Evolution and Challenges to the Innovation Systems in Japan

<Innovation by Emulation>

The Council for Science and Technology

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Two Views of S/T Progress

(1) Paradigm Change (*The Kuhnian*)

------Social Dynamism (*Discrete Process*)

(2) Logical Empiricism (*The Popperian*)

------Refutability Dynamism (*Incremental Process*)

System or Social Norms ? *(Japan Problem)*

(Question 1) Why Japan once bashed, and now passed?

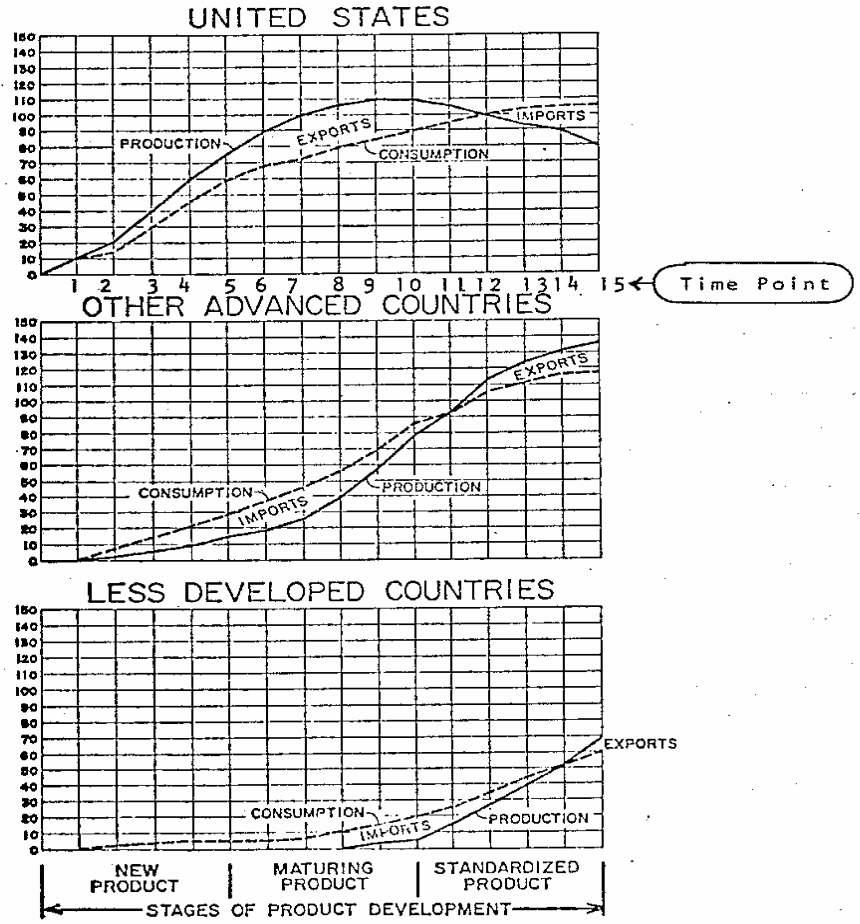
(Question 2) Will China become a "*techno-hegemon*"?

〈Three Accounts〉

・*Geese-flying theorem*

・*Made in Germany (1898) Syndrome*

・imitation＋α＝*emulation*



(Note) Reproduced from:
Vernon, R., "Int'l. Investment and Int'l. Trade in the Product Cycle," Quarterly Journal of Economics, 80(2), pp.190-207.

