

NORTH-SOUTH TRADE IN IDEAS AS NEW DEVELOPMENT POLICY

- THE PROBLEM OF LEVERAGING HUMAN CAPITAL
FORMATION THROUGH
MARKETS IN PATENTS

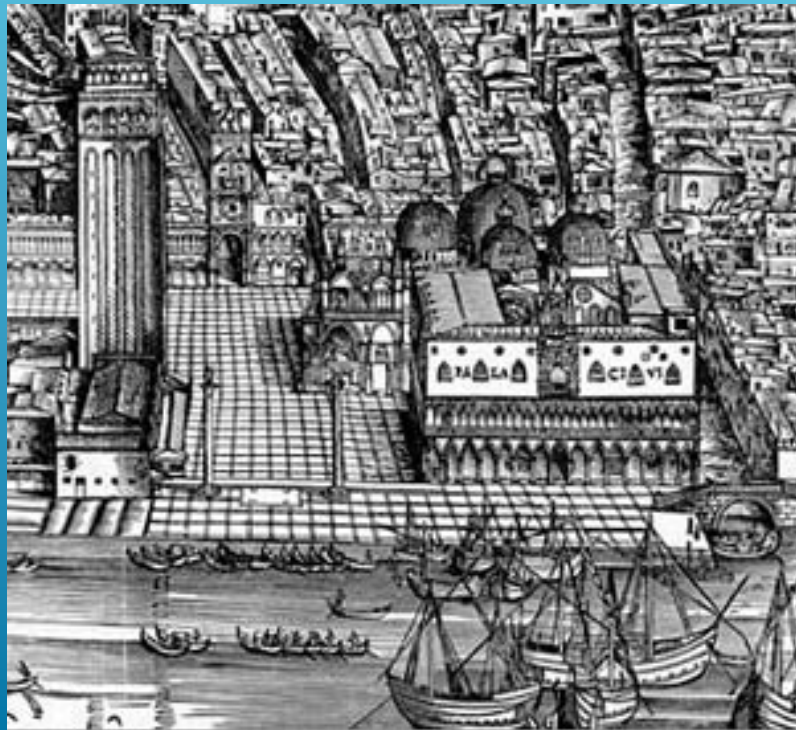
Trade Dialogues Lecture Series

WTO 29/6, 2017, 14:00-15:15 Room S3, WTO
Headquarters

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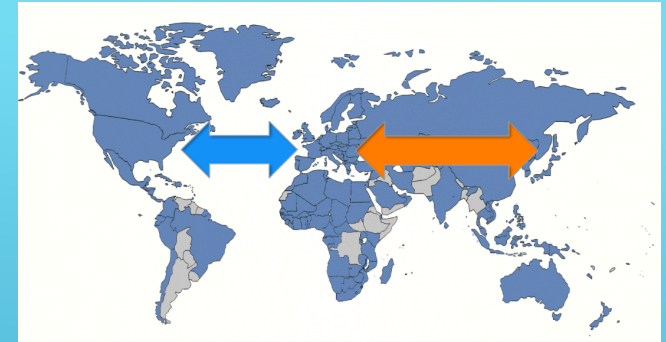
Adjunct Professor George Mason University

WHAT HAPPENED IN VENICE IN 1474?



- ▶ First known patent system, and intellectual property rights (IP) system, created.
- ▶ Changed economic policy “honoring the inventor” in law – busting guilds, making ideas commercially tradable and socially sharable; alternative to trade secrets
- ▶ *Personal* (technical) ideas became *impersonally* tradable by manufacture; What it means for economic development?

A GLOBAL MARKET SINCE 1883...



- ▶ Profitability by assets: 3,5% FA, 7% PA, 11% IA
- ▶ IPR \$329b in 2016 or 1.5% of world trade, up from 1% 10 years ago
- ▶ Possibly \$1 tr in patent licensing, 5-8x more in cross-licensing
- ▶ Top 20: US 39%, EU 34%, JP 10%, CH 6%(!),...CN .3%, IL .3% (WTO)
- ▶ South-inventions “come back” to North
- ▶ Market in licensing growing 16%pa, 8% in prod/service trade
- ▶ What do these firms do to create such a trade value and why?

PRESENTATION: TRADE IN IDEAS

1. The basis for exchange in human ideas
 - ▶ Trade in ideas through patent (IP) system, not only products, services
2. Two studies on markets in patents
 - ▶ 2.1 Experimental study on coordination to find best technology; take risk
 - ▶ 2.2 Empirical study what firms do, strategies, to create trust in each others actions
3. Implications for institutional, taxation and education policy
 - ▶ North-South exchange (development policy)
4. Conclusions and practical approach
 - ▶ Program to get data on N-S trade
 - ▶ Practical Proof of Concept N-S Patent Exchange

1. EXCHANGE IN HUMAN IDEAS

- ▶ Einstein's "1% inspiration and 99% perspiration"; new world view
- ▶ Markets in Patents ameliorate on this understanding of nature
 - ▶ Alternative to trade secrets in 1474
- ▶ A principle: honoring creative minds of inventors' technical solutions furthering knowledge of nature
- ▶ A mechanism in integrating science and technology, the key concept in "second economic revolution"
 - ▶ How to capitalize on "1%" ideas for the 100%, in an honorable way?
- ▶ These principles makes the patent system an instrument of economic development based on exchange in human ideas

