharing sites)
  - ◆ **Bridging** social capital: inclusive interactions that draw people together across social boundaries and provide access to heterogeneous resources (e.g., social movements, religious organizations offline; communal knowledge spaces such as TripAdvisor)
  - ◆ Many sites support both types, such as social networking sites

# Social Capital as Private Good

- Strong versus weak ties: frequent communication with the same people yields less new information than “weak ties” (e.g., Granovetter, 1973, job search)
- Structural holes: influence derives from serving as a go-between for people who are not otherwise connected (Burt, 1992)
- Private and collective benefits are not mutually exclusive: tennis club member might get collective bonding social capital and but also potentially private benefits by meeting important people in other professions that they would not normally encounter in the course of their work or socializing

# Private good social capital and communal knowledge spaces

- Weak ties: Online health support communities can help families facing the same health issue who would not otherwise have known each other to find each other to share information and bonds
- Brokerage: membership in online community may allow an individual to be a conduit for information from the online community to outside people who are not members of it
- Bridging/bonding social capital recast as private goods; e.g., intense users of Facebook had higher personal levels of bridging and bonding social capital (Ellison, Steinfield & Lampe, 2007); Williams (2006) has applied concept to online gaming environments

# Key concept: embeddedness

- Social relationships in which resource exchange takes place
- Relational embeddedness: history of interaction that shapes the set of actions available to individuals
  - ◆ prior interaction facilitates trust judgments
  - ◆ offline and online relationships interpenetrate each other (Hampton, 2007 community study; Matzat 2008 on teaching communities)
  - ◆ Two-edged sword: migration, as in online gaming groups abandoning a game for a new one
- Structural embeddedness: an actor's position in a network structure provides access to information about others in the network through indirect ties—reputational effects
  - ◆ Deterrent to free riding (Kollock & Smith, 1996 re newsgroups)
  - ◆ Positive reputational effects contribute to success of Linux (Moon & Sproul, 2002; Weber, 2004)



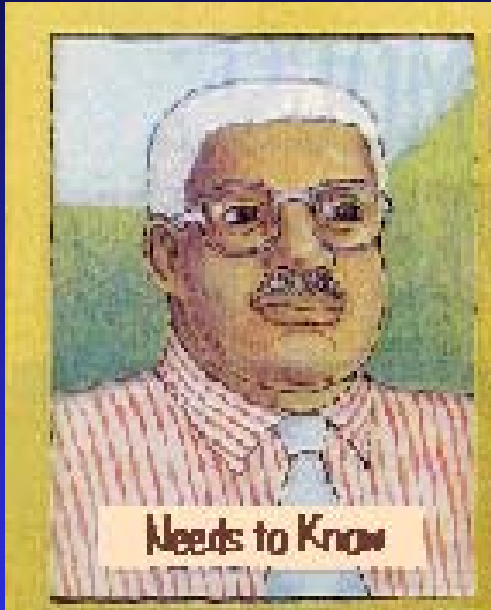
# Revisit of Key Questions

How can communal knowledge spaces be created and retained?

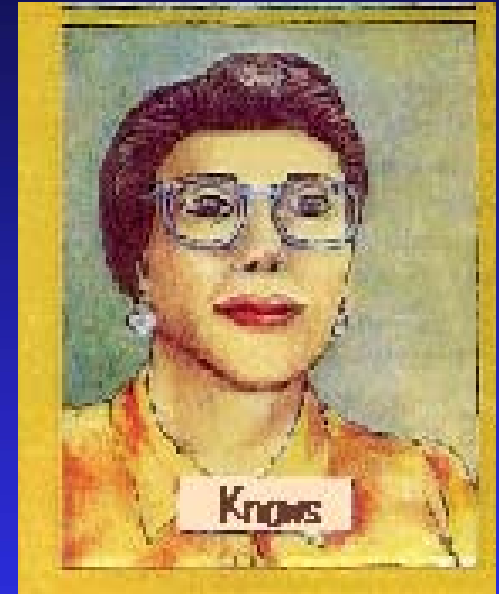
Under what conditions are people motivated to participate in communal knowledge spaces?

Theory, empirical data, and extant case research offer some tentative suggestions...