FIGURE VI- 20

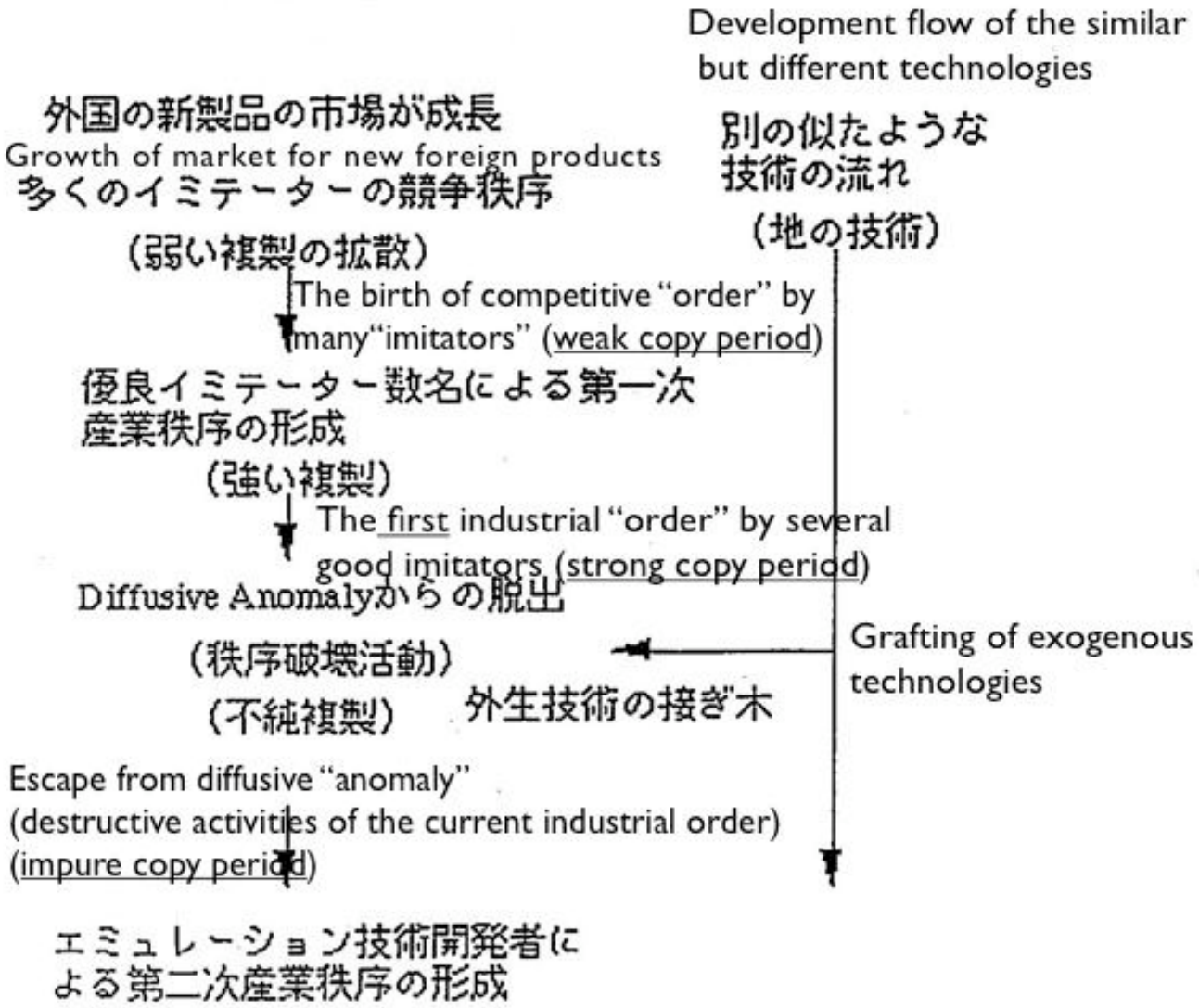
R. Vernon's Model on Stages of Product Development

Social Norms and S/T (*US Case*)

(Question) Why the US became No.1 in S/T in a short time?

- S/T as the national integration and identity
- French S/T (*West Point, Du Point de Nemours, etc.*) and *emulation*
- *Pluralism* and American *liberalism*
- A county of S/T immigrants
- A country for experiment (*A. Schlesinger, Jr.*)