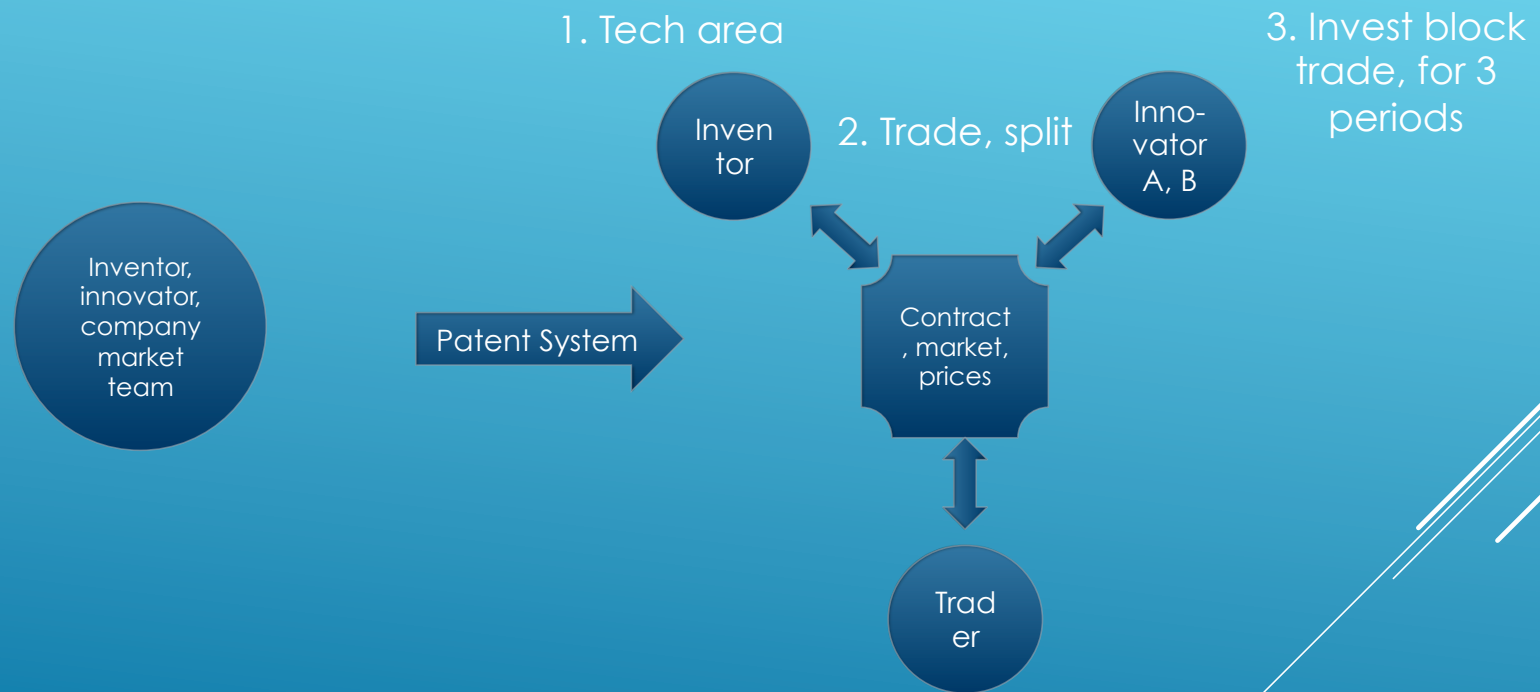
2.1 WILLINGNESS TO SEARCH FOR NEW PATENTABLE TECHNOLOGY TO IMPROVE ECONOMIC PERFORMANCE

- ▶ *Willingness to search*–or take risk in–new patentable technology
- ▶ Technology an externality in economic theory (Arrow, 1962) (Schumpeter, 1919/34, 1942)
 - ▶ Focus on *using* tech not *producing* tech in economic theory
 - ▶ Treated like “air”, “trees” but really a highly dynamic process
- ▶ Experimental economics: Study what people do, given rules
 - ▶ *Nobel Prize 2002, V. Smith; Electricity markets N-Z*
- ▶ Different *trading rules* and *patent strengths* (high, low) examined
- ▶ Technology drives productivity thus understanding this selection process better may shed light on what *institutional and taxation policies may foster a more productive economic system*

EXP. ECO STUDY WHAT PEOPLE DO... GIVEN TRADE RULES WHICH LEADS TO INSTITUTIONAL LEARNING

- ▶ Study markets that don't exist by creating a "design economy"
 - ▶ Try to understand the "mechanisms", which then inform policy
 - ▶ Electricity market in New-Zealand
- ▶ Study behavior, given the trade rules
 - ▶ Don't assume rational behavior
- ▶ Principles and practices for good parallelism
 - ▶ People behave as we see firms do in real world...
- ▶ Institutional performance tested => institutional learning in the lab

A DYNAMIC MICROECONOMIC SYSTEM REAL WORLD PRINCIPLES AND PRACTICES



A hierarchy

A market in IPR– alternative to “trade secrets”:
“Institutions matter because rules matter and rules matter because incentives matter”, V. Smith

Experiment1

1 2 3

Value estimates of produced contract for sale

Technology map

Product mix

Trade: Contracts to buy/sell this period

Information	Contract Disc.r	Expectation Use or Block				Use Cost	Enter Bid/Offer			Profit		Send Bid
		Period 1	2	3	Sum		Fix	Royalty%	Price	Use or Block	Use or Block	
-	%											Accept Offer

Use blue boxes to estimate profit (NPV) of your bid
Bidding rule:

Contracts in portfolio to use in period: -

Contract	Focus	Validity	Disc.rte	Fix	Royalty%	Price	Resell	Use	Invest	Block
-	-	-	%	-	-	-				

Market 1 info

Contract Focus	Validity	Fix	Royalty%	Status	Timer
-	-	-			---

Lowest Ask

Highest Bid

Previously sold contracts

Auc...	Contr.	Focus	Vali...	Fix	R%	Price

Contract usage info for all contracts

Sales of Product A	-
Sales of Product B	-

Your Earnings in Period: -

Product Sales from Investing (+)	-
Earnings from Blocking (+)	-
Earnings from Reselling (+)	-
Fix fee on contract (-)	-
Royalty on contract (-)	-
Cost of re-sold contract (-)	-
Cost of using/reselling contract (-)	-
Validity insurance (25% of Sales) (-)	-
Earnings this period	-

Your ID# 1 Experiment: - Round: - Period: - Your role in round: - Your eDollar earnings: - - - - -