- ◆ Organizers
- ◆ Build on existing networks
- ◆ Build on successful collaborations
- ◆ Cooperation-contingent transformations through selective incentives
- ◆ Public goods transformations
- ◆ Build common identity
- ◆ Make contributions (and free riding) visible
- ◆ Modularize tasks
- ◆ Make structure of database visible
- ◆ Provide and maintain updated expert directories
- ◆ Provide system access and training to potential contributors
- ◆ Encourage supportive norms and cultures related to both contribution and retrieval

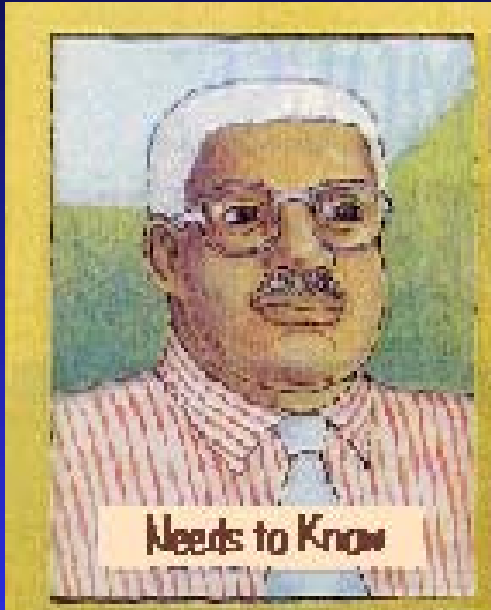


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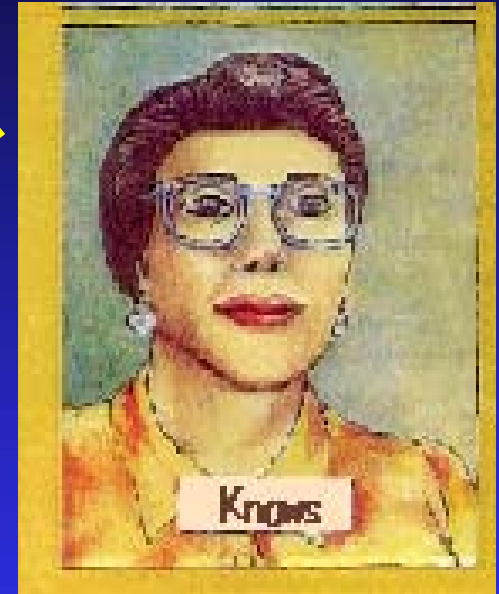
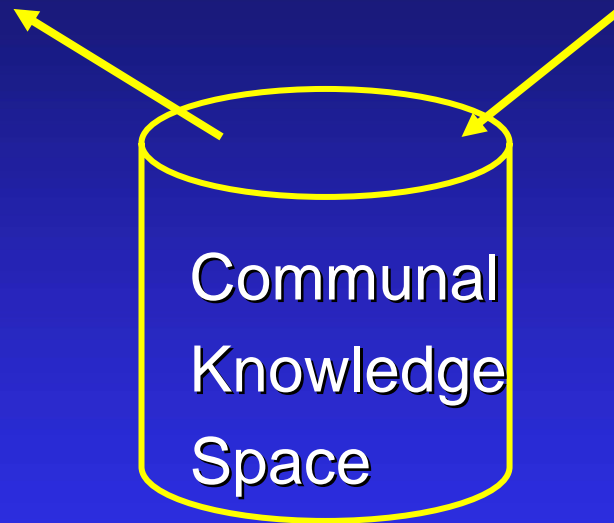


Doesn't know her, or  
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knows

