Άρρητη Γνώση

Yeoryios Stamboulis

Department of Economics
University of Thessaly

Technology

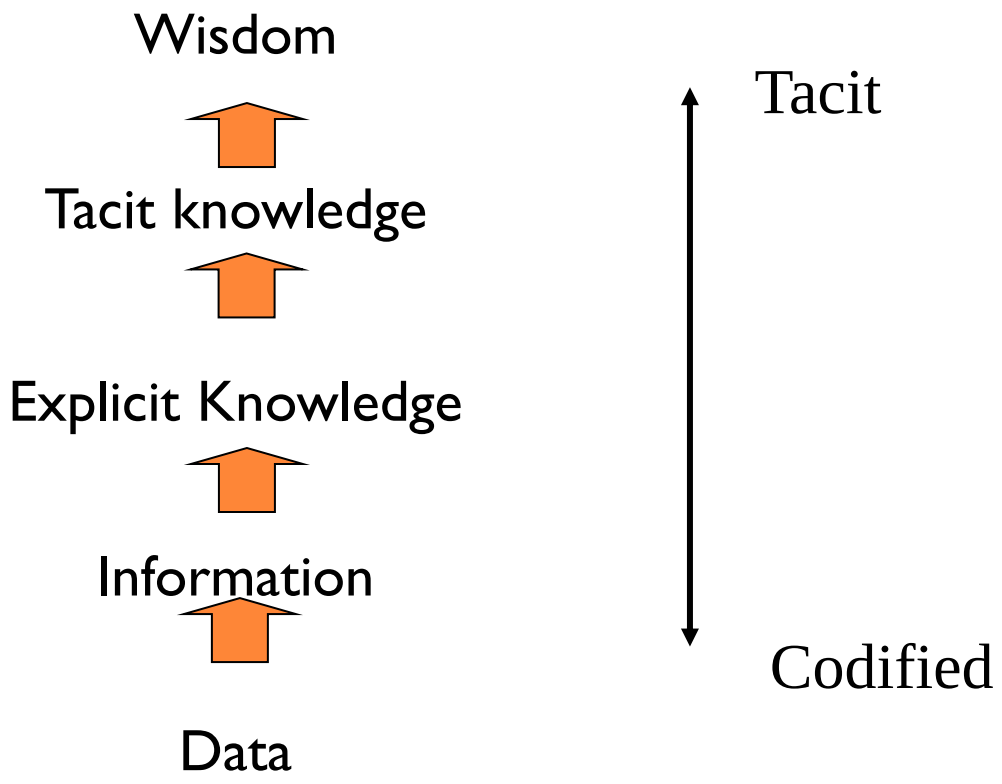
- Different from science
- Not just information, knowledge intensive
- Tangible and intangible
- Aspects of technology
  - Embodied (in equipment tangible and intangible)
  - Codified (information in books, manuals, plans etc.) and tacit (knowledge)
  - Empirical (art)
  - Organizational dimension: operational mode, routines, perceptions, culture
- Endogenous
- Know-how, know-what and know-why
- Firm (organization) -specific