***** DEMO *****



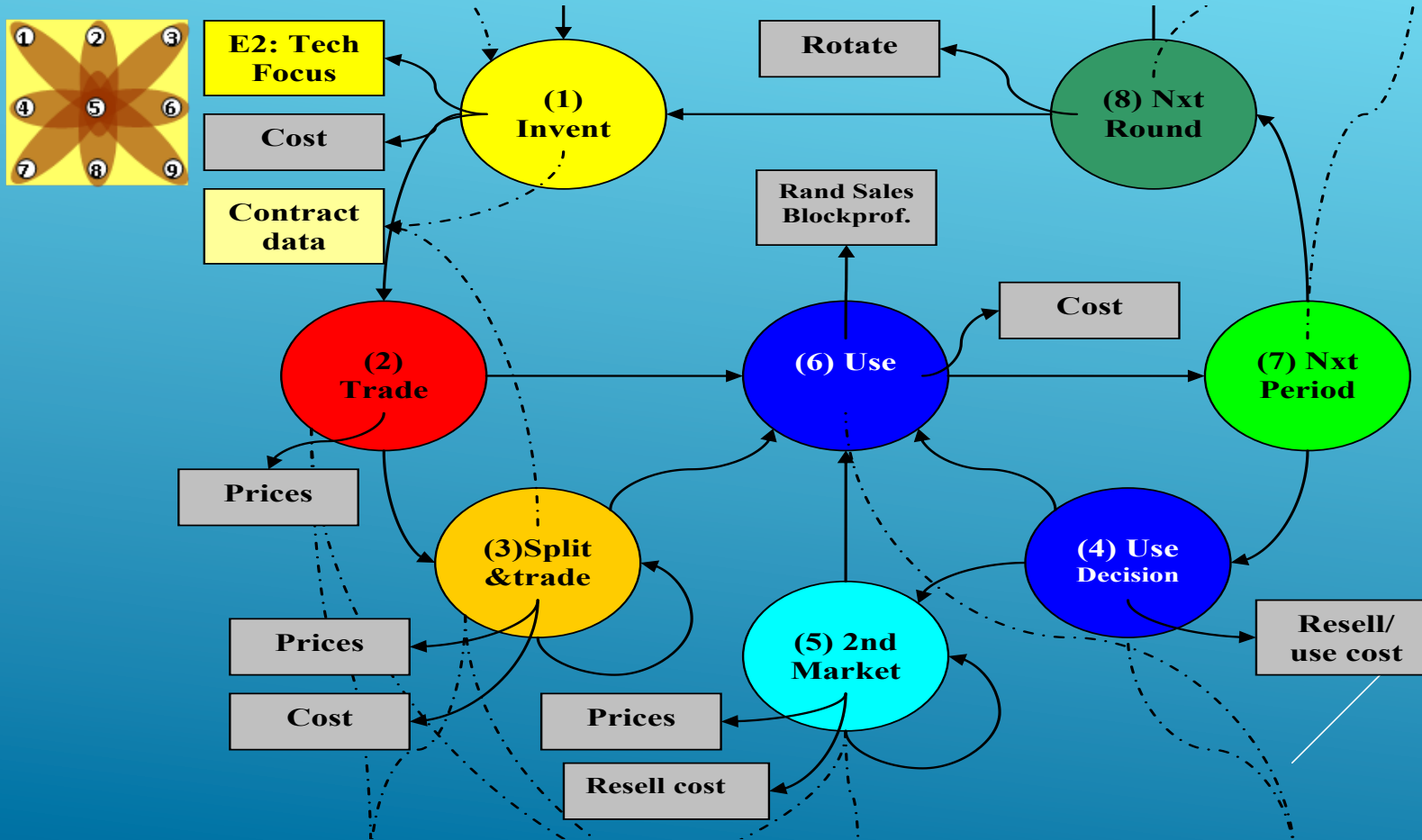
9 tech areas

1 inventor
2 traders
8 innovators in 2 industries

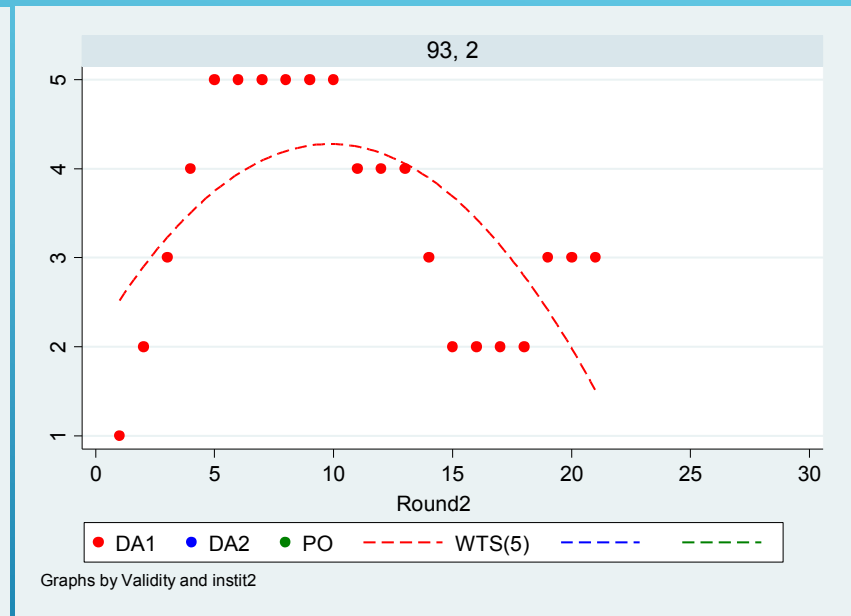
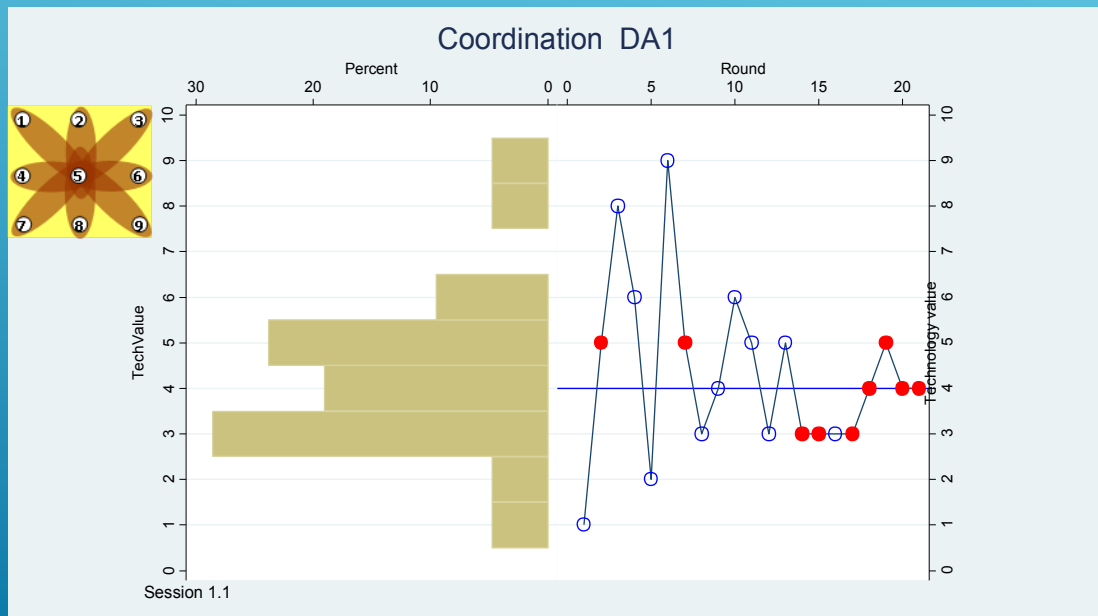
Linear contract
Uncertain values
Block/Invest/Resell

