

Cooperation and Control in Innovation Networks

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Agenda

- A brief introduction to the multi-focal downstream innovation model and why it is useful in understanding innovation networks
- In the MFDI, inter-community interactions determine the fate of innovations
- We try and answer the following questions:
 - Are there qualitatively different types of interaction mechanisms innovators can use?
 - How the chosen mode of interaction influences ecosystem evolution?
 - Where is the source of control in the different types of innovation networks?
- We focus on five different types of network coupling:
 - 1. Transactions, 2. Contracts, 3. Boundary objects, 4. Dialogue, 5. Political processes

A Brief Introduction to the Multifocal Downstream Innovation Model

The Heroic Innovation Model



Genesis

- ***1:24 And God said, Let the earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the earth after his kind: and it was so.***
- ***1:25 And God made the beast of the earth after his kind, and cattle after their kind, and every thing that creepeth upon the earth after his kind: and God saw that it was good.***

So, What Is This?



Knowledge is Relational

- Knowledge can not emerge by studying the attributes of an object. Empiricism fails unless we have access to the great plan of God. Empiricism also fails if God learns. There is no way you can distinguish beast from cattle by observing only the animal.
- Knowing can not be purely “relativistic” or idiosyncratic, either. The world creates affordances and constraints that create a topology for action. Not all directions are equal. Knowledge links human minds with matter, and knowing is inherently a social phenomenon. Idealism fails.
- Knowledge is capability for effective action. It depends on the context, capabilities and objectives of the community of knowing.

Knowledge Is Relational

**... Not Universal
... Or Anarchistic**

The Social Infrastructure of Knowing

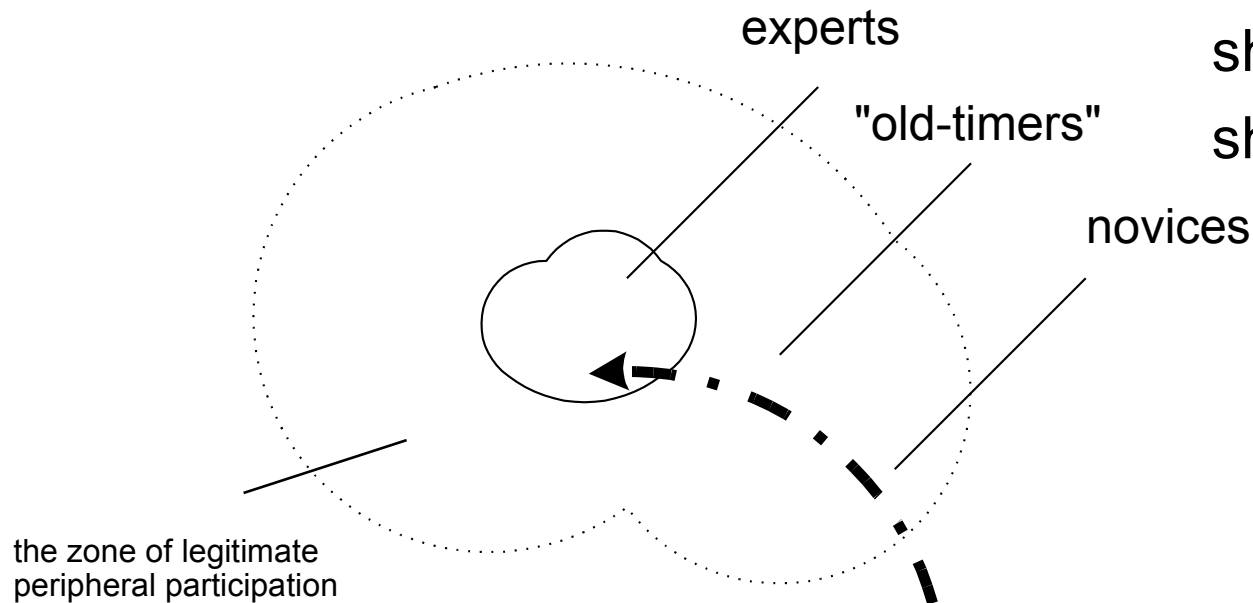
- Knowledge is articulated in a social process, and learned through socialization,
 - reflected in the conceptual systems that are used to interpret the world,
 - shared by the participants in a thought community
 - partially embedded in material and technical artifacts,
 - and emerges in a shared system of meanings and context that remains partly unarticulated
- Knowledge is not universal. It emerges in a social infrastructure that is heterogeneous, and structured by cultures, genres and social practices. The world of knowing is not flat.