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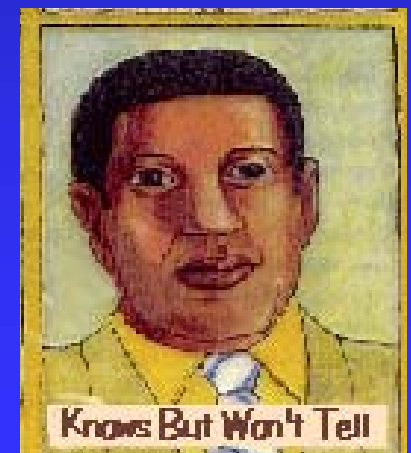
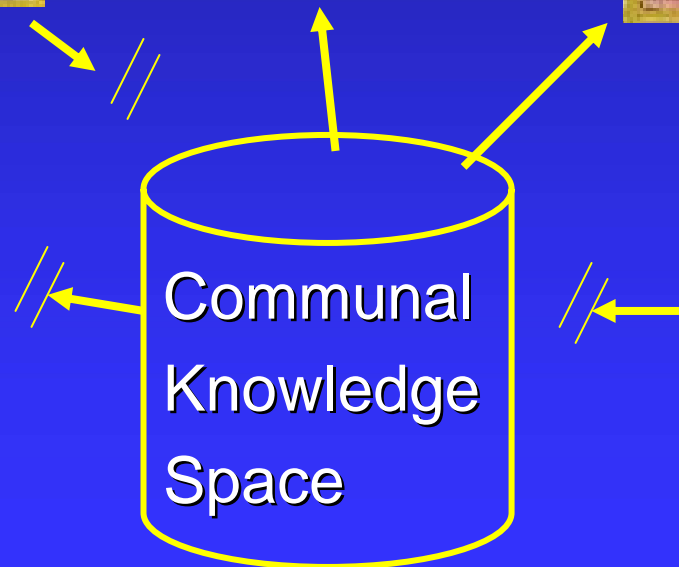
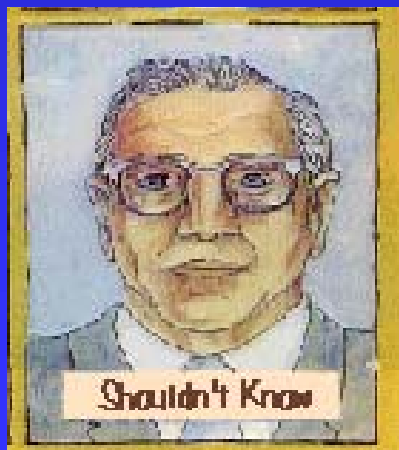
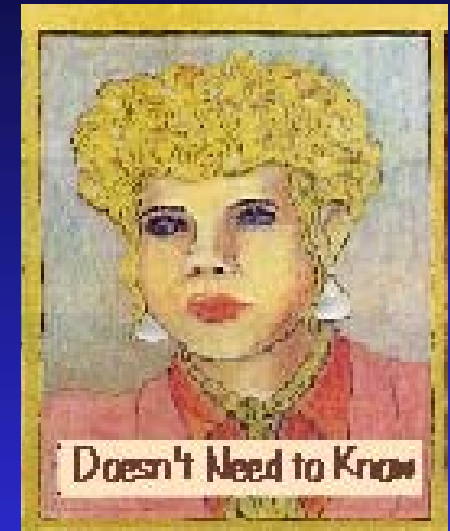
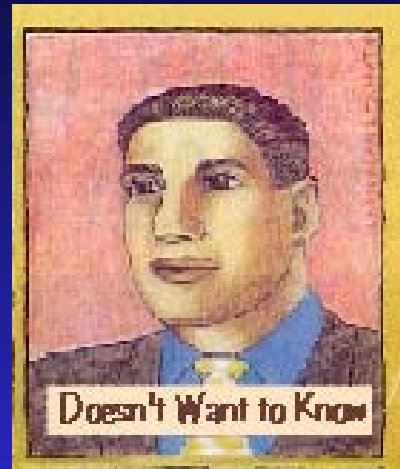


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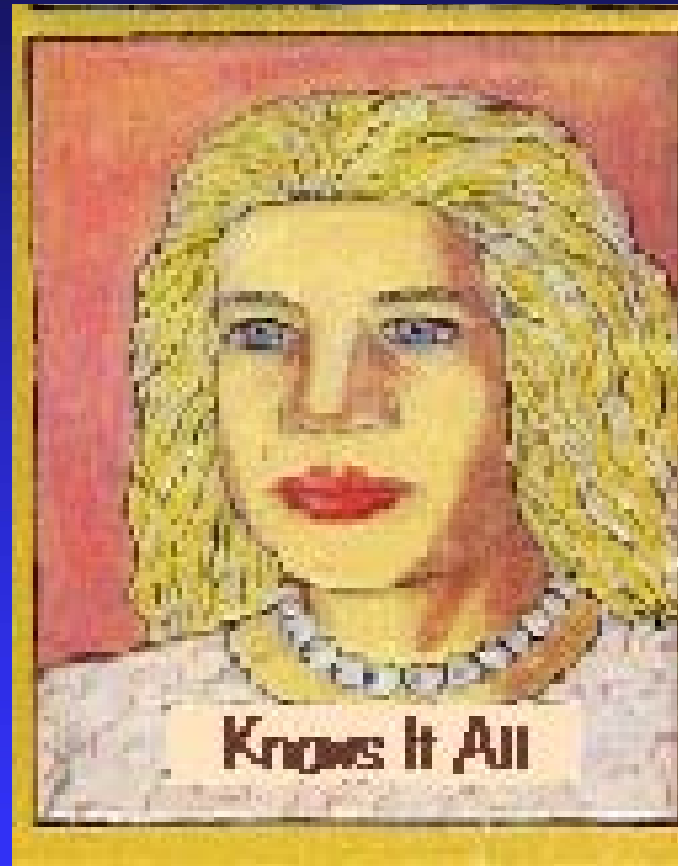


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# Challenges for Shared Repositories



And...



The end. Thanks for listening.