3 institutions
2 patent quality
3 value sets

EXPERIMENTAL FLOW...RECORDING EVERY DECISION

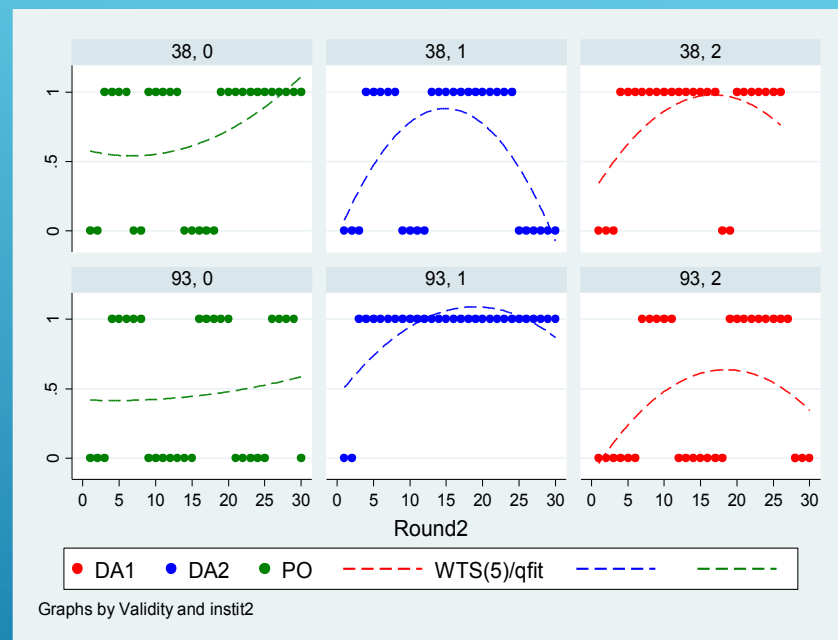


WILLINGNESS TO SEARCH IN SIMPLE ENVIRONMENT: MOVING AVERAGE OVER 5 ROUNDS



SEARCH "A LOT" AND "A LITTLE": EXPLANATORY FACTORS (PROBIT)

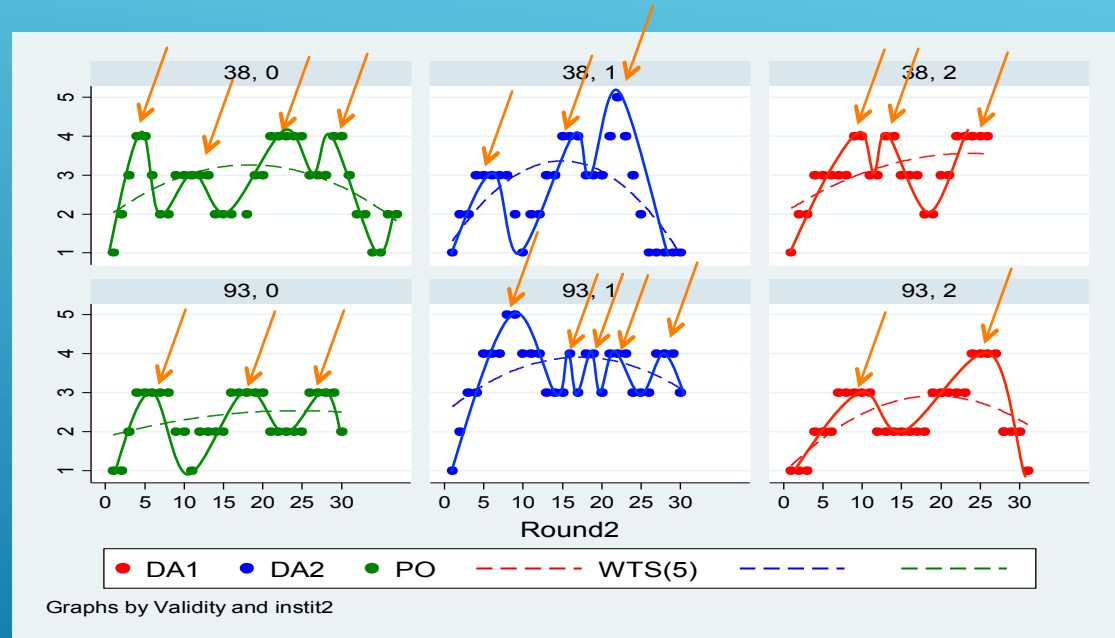
Variables	Coeff.	z	Signi
WTS			
Validity	-0.01	-2.87	***
Institution	0.58	3.9	***
n players	-0.79	-4.99	***
Round time	0.01	2.73	***
"At the money" price :	-0.82	-2.12	*
Constant	7.74	4.9	***
Round			
Pseudo R2	0.2		
N	247		



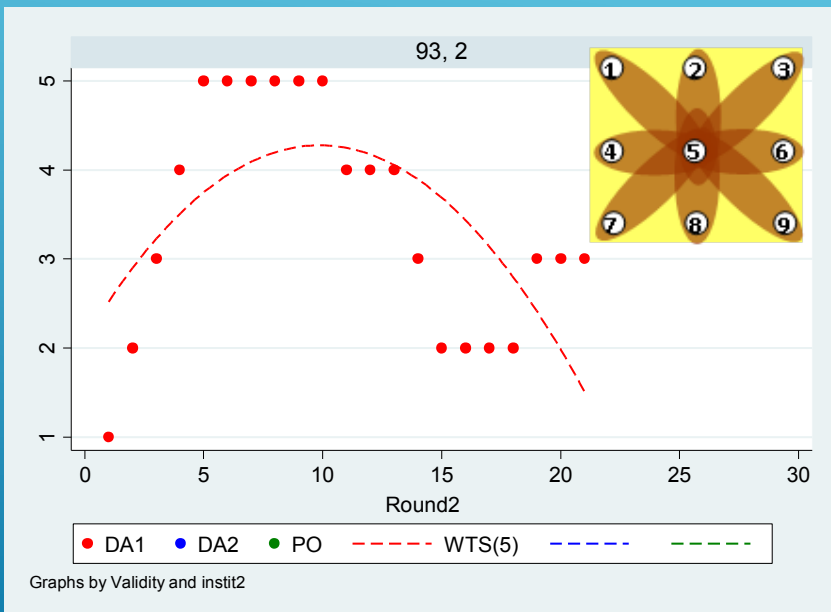
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1 & 2