Emulation Dynamics



American Wheels

Stage	
1) Antecedents	I-Steam engine; coal-gas engine; Otto's I internal combustion engine; Daimler's engine; I Benz's cars; French Panhard-Levassor
2) Imitation and the First Competitive Emulation	I-Entries from bicycle business; from wagon I and carriage business I-Emulation of European attempts I
3) The First Industrial Order	I-The Selden patent suits; ALAM vs. I AMCMA I-Ford retained independence (heterogeneity)
4) Technological Carrier and Transplanting	I-European engineers at Ford and Winton I-Ford's reverse engineering of the European cars I-Inter-industry carriers of technology
5) Developmental Constraint, Articulation, Exogeneity	I-Poor road condition I-Intra-company conflicts over a cheap car vs. I a costlier car I-Continuous flow and belt-conveyor system I from the exogenous industries
6) Pre-eminence and Novelty	I-Model-T Ford (the vast reduction of mfg. cost) I-The rapid diffusion into farmers, due to the I rural free delivery system, and the enlight- I ment of farmers by the Granger Movement
7) Key Actors	I-Henry Ford, Billy Durant, Walter Chrysler, I etc.; George Selden
8) The 2nd Competitive Emulation and Industrial Order	I-Clones of Model T Ford I-The establishment of GM I-Ford-GM industrial heterogeneity I
9) Sustenance Skills	I-No patent monopoly (by Ford) I-Coexistence with competitors
10) Spill-over/ Boomerang	I-Hitler's emulation of "Fordization" (Volks- I wagen) I-Japan GM, Japan Ford, Nissan, Toyota
11) Crisis control or Exiting	I-Japanese exports in the U.S. market I-The Voluntary Export Restraint I-GM-Toyota joint-venture; GM's "Saturn" Project

Social Norms and S/T (*USSR Case*)

(Question) Why Soviet Union collapsed?

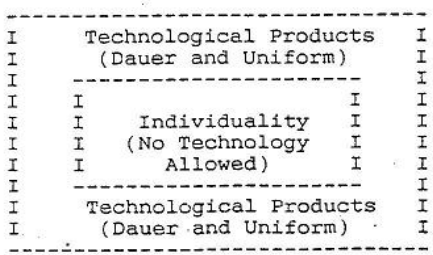
- German influences (*German Village in the 17th Century*)
- German military industry in the USSR during *the Weimar Republic*
- The COMECON's division of labor in S/T (USSR for military S/T, periphery states (Czechs and Poles) for civilian S/T)

Social Norms and S/T (*German Case*)

(Question) Why German S/T is strong although its social norm is conservative?

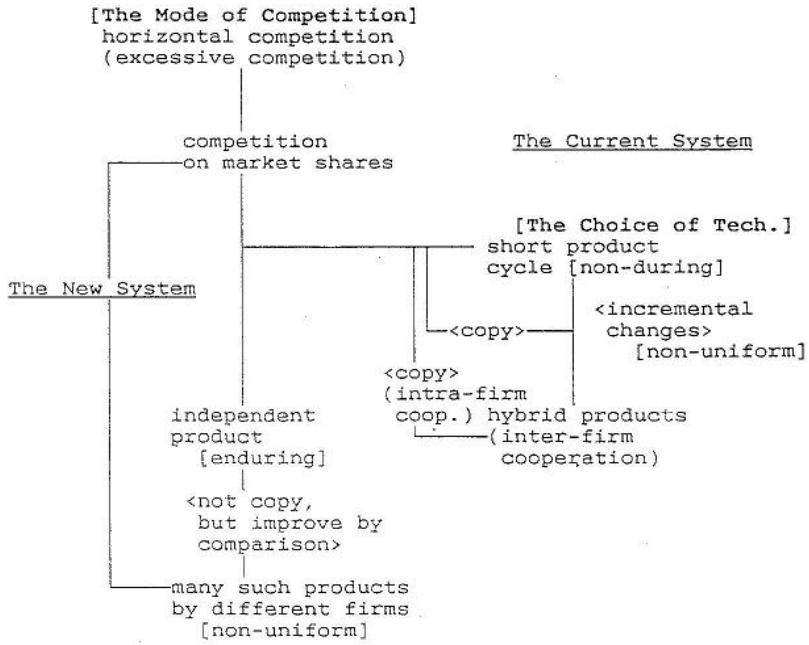
- *"Schaffe, Schaffe, Haeusle, Baue"*
- "The Double Tracks" approach (*DIN, Benz, V2, etc.*)
- *"soziale Marktwirtschaft"*
- *"Technikfeindseligkeit"*
- *"sozialer Stand"* as a social division of labor

