

Global Focus on Knowledge/Winter Semester 2008

Globalization and Industry:
Evolution of Organizational Capability and
Comparative Advantage in Architecture (1)

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What kind of epoch is the 21st century growing into?

- The fundamentals are **globalization** • • recurrence to the 19th-century-ish world?
- Extreme discussions at the turn of the century have been denied by realities.
- It's becoming clear that this unexpectedly is an **epoch taking the golden mean.**

World at the Beginning of the 21st Century · · Century of Globalization?

- Since the '90s digital networking technology has changed the world; theory that “the 21st century is an era of digitization.” It is the U.S. that has led this and revived own economy.
- While America's prominent position stays still unshakable, its self-confidence in absolute predominance of information, military affairs, and finance has wavered since 2001.
 - ①The **IT bubble set off in the U.S. has collapsed** and American-style corporate governance has shown its own limits.
 - ②The dominating **military technology** has failed to guarantee the realization of its national interests.
 - ③The highly developed **financial technology** has not been alchemy to ingenerate excellent articles out of nonperforming loans.
- The American force has continued to be engaged in uphill battles in a number of traditional manufacturing industries, resulting in the largest amount of current account deficit in the world (in 2007).
- China, using as the driving force exports to the U.S. and EU whose corporations operate there, has made its trade surplus monstrously large.
- In Korea and Taiwan, there have emerged in rapid succession products and corporations that are superior to the Japanese force in competitiveness.
- In Europe, Germany has recorded the world's top level of trade surplus despite the higher Euro.

Sketch of the 21st Century: Globalization and Japanese Manufacturing

- Japan early in the 21st century appears to have become feeble in its self-confidence and presence from the protracted depression and financial crisis.
- Nonetheless it has maintained a high-level of trade surplus and current account surplus on the whole.
- A vague cognition has gradually spread among general Japanese people that “**Manufacturing is the strong asset left to Japan.**” · · But its nonmanufacturing sector has lacked international competitiveness in general.
- However, a closer examination of the real contents of such perception reveals that, in the category of the so-called **high-tech products** in which Japan has been expected to be superior, there have emerged in succession products that have lost competitiveness against Asian strong footholds.
- Whereas, there remain old products in which Japanese corporations tenaciously maintain competitiveness.
- A simple statement like “Japan is good at so-and-so industry” does not hold water any more.
- Explanations cannot be provided under a framework of the existing industrial classification any longer. · · · Miniaturization of **intra-industry trade**

Classic View on the 21st Century · · Continuity from Past

- Looking back on some 10 years of the beginning of the 21st century · · realities have denied a drastic view on the 21st century purported at the end of the previous one; “Digital information technology will lead the new century, the world will fundamentally change, where the U.S. will be omnidirectionally predominant .”
- Impact of digital technology has been drastic and huge, but is not everything that determines the state of things of the new century.
- A perspective is settling down as being commonsense, continuous, and relative, that is, a **mild view on the 21st century**.
- The majority of the 21st century's issues are on extra innings of the 20th century, and some are **homework continued from the 19th century**.
- **Problems on environment and energy** have become more serious · ·
- The basics of solutions are not so much revolutionary changes (a denial of the past) · · but rather as **accumulative evolutions** · · capability₅ building, accumulation of improvements that are continuous from the past.

Globalization and Comparative Advantage

- **Globalization** of the 21st century ▪▪ necessary to **rediscover comparative advantage**
- In what kind of products do Japanese job sites have comparative advantage?
 - New viewpoints ▪▪ organizational capability theory, architectural theory

Importance of Manufacturing in Japan: As Source of Comparative Advantage Amid Globalization

Globalized economy . . . **prominent position or inferior position in international competitiveness by industry gets revealed.** (protectionism ↓ , non-tariff barrier ↓ , transporting expenses ↓ , communication expenses ↓)

“**Comparative advantage/international specialization/gain from trade**” which D. Ricardo formulated will come into view?