Information and knowledge

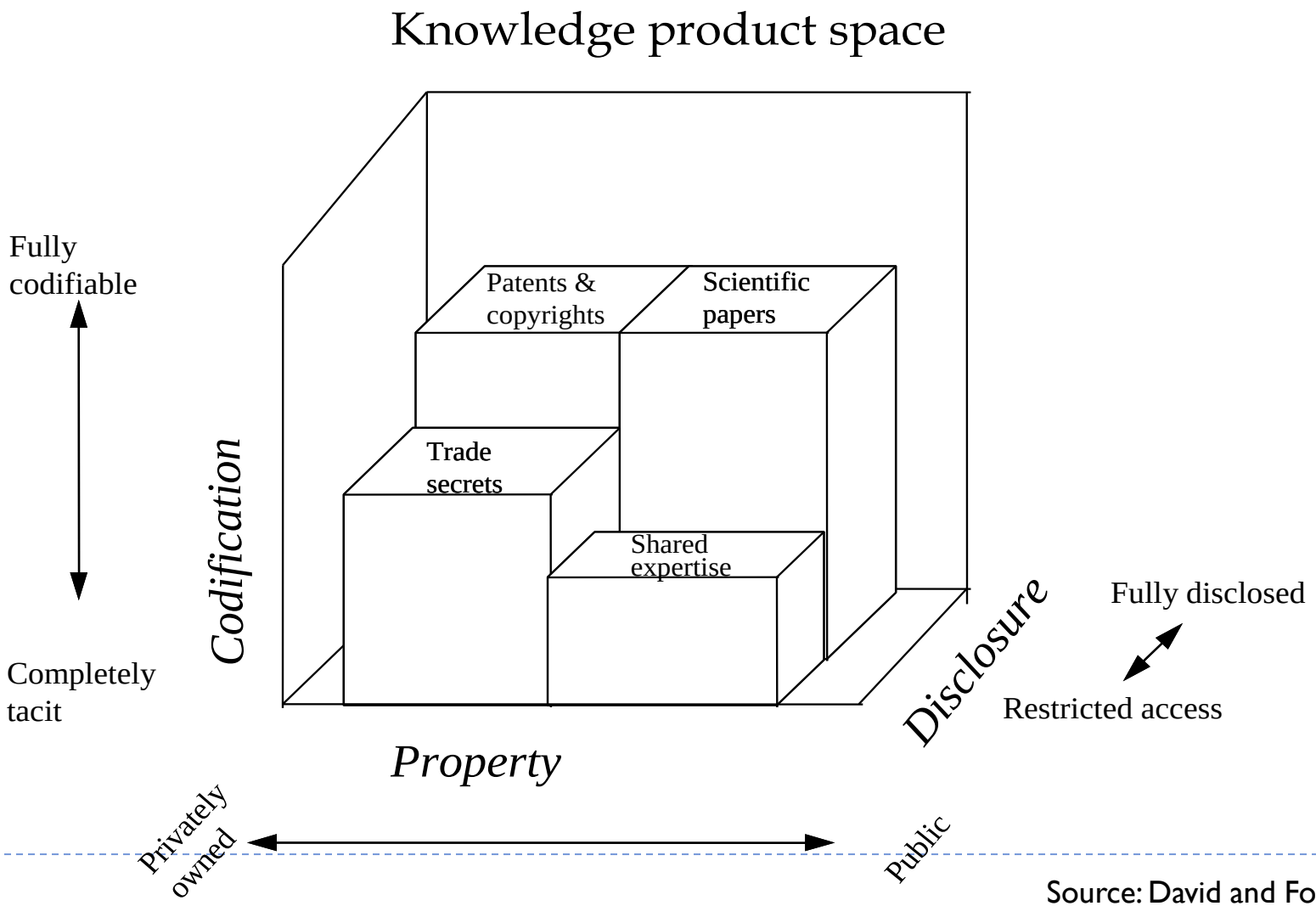
- Knowledge is the cumulative result learning (processes)
- Knowledge different from information
  - Information "represents the sum total of 'messages'"
  - Information is marketable, i.e. exchangeable, transferable
  - Knowledge is not marketable
  - Knowledge is embodied in individuals, organizations, processes

Information to tacit knowledge

According to the degree of codification:



Knowledge and Technology



Source: David and Foray (1994)

KNOWLEDGE AS COMMONS?

> "Knowledge –in whatever field- empowers its possessors with the capacity for intellectual or physical action. What I mean by knowledge is fundamentally a matter of cognitive capability. Information, on the other hand, takes the shape of structured and formatted data that remain passive and inert until used by those with the knowledge needed to interpret and process them"
>
> (Foray, 2004, p.4)

R&D

- “intellectual creation undertaken systematically for the purpose of increasing the stock of knowledge” (Foray, 2004, p. 50)
- the organization’s absorptive capacity is crucial for its ability to utilize exterior knowledge and it is created through the business’s R&D (Cohen and Levinthal, 1990)
- Innovation is also a form of knowledge creation

LEARNING

Learning-by-doing

- “takes place at the manufacturing (and/or utilization) stage after the product has been designed” (Foray, 2004, p. 58)

Learning-by-using

- “using generates problems; problem-solving capacities are deployed and learning occurs” (Foray, 2004, p. 62)