Traditional Pattern of Germans'
Techno-"Lebensform"

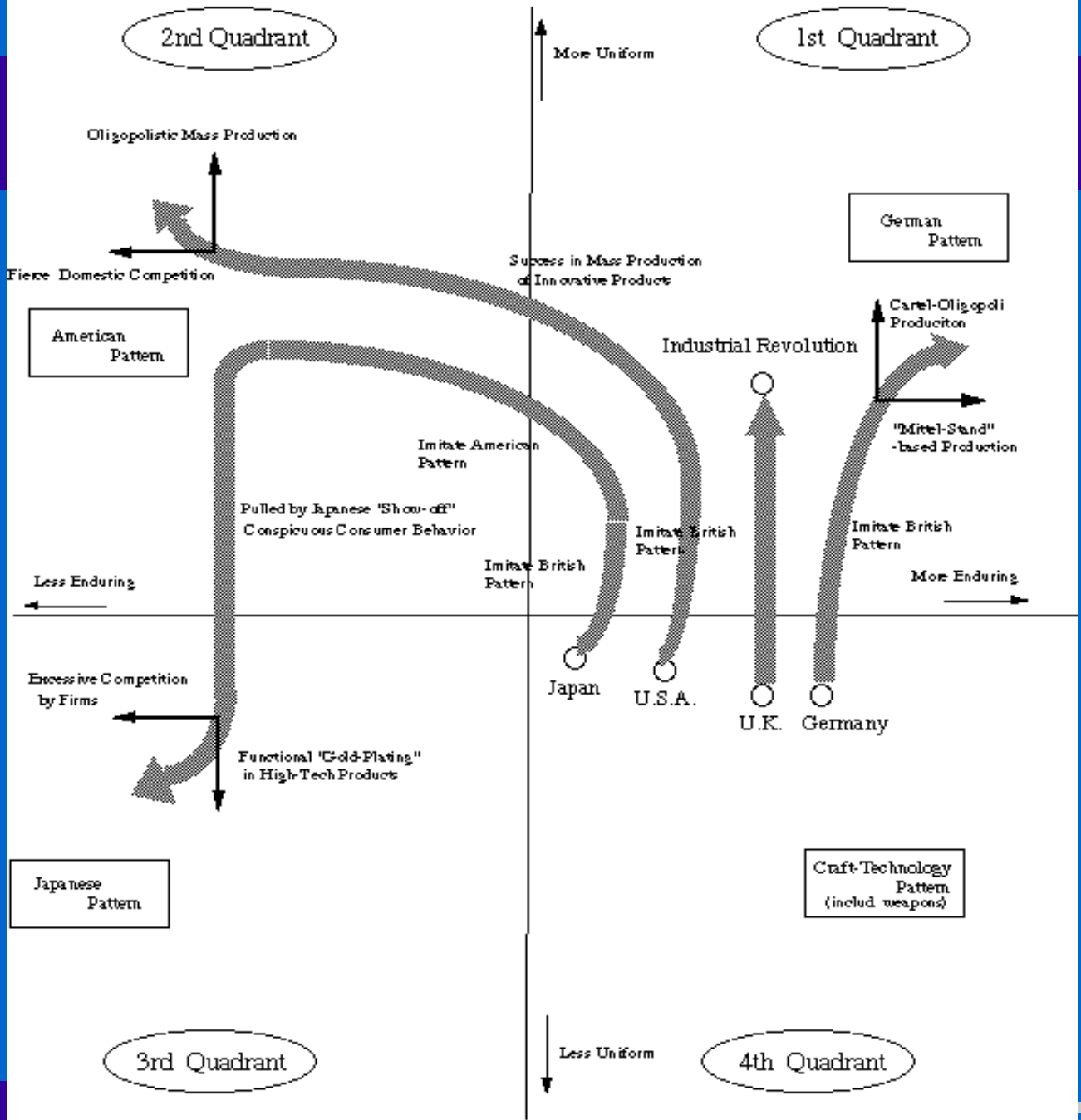


	"dauerhaftigkeit"	uniformity
Japanese Model	non-enduring	non-uniform
American Model	non-enduring	uniform
German Model	enduring	uniform