COMPLEX SEARCH SET; 3 INSTITUTIONS (INCREASING DEMAND LANGUAGE); 2 VALIDITY LEVELS




SEARCH PROBLEMS REQUIRE COOPERATIVE STRATEGIES



- ▶ Economic value 7y on average
- ▶ Conversion to “high value technology” long time – 30 rounds
- ▶ Multiple parallel tracks needed (to meet 3.5y 8-12 are needed)
- ▶ Coordination btw tracks with patents
- ▶ Examples: standards

CONCLUSIONS

- ▶ 1. Institutions matter more than patent system for willingness to search
 - ▶ Cannot improve WTS by patents system alone: Patent system “entry ticket”
 - ▶ Why?
 - ▶ Price precision – valuing blocking and investment values separately
 - ▶ Competition on demand side (vaguely supports neo-classical theory)
 - ▶ 2. Fluctuating search not rational; some other rationality at work
 - ▶ Why? Don't have a clear answer here
 - ▶ 3. Serendipity finding
 - ▶ Long time to converge requires multiple parallel projects for enough returns
 - ▶ Only the largest nations can do this; All other nations have to cooperate
 - ▶ Rules for cooperation at national level: firms, universities, other tech producers
 - ▶ Dual policy
 - ▶ Institutional policy and educational policy (STEM)
 - ▶ Taxation to give incentives to take on more risk
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JUST ADD NORTH-SOUTH TRADE RULES

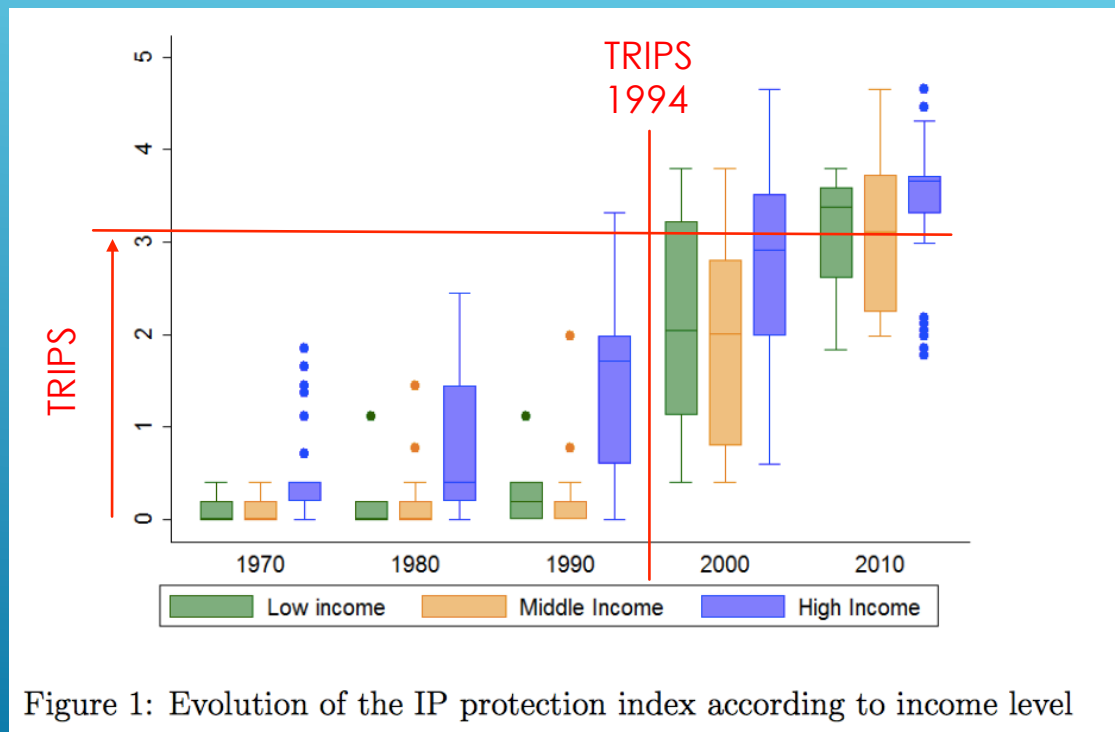



Figure 1: Evolution of the IP protection index according to income level

2.1 WHAT DO FIRMS DO AND WHY WHEN THEY LICENSE PATENTS?

- ▶ Market dynamic discussion one step further
 - ▶ How create the trust in each other's *actions*?
 - ▶ Not positive “personal” or “calculative” trust but trust not to sue
 - ▶ But firms do overcome this since 1474 and licensee in \$billions
 - ▶ What firms do, their *strategy*, to overcome such uncertainty?
- 

TRUST – A *SOCIOLOGICAL* PROBLEM

- ▶ Value of patented technology uncertain in themselves but...
 - ▶ People can keep secrets – then sell to a competitor
 - ▶ Hold you up after selling one patent
 - ▶ Cheat with presumption of validity (which is illegal but possible)
 - ▶ Just invent something after licensing to you
 - ▶ You can invent something “better”
- ▶ These are genuinely uncertainty, a probability distribution cannot be assessed so how do firms solve is as they do license?
 - ▶ This is a sociological problem, not an economic problem

FIRMS INTERVIEWED

Table I. Firms interviewed

Firm ID	Short Case Study			Patenting	Primary business		
	Region	Technology (Industry with high interoperability)	Patent portfolio		Licensing	Producing	Services
1	US	IT	> 10,000	x	x	x	x
2	US	Software	> 10,000	x	x		x
3	EU	Software	> 1000	x			x
8	US	Software	> 10,000	x	x	x	
4	EU	Telecom	> 10,000	x	x		
10	EU	Telecom	> 10,000	x		x	
7	US	Telecom & IP	> 10,000	x	x	x	
5	JP	Consumer Electronics	> 10,000	x		x	
9	TW	Consumer Electronics	> 1000	x		x	
6	US	IP	> 10,000	x	x		
12	US	IP	> 10,000		x		
13	US	IP	> 10,000	x	x		
14	US	IP	> 1000		x		
11	EU	Oil (shorter discussion)	> 1000	x		x	

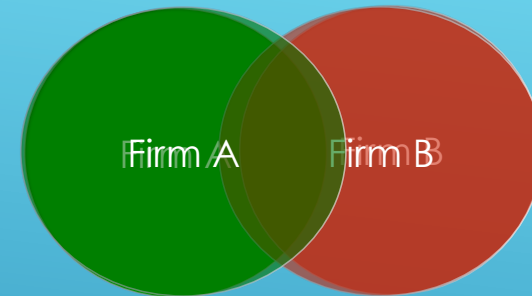
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4 STRATEGIES GLOBAL FIRMS USE

- ▶ 1. Staying clear, MAD
 - ▶ 2. Mutually Assured Self-restraint
 - ▶ 3. Marginal transactions (supported by neo-classical theory)
 - ▶ 4. Systemic abuse
-
- ▶ 3 of 4 strategies outside reach of economic theory...
 - ▶ 14 firms, 10 top patent licensing active firms in the world
 - ▶ Different industries with high interoperability (IT, Telecom, manuf.)