Learning in Communities of Knowing

- How to become an expert

Community of practice:

- shared knowledge
- same well-known experts
- shared tools
- shared practices
- shared identity



- An expert is a person who defines what counts as knowledge

The Downstream Innovation Model

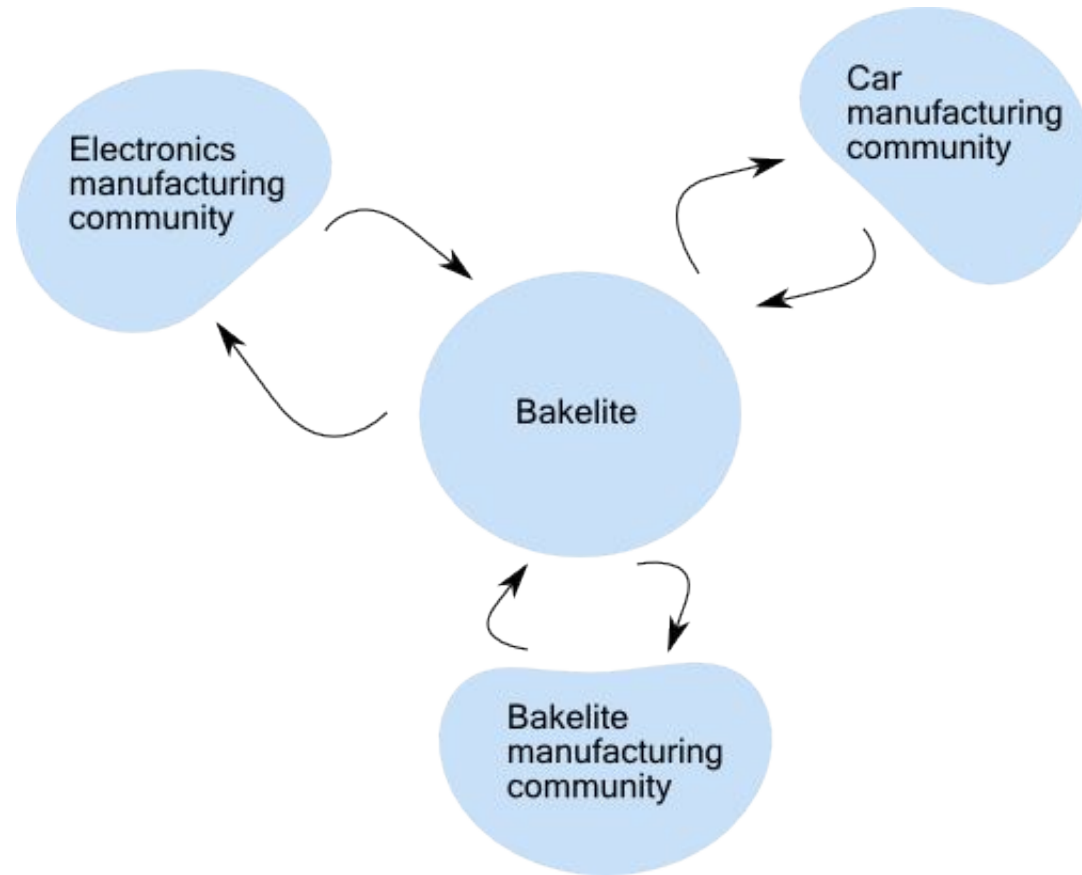
- Now we have a knowledge-creation model that highlights
 - The social nature of knowledge
 - The embeddedness of individuals in a socio-cultural and socio-technical context
 - The fact that these contexts are structured by systems of social practice and division of labor
 - The fact that at least some social learning can be understood as “legitimate peripheral participator's” gradual progress from novice status to “old-timer” and “expert” status, and that these social roles are institutionalized through relatively stable social communities of practice.
- Then we start to see a new model of innovation that is inherently distributed and open (and relatively independent of organizational product development).