(The Current and New Japanese Models)



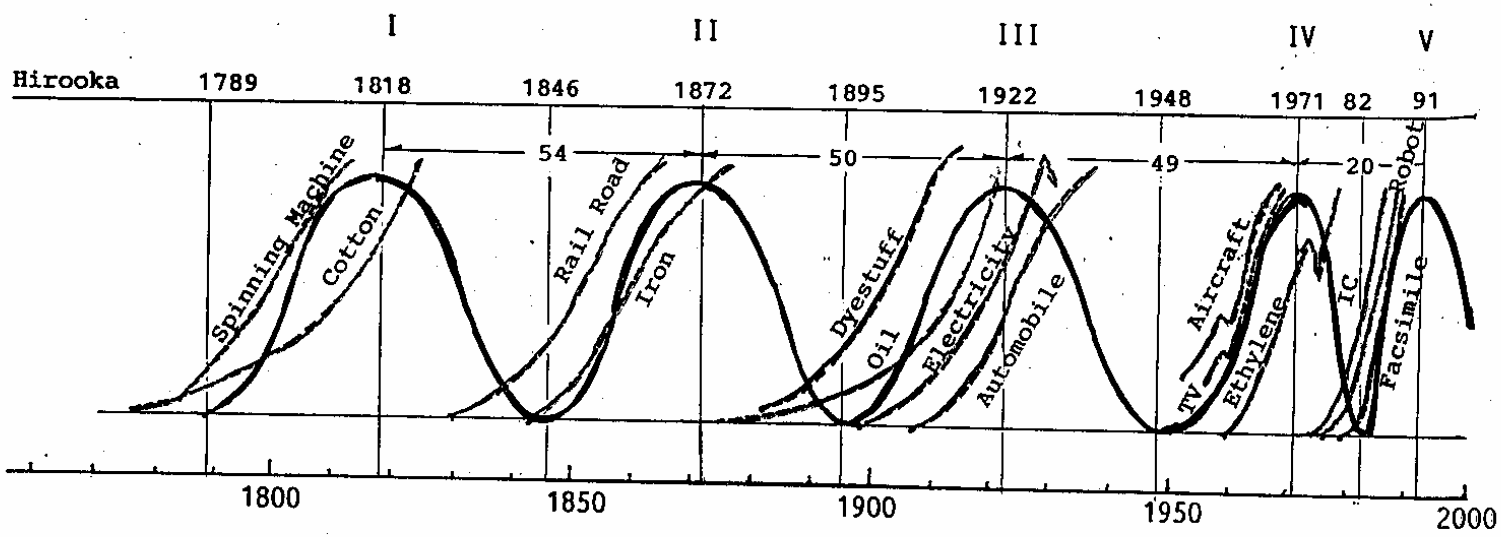
The Loci of Techno-Hegemony



The Rise and Decline of the Great Powers, Why?