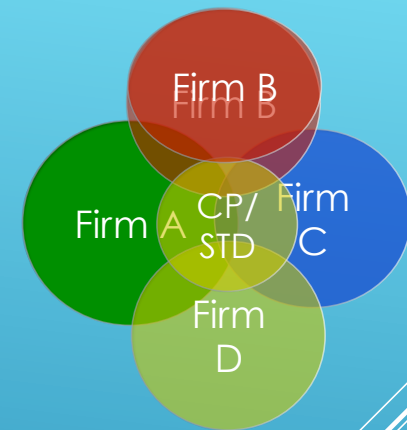
1. STAYING CLEAR, MAD

- ▶ Two firms competing in the product / service market
- ▶ Create huge portfolios with *intentional* overlap
- ▶ Strategy to stay clear or cost of suing each other prohibitive
 - ▶ Technologies “clear” in the product / service markets
 - ▶ Patents are “real tigers” – don't even think of getting close
 - ▶ Injunctions key for credible protection
- ▶ Restrained from infringements due to prohibitive costs of suing each other
- ▶ This strategy not possible without the patent system – open access or trade secrets can't help you here
- ▶ Ex: Non-cooperative industries like oil, energy (BP); mechanical industry: (AtlasCopco)



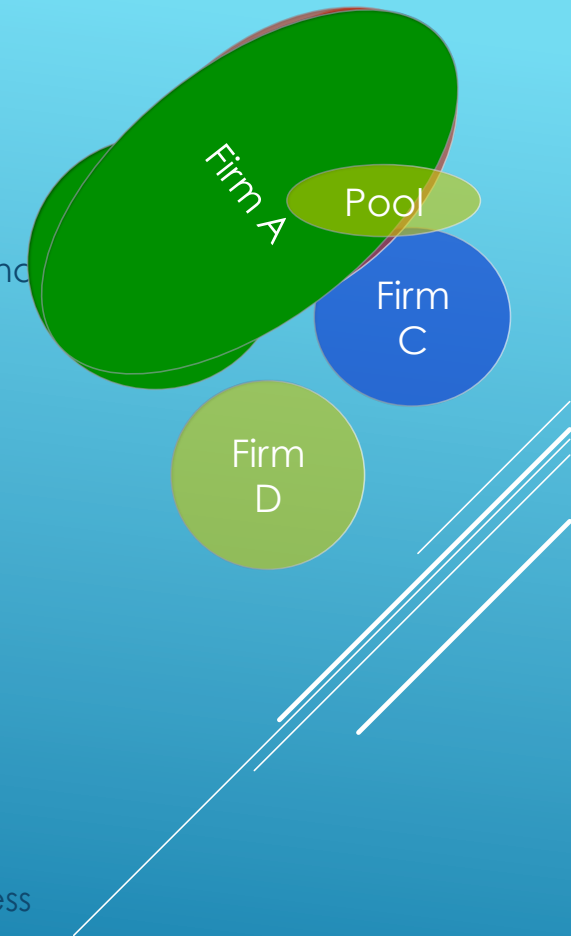
2. MUTUALLY ASSURED SELF-RESTRAINT

- ▶ Two or more firms competing cooperating on certain technology areas and may compete in product/services markets
- ▶ Create large portfolios of *complementary* patents and some extra for a “fallback” position to 1.
- ▶ Capture period contracts – non-standard or standard; network effects
 - ▶ Standards special case here in telecom – complex negotiations
 - ▶ Patent life or “guillotine” contracts (3-7years)
 - ▶ “Open access”, “Zero royalty license” for adopting tech
- ▶ Strategy to get access to all new technology without being held-up
- ▶ Technology cleared with net pricing in contracts
- ▶ Ex: High interoperability, like telecom, IT; Samsung, Apple, Qualcomm, Ericsson, IBM, etc.; Tesla tech, IBM tech
 - ▶ Almost all services and manufacturing, as software driven
 - ▶ How big? Ericsson: 6% sales, 40% of R&D bgt, 70% EBIT



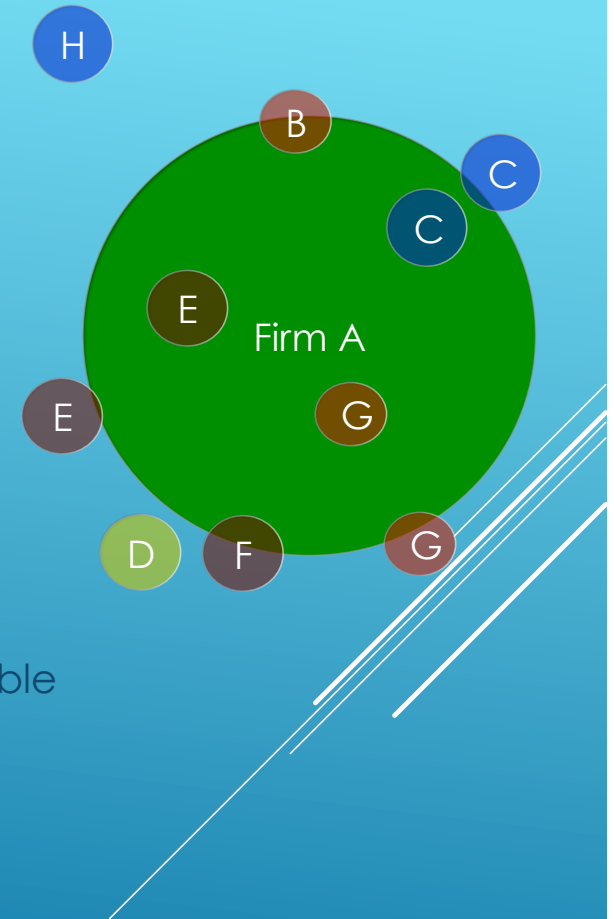
3. MARGINAL TRANSACTIONS

- ▶ Two or more firms cooperating on certain well established technology areas and may compete in product/services markets
- ▶ Create a portfolios of *specialized* patents or simply license in technology.
- ▶ Product/service specific contract “products” – non-standard or standard
 - ▶ Any technology area
 - ▶ Standards special case here in telecom – complex negotiations
 - ▶ “Tear-off” contracts for standards
- ▶ Strategy to get access to new technology without investing in research
- ▶ Technology cleared with pricing or net pricing in contracts
- ▶ Blocking strategy possible or defensive publishing
 - ▶ University% – Business% – Traders% shares important
- ▶ Ex: High interoperability, like telecom, IoT: Apple, MS others in the phone business (standard essential patents), Fraunhofer (stds and scale-up); SME Printer Case