Communities of practice

- Learning not only situated but with a social character

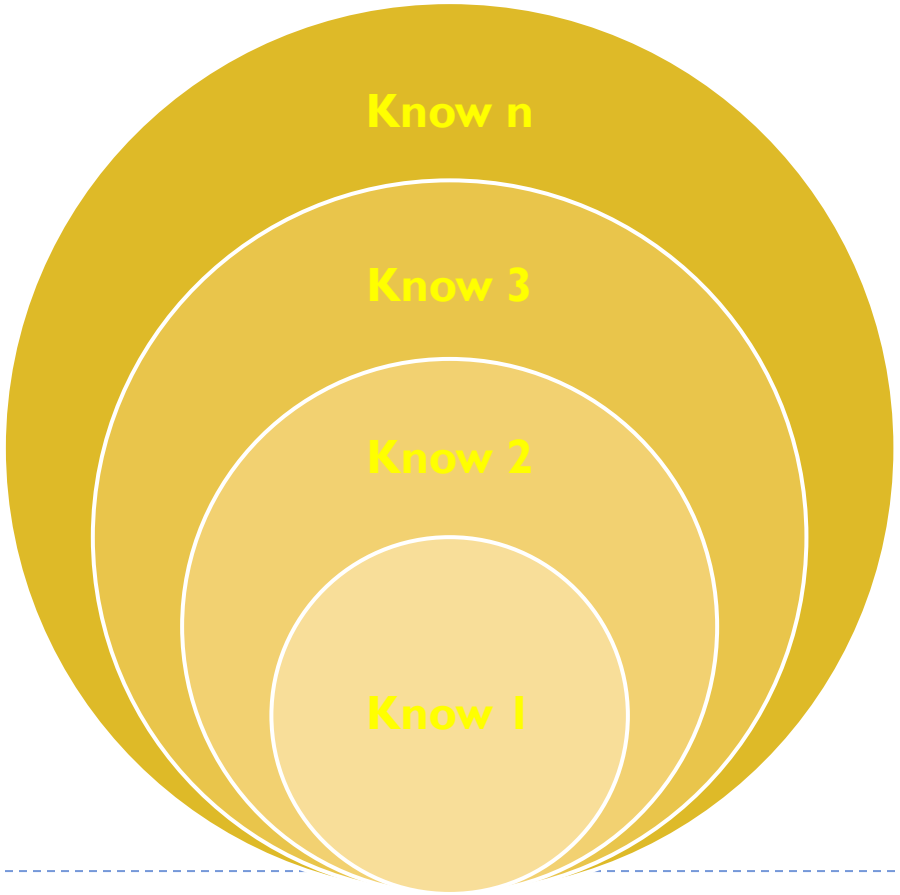
(Lave and Wenger, 1991, p.122)

Learning

- Learning occurs in organizational settings (e.g. groups, teams, firms, networks, clusters, regions/states)
- Learning is institutionalized
- Learning processes are usually associated with specific contexts and locations
  - Industries, technologies, geographies

Knowledge and learning

- Knowing, not knowing, learning



- absorptive capacity

KNOWLEDGE AS COMMONS *vs* MAINSTREAM THEORY

To get high-quality factual reference works, we need strong property rights for at least four independent reasons:

- the need for exclusive control over reproduction
- the incentives necessary for large-scale investment
- the need for control over content and editing
- the need for control over the name or symbol of the resource itself

(Boyle, 2007, p. 138)

IPRs (Intellectual Property Rights)

are considered to serve three functions in relation to the formation of knowledge commons:

- to hinder
- to assist
- to have no relation to knowledge commons

KNOWLEDGE AS COMMONS

Knowledge:

- “all intelligible ideas, information, and data in whatever form in which it is expressed or obtained”

- “all types of understanding gained through experience or study, whether indigenous, scientific, scholarly, or otherwise nonacademic”

(Hess and Ostrom, 2007, p. 7-8)

Knowledge commons and anticommons

- "we use the terms *knowledge commons* and *information commons* interchangeably"
  - "all intelligible ideas, information, and data in whatever form in which it is expressed or obtained"
  - "all types of understanding gained through experience or study, whether indigenous, scientific, scholarly, or otherwise nonacademic"

(Hess and Ostrom, 2007, p. 7-9)

- "the tragedy of the anticommons in the knowledge arena lies in the potential underuse of scarce scientific resources caused by excessive intellectual property rights and overpatenting in biomedical research" (ibib, p. 11, from Heller 1998)

- enclosure of knowledge products (information), not knowledge itself

KNOWLEDGE

Ontological characteristics:

- tacit and explicit
- non-rival
- non-excludable
- cumulative
- localized – contextual - situational
- sticky
- dispersed
- not easy to control
- Organisational – embedded
  - Transaction specific asset

From commons to clubs

	Excludable	Nonexcludable
Rival	**Private Goods** Food and clothing Car House	**Commons Goods** Fish in open sea Atmosphere Public waterways
Nonrival	**Low-congestion Goods** Cable television Satellite radio Online WSJ	**Public Goods** Tax-based: Nuclear umbrella The law Indirect private funding: Search engine On the air TV

"TRAGEDY" OF THE KNOWLEDGE CLUB

- Not valid – in the 'classic' sense - due to:
  - non-rivalry in use
  - non-excludable
  - not free: prerequisite absorptive capacity

- Possible in a 'reverse' sense:
  - due to under-creation or
  - underuse

Understanding knowledge as a commons?