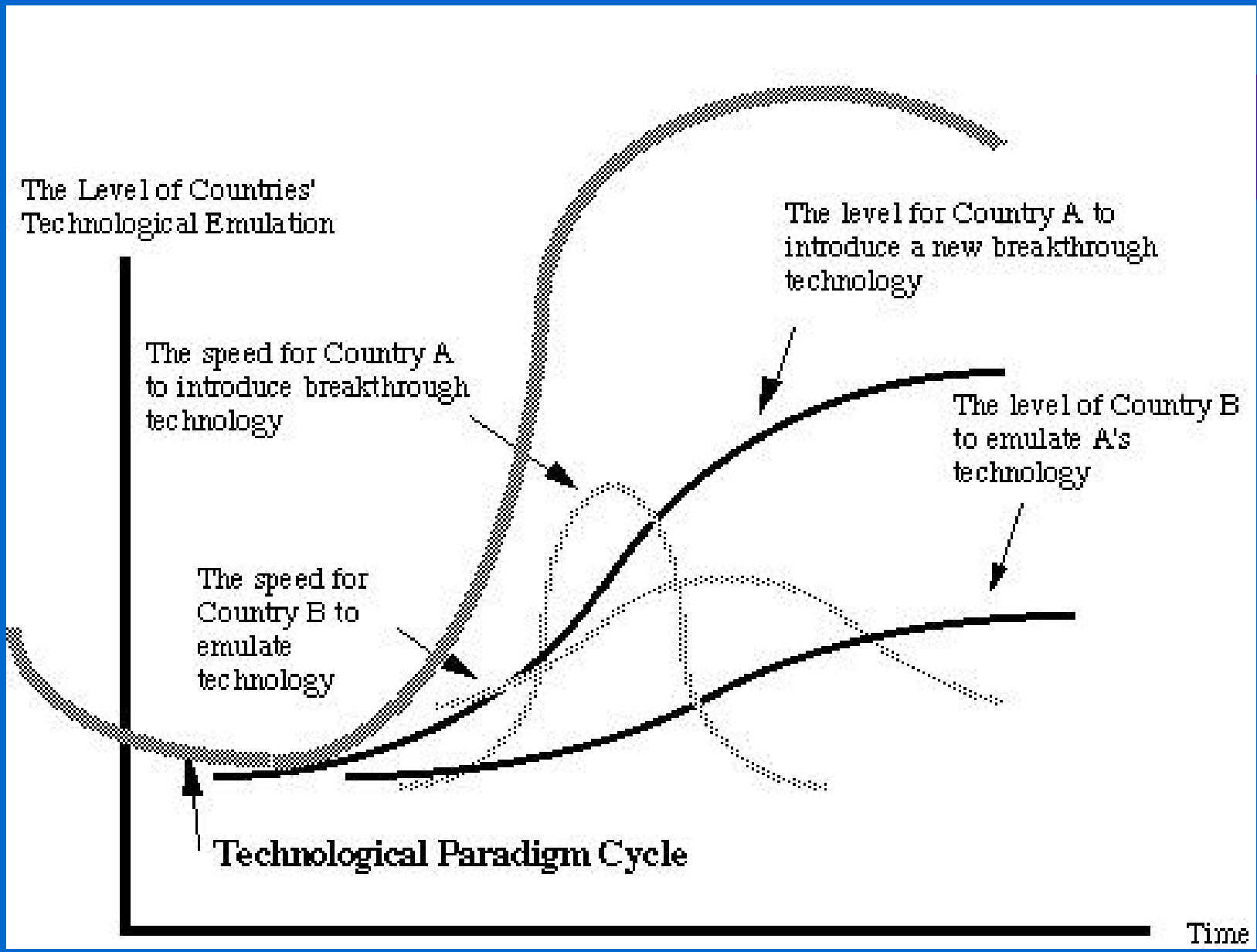
- Decline forever?
- A 60-year cycle
- A 100-year cycle
- Who determines the hegemonic cycle?
- The mysterious coincidence of the early 17th century (UK, Russia, Japan)