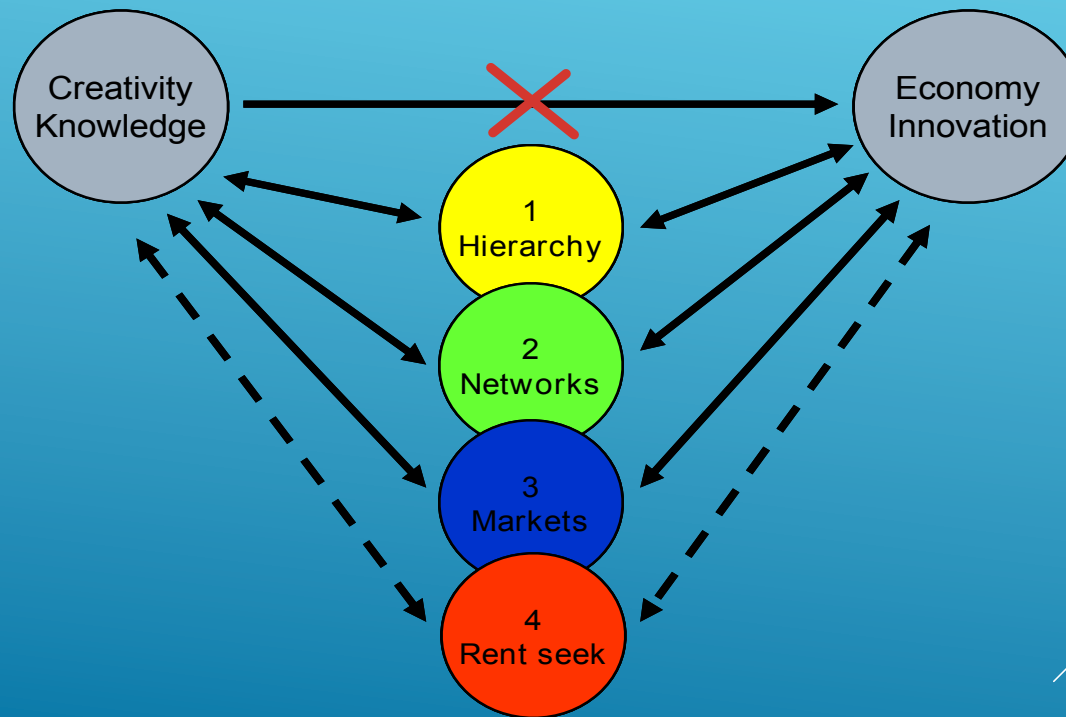


4. SYSTEMIC ABUSE

- ▶ Specialized firms who buy low value patents and enforce them against other firms threatening them to sue
- ▶ Create a portfolios of *low cost, low value* patents/portfolios
- ▶ Product specific contracts
 - ▶ Any technology area
 - ▶ Prices set by threat of court costs
- ▶ Strategy to seek rents from deep-pocket firms or weak SMEs unable to withstand a lawsuit
- ▶ Large firms go to court and run these entities out of business
- ▶ Ex: IT “Patent trolls”



BUSINESS MODELS MOTIVATED BY PATENT COORDINATION OF INVENTIONS AND INNOVATIONS



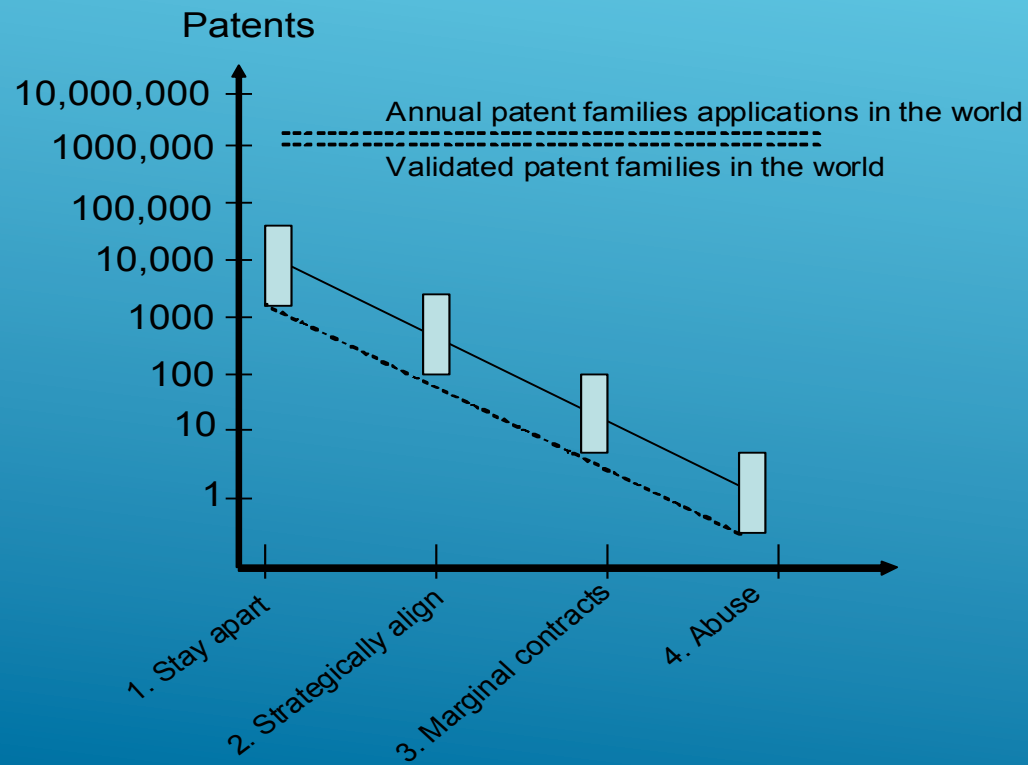
BUSINESS MODELS & STRATEGIES

Table II: Business models and strategy to create trust in each others actions

	Strategy			
Business Model	1. Staying clear	2. Strategic alignment	3. Marginal transactions	4. Systemic abuse
Hierarchy	x	x	x	(x)
Network		x	x	(x)
Transactions			x	(x)
Rent Seeking				x

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SIZE OF PATENT HOLDING TO SUSTAIN STRATEGY OF TRUST




CONCLUSIONS: COULD ECONOMIST HAVE GOTTEN IT WRONG?