		SUBTRACTABILITY	
		Low	*High*
EXCLUSION	*Difficult*	**Public goods** Useful knowledge Sunsets	**Common-pool resources** Libraries Irrigation systems
	Easy	**Toll or club goods** Journal subscriptions Day-care centers	**Private goods** Personal computers Doughnuts

(Hess and Ostrom, 2008; p. 9)

Club

- "a group sharing a particular type of impure public good, characterized by congestion and *excludable benefits*" (Buchanan; 1965, Cornes and Sandler 1996; p. 4)

- "… diverse definitions for clubs have been stated, depending upon what was being shared"

[a taste for association, cost reductions from scale economies, cost reductions from team production, public goods, public factors]

(Sandler and Tschirhart, 1980)

Theory of clubs

- "… provides the theoretical foundation for the study of allocative efficiency for an important class of impure public goods." (Cornes and Sandler 1996; p. 12)
- "Gradually, the list of impure public goods expanded to include, among others, recreation areas, schools, highways, communication systems, information networks, national parks, waterways, and the electromagnetic spectrum." (ibid, p. 4)

	Non-excludability *of benefits*	**Excludability** *of benefits*
Non-rivalry of consumption(?) *indivisibility of benefits*	Pure public good	Impure public good – **Club good**

Knowledge is - ontologically - a club good

- Easy to exclude:

  Toll: the cost of learning

- Exclusion mechanism:

  barriers to learning (tacit, conjectural knowledge, situated learning, proximity)

- Inclusion mechanism:

  Learning as initiation: "absorbing and being absorbed in - the "culture of practice"." (Lave and Wenger 1991, p. 95)

- Heterogeneous membership

- tacit and explicit
- non-rival
- excludable
- cumulative
- localized – contextual - situational
- sticky
- dispersed
- organizational
- embedded
- transaction specific asset

Communities of practice

"groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis"

(Wenger et al., 2002, p. 4)

- **Participation** a prerequisite of learning and knowledge
- Learning as legitimate peripheral participation
- Meaning, "cognition and communication in, and with, the social world are situated in the historical development of ongoing activity."
- "knowing as activity by specific people in specific circumstances"

(Lave and Wenger 1991, p. 50-52)

Passive vs Dynamic clubs

- Participation
  - **Passive**: members enjoy the benefits without active involvement (passive use/consumption)
  - **Active**: members involvement enhances efficiency and effectiveness, hence benefits (e.g. unions, knowledge)
- (Reverse) tragedy of the club - not free riders, but collective *in*action
  - Use of knowledge induces participatory learning, hence knowledge accumulation (reinforcing feedback loop)
- Increasing returns

Communities as Clubs

- "A community of practice is a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice. A community of practice is an intrinsic condition for the existence of knowledge, not least because it provides the interpretive support necessary for making sense of its heritage." (Lave and Wenger 1991, p. 98)
- Meaning – identity - trust – reduced coordination costs (Baumard, 1999, p. 210-11)

KNOWLEDGE AS CLUB/COMMUNITY

Prerequisites:

- Spatial proximity
- Similar knowledge bases
- Similar absorptive capacities

Institutional setup of clubs

- Ownership and/or Operation (member, firm, state/government)
  - Inclusion cost
  - Policy mandate - constitutional constraints
  - Critical mass - Scale economies, e.g. infrastructure or breadth of knowledge
- Assymetries (cognitive, power, interaction), key actors
- Discontinuity
- Congestion: facilities, infrastructure
- Limits to returns from scale(?) – dynamic transaction costs
- Multiple products/benefits
- Authority structure,
- Network effects,
- Proximity (cognitive, organizational, cultural, spatial etc.)
- Formal and informal knowledge clubs
  - Unions, cooperatives, university departments, hospitals
  - Communities of practice, innovation clusters
- Imitation/absorption vs situated knowledge and path dependence

Innovation

- Different from invention
  - Time lag
- First economic application of a process or production of a product (artifact) or service
- Coupling of new technology with a market (a need)
- Cumulative
- Increasing returns to innovation
- Aim-Result as well as Process

Literature

- Arora A. and Gambardella A. (2010) The Market for Technology, Chapter 15 in Hall B.H. and Rosenberg N. (eds) Handbook of the Economics of Innovation, Volume 1, Elsevier, Amsterdam, pp. 641-678
- Rockett K. (2010) "Property Rights and Invention", Chapter 7 in Hall B.H. and Rosenberg N. (eds) Handbook of the Economics of Innovation, Volume 1, Elsevier, Amsterdam, pp. 315-380
- Senker J. (2008) The Contribution of Tacit Knowledge to Innovation. In: Gill S. (ed) Cognition, Communication and Interaction. Human-Computer Interaction Series. Springer, London, pp. 376-392
- Senker J (1995) "Tacit Knowledge and Models of Innovation", Industrial and Corporate Change, Volume 4, Issue 2, pp. 425-447
- Tang P. (2005) Digital copyright and the "new" controversy: Is the law moulding technology and innovation?, Research Policy, Volume 34, Issue 6, August 2005, pp. 852-871
- Thompson P. (2010) Learning by Doing, Chapter 10 in Hall B.H. and Rosenberg N. (eds) Handbook of the Economics of Innovation, Volume 1, Elsevier, Amsterdam, pp. 429-476