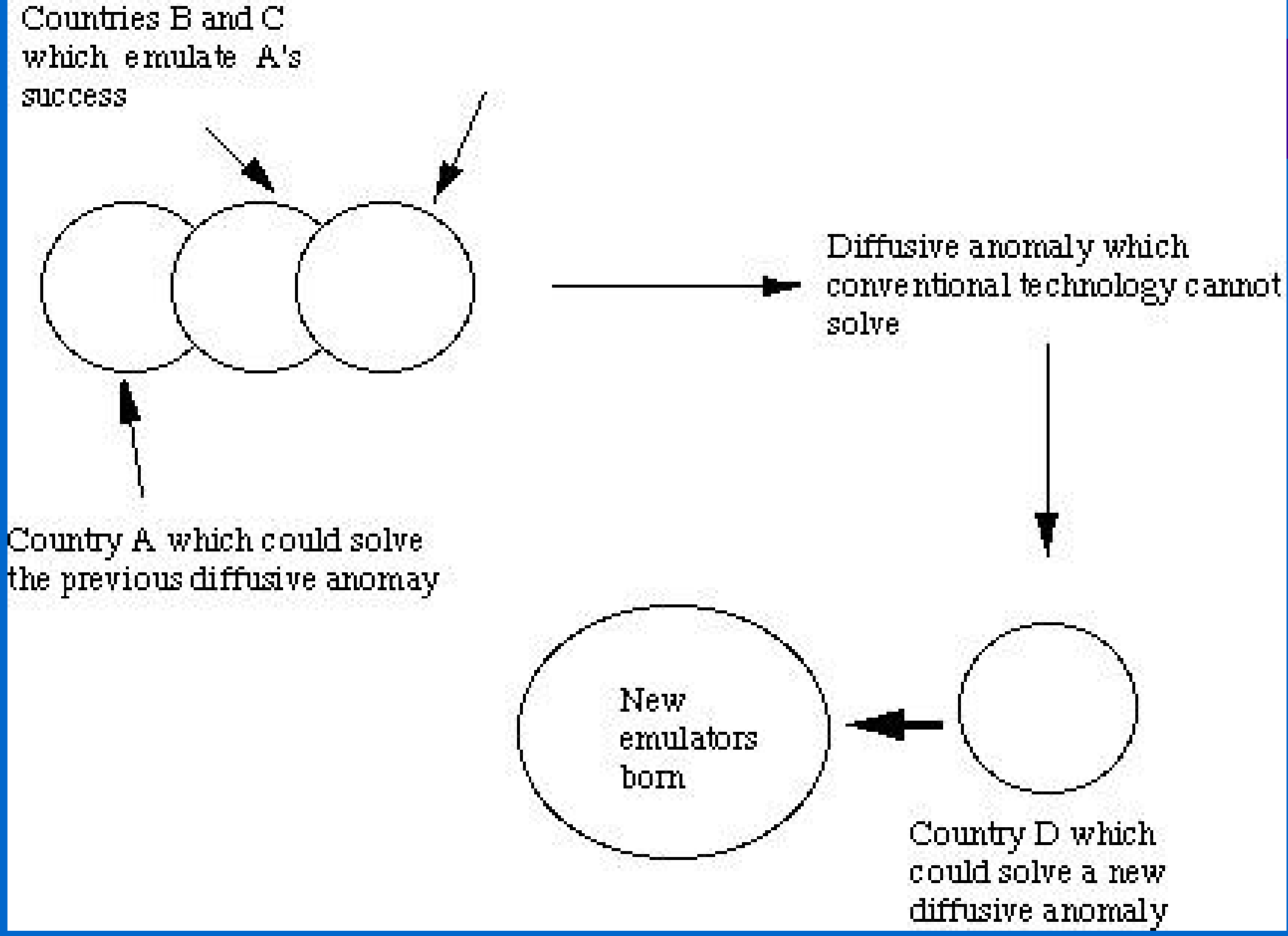
Kondratieff	1790	1810-17	1845-51	1870-75	—	—	—	—
Schumpeter	1787	13-14	42-43	69-70	1897-98	1924-25	—	—
Rostow	1790	15	48	73	96	20	1935	1951
Mandel	—	26	47	73	93	13	39-48	67
Van Duijn	—	—	45	72	92	29	48	73



Identification of Kondratieff Business Cycle
and Correlation to Product Life Cycle

——— : Kondratieff Business Cycle
----- : Product Life Cycle


The Level of Countries' Technological Emulation
The level for Country A to introduce a new breakthrough technology
The speed for Country A to introduce breakthrough technology
The level of Country B to emulate A's technology
The speed for Country B to emulate technology
Technological Paradigm Cycle
Time


Countries B and C which emulate A's success
Diffusive anomaly which conventional technology cannot solve
Country A which could solve the previous diffusive anomay
New emulators born
Country D which could solve a new diffusive anomaly

Conclusion (*New Japan*)

(Question) Where Japan goes?

- Industrial "*hollowing*"
- Japan strikes back, but how?
- The *Third S/T Plan* for social institutional reforms
- Graduation from *"modernization" mindset*
- S/T for safety, dreams and a new social norm (*back to the future, an new emulous power*)