- ▶ Trade not only hierarchy: Strategies of mutual self-restraint creating trust in each other's actions not to sue, creates the basis of economic and social gains from exchange
- ▶ The hierarchy premise, and spill-over social argument, of most current policy appears misguided—like economic thought essentially based on integrated “business models of 100y ago”—apparently not taking into account gains from trade in the (patented) ideas themselves, an important dimension for North-South trade in human ideas.
- ▶ Attempts to weaken the system in favor of economies of scale in innovation seem to be on the rise to the potential demise of inventive economic activity.

CONCLUSIONS (CONTINUED)

- ▶ The proposed policy would shift some investments from “more of the same” inventions to “more of the new” inventions, paving the way for future technology stock and economic growth.
- ▶ Maybe add 1% point to growth or more, shared between North and South, (See book) with increased benefit to developing countries.
- ▶ Specialization North-South to be achieved by incentives to move from strategy 1,4 to 2,3
- ▶ Taxation should be moderate or 0: A new tax exempt firm, specializing in development and trade is proposed
- ▶ Start “TechClubs/Hubs” in developing nations as “node” to trade
- ▶ Some investments will then shift from more innovation (1) or abuse (4) to more invention (2,3), growing the global technology base with highly promising contribution from the South

THE FUTURE MARKETS: SOUTH > NORTH

- ▶ Trade flows reversed: South BUYER from North 2010 -, Mike Spence
 - ▶ 80% of growth from South, Mme. Lagarde, IMF
 - ▶ Team up with the South's companies, universities
 - ▶ Talk to policy makers about IPR human capital formation
 - ▶ Patent everything and sell to the world
- 


3. NEW DEVELOPMENT POLICY

- ▶ 1. Focus on institutional policy of trade rules in each country and where international rules matter, like small country collaboration
 - ▶ Human capital formation must go hand-in-hand with these institutional policies of trade, making is a DUAL policy
- ▶ 2. To move to policy the mechanisms behind the four strategies to create trust have to be investigated further
 - ▶ General comment: Move 1,4 to 2,3 with global standard of quality for trade to release North-South economic potential
- ▶ 3. Add Doha round item based on North-South exchange (not only enforcement)

4.1 PILOT STUDY THROUGH GRANT FROM SWEDEN

- ▶ What is the potential of such North-South trade for developing nations?
- ▶ Announcement: Sweden has just decided to fund such a study
- ▶ This will be a pilot study of initially 5 countries, followed by a number of key projects that may further the policy discussion with a trade motivated agenda
- ▶ You are welcome to join today! (separate document available)

4.2 PROOF OF CONCEPT

- ▶ A proof of concept to change abstract economists' abstract solutions
 - ▶ A world class technology partner for a first practical market, to releasing the values of North-South trade in ideas
 - ▶ Helping in creating a level playing field for SMEs, individual inventors and MNCs.
 - ▶ This project will include corporate customers, and I hope, countries, interested in creating a more efficient market in ideas.
 - ▶ You are welcome to join through min. of industry and trade
- 

THANK YOU!

- ▶ ESKIL ULLBERG

- ▶ Adjunct Professor, George Mason University
- ▶ Senior Research Scholar

- ▶ Eskil @ Ullberg . BIZ

- ▶ Report. Ullberg . BIZ

ADDITIONAL COMMENTS

- ▶ Human creativity
 - ▶ Contracts
 - ▶ Human capital – competitive environment – patent system
- 
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HUMAN CREATIVITY: GIVING RIGHT INCENTIVES TO CREATIVE PEOPLE



HUMAN CREATIVITY: GIVING THE RIGHT INCENTIVES TO CREATIVE PEOPLE

- ▶ GE: Hall got a \$10 savings bond for creating synthetic diamonds, left in utter bitterness, started MegaDiamond (ended life as a tree farmer)
- ▶ CDC: Cray created fastest computer in the world CDC6000/7600; fair pay then left amicably to create Cray Research & Cray1 – GaAs! Now Quantum Computing? (INSEAD Case)
- ▶ Dupont: Carothers developed nylon, company did “everything” to help chemist (double salary); NAS member; ended his life due to depression.
- ▶ Industry: more (short-term) scaling up than creating new: Great science, poor management
- ▶ How to balance “new” and “same”?
- ▶ “We don’t need to back good projects, back great people”, Start-up CEO
- ▶ One key element in producing technology is the contract!

CONTRACTS KEY

- ▶ O. Hart, Nobel Prize 2016: Principal-agent problem, example of coalmine and power plant incomplete contracts, residual control
 - ▶ Conclusion: residual control rights matter
 - ▶ Incentives to invent to produce better, cleaner coal?
 - ▶ Fully ownership or contract between firms?
- ▶ What would contracts look like for technology/creativity?
 - ▶ Is coordination in a hierarchy better than in a market?
 - ▶ Capture period contracts? Profit sharing (univ x%, prof. y%, invest z%)
 - ▶ Probably > \$10 for an invention...
 - ▶ Is an institute a good idea? (Fraunhofer case)

SUM-UP: STRATEGY ELEMENTS PUT TOGETHER

- ▶ 1. Human capital
 - ▶ Do we have the human capital to develop a new technology?
 - ▶ How do we get the competence? Can the contracts be implemented within the legal framework, etc.? Human creativity an untapped resource?
 - ▶ Is proximity to research, universities, etc. a L.T. strategy?
 - ▶ 2. Competitive environment
 - ▶ What strategies are/could/should be adopted (1,2,3,4)?
 - ▶ What is the business case for these choices?
 - ▶ M&A possibilities?
 - ▶ 3. Patent system
 - ▶ Can the idealized strategy be implemented given patent/IP systems?
 - ▶ In which nations are protection critical?
 - ▶ Is the business case profitable, what is earned from IP and product/service markets?
- 