“Innovation as Multifocal Development of Social Practice”

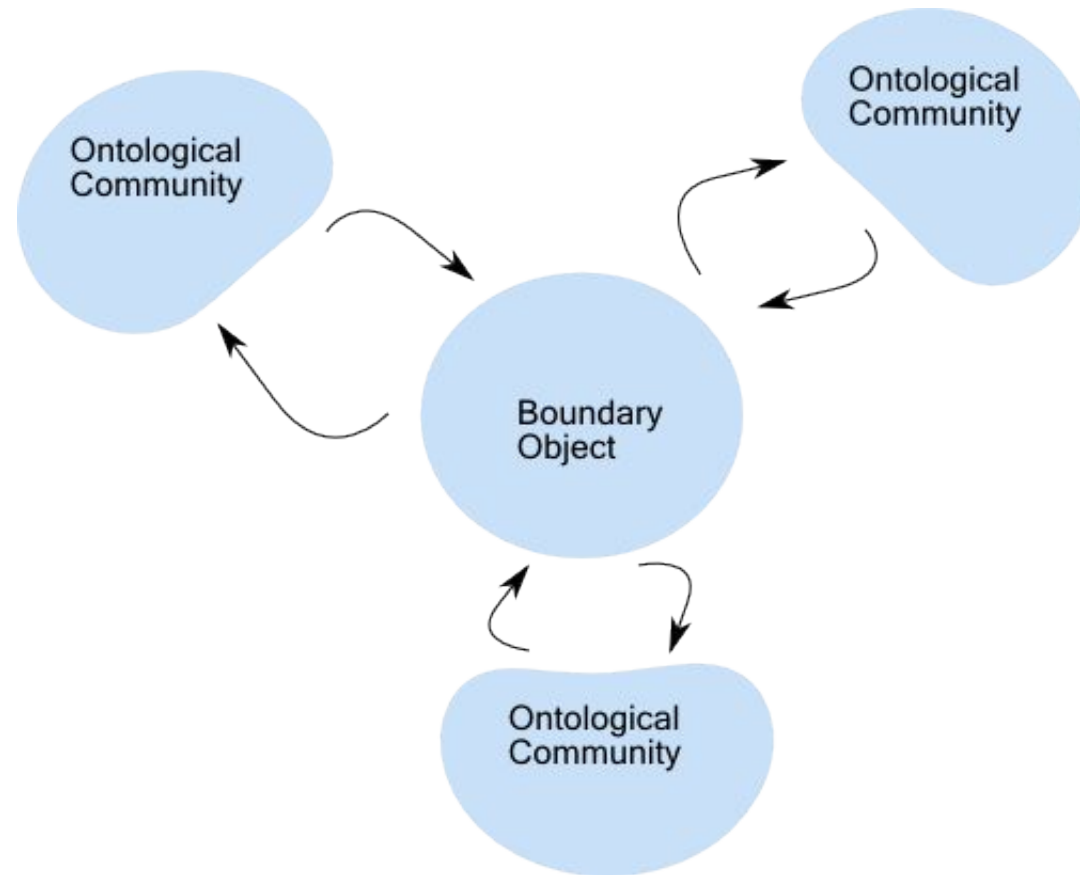
Tuomi, I. (2002) Networks of Innovation, OUP, Ch 2.

- Starting points:
 - The adoption of new technical opportunities requires social learning in user communities.
 - Innovations materialize when social practices change, and when latent technical opportunities are taken into use in the society.
 - In the first approximation, “upstream” innovation can be taken for granted.
 - History shows that reinvention and parallel discovery dominate in the upstream. Innovative ideas are over-abundant.
 - The heroic innovation model is wrong. This is not always obvious. Historical accounts typically reorganize events and invent facts to generate a linear storyline of progress, with a heroic innovator.
 - Note that the MFDI focuses on creative and disruptive innovation. As a special case, innovation can also lead to local incremental improvement that does not require change in social practices.

Bakelite as a Structural Coupler



Structural Drift in Innovation



Users and Products

- Upstream and downstream innovators are not simply individuals with bright ideas. Instead, innovation occurs in a social structure that consists of a network of specialized communities.
- Technical products are often used in several social practices, and become incorporated in many communities of practice. “The” product, therefore, has multiple identities and realizations simultaneously.
- The proper conceptualization is “product-in-use.” A physical artifact (e.g., mobile phone) evolves simultaneously along many developmental paths. Some of the uses are perceived as “dominant” uses. Technical evolution can be driven by the dominant use, by the intended use (as determined by the producer and its designers), or by unintended use (think GSM SMS and the Internet).
- The potential for downstream change depends on downstream actors' capabilities to mobilize social and material resources.
- Downstream change leads to conflicts. The realization of innovations depends on how these conflicts are managed.

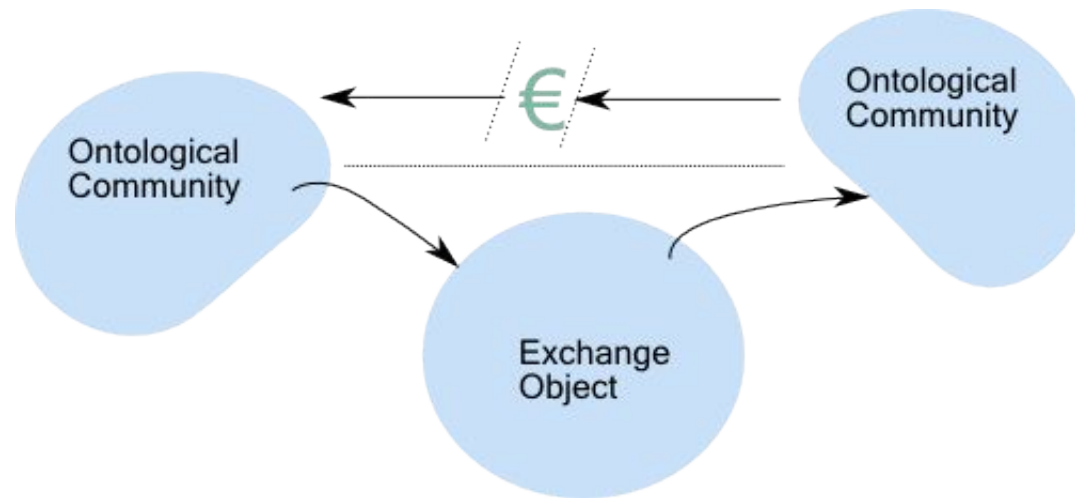
Five Types of Coordination Mechanisms

- 1. Pointwise memory-less transaction
 - Creates opaque boundaries between ontological communities and their value systems
 - Clean separation between “producers” and “consumers”
 - Enables interdependent production systems across cultures
 - Generates modern capitalism and Durkheimian modernity
- 2. Contract
 - Future-oriented transaction promise with negotiated sanctions
 - Requires “legal persons” and effectively enforced civil law, or tight social controls
 - Enables planning and synchronized production processes based on milestones
 - Effective knowledge isolation; focus on delivery risk
- 3. Object-mediated coordination
 - Traditional boundary objects (blueprints, standardized forms, enterprise data repositories, classification and categorization systems...)
 - Cryptic concepts (competitiveness, productivity, knowledge society...)
 - Loose coupling between innovation communities
 - “Cooperation without consensus” (Star, 1992)
 - Enables shared production processes among multiple stakeholders

Five Types of Coordination Mechanisms

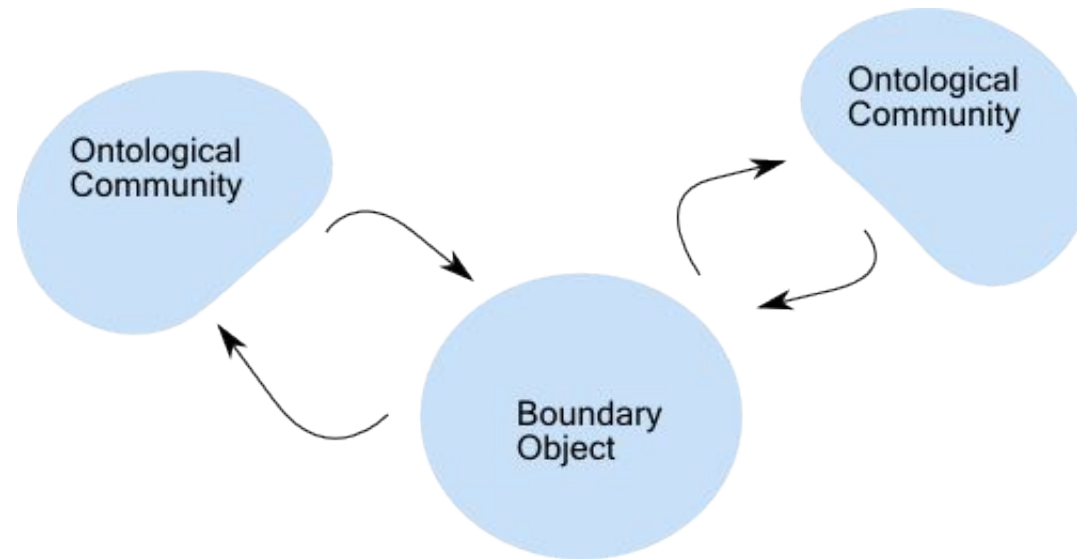
- 4. Dialogue
 - Active generation of shared meaning and mutual understanding
 - Requires inter-community communication processes and media
 - Strives for consensus
 - Requires shared memory and partial “fusion of meaning horizons”
 - Enables parallel and participative production processes
- 5. Political process
 - Requires a shared model of how to proceed under disagreement and incompatible value systems
 - Meta-level mutual agreement of constitutional principles; no need for shared domain meaning
 - Allocation of power varies wildly: dynamically distributed – democratic – legitimated authority – totalitarian
 - Enables synchronized production across incompatible value systems

Pointwise Exchange



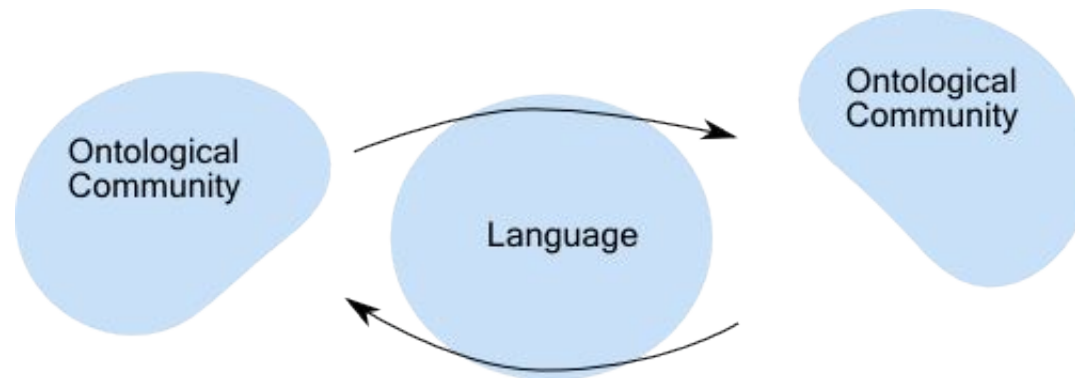
Example: market transaction

Object-Mediated Interaction



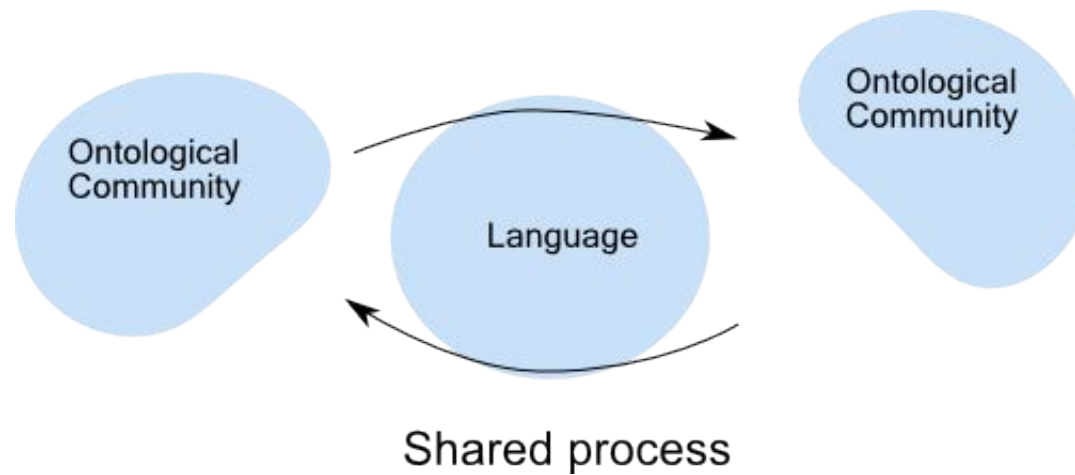
Example: user manual,
construction blueprint

Dialogue



Example: negotiation, translation

Procedural Regulation



Example:parliamentary democracy

Sources of Control:

- Transaction
 - Control: purchasing power
 - Transfer of ownership gives great flexibility for downstream innovation
- Contract
 - Control: negotiation power (relative costs and benefits)
 - An inherent tendency to constrain and limit innovation
- Boundary object
 - Control: boundary specification (social dominance)
 - Fixes social and technical interfaces thus making peripheral innovation easy
- Dialogue
 - Control: rhetorical imagination, perceived contribution
 - Facilitates innovation at system core
- Political process
 - Control: political power, lobbying
 - Aligns innovative change with dominant interests

Thank You!

Work in Progress....

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