National commitment to across-the-board processing trade (**industrial full-set ism**) → **international specialization** based on **comparative advantage**

Japan has pursued a **national commitment to processing trade** for 100 years. . . . Almost achieved by around 1980? (to import raw materials, fuels and foods, and to export all kinds of industrial goods)

But since the 1990s . . . higher yen, emerging industrial nations of Asian, digital technology, revival of American economy, and globalization

Shift to “**minute intra-industry trade**” . . . to import industrial goods and export them

Then, **what would the 21st-century Japan import and export?**

- . . . The existing theory of comparative advantage (in a narrow sense) cannot fully explain the phenomenon.
- . . . A “new trade theory” does not specifically give an answer on what to export.

Globalization and Comparative Advantage

• Why is it that, in a certain country A, instead of an industry X, another industry Y prospers? In the 21st-century Japan what industry will remain, what will be exported, and what will be imported? What is competitiveness of one industry in one country?

Standard answer of economics . . . **the theory of comparative advantage**

Relative level of **factor productivity** → competitive superiority of one country's industry (classical school Ricardo)

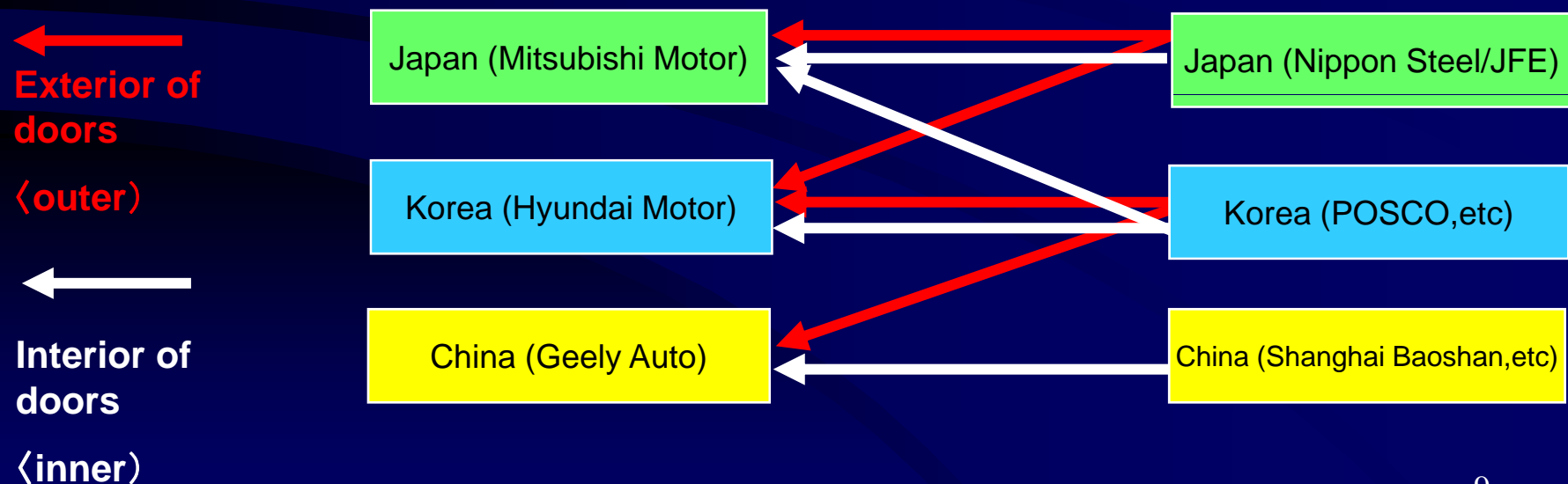
Degree of co between industry characteristics and national characteristics with respect to production factors → competitive superiority (new classical school)

Minute Intrasectoral Trade · · Example of Trade of Automotive Steel Sheet

While there is little difference in technology, facilities, and composition of manpower, international specialization has emerged in automotive steel sheet.

- · · difficult to be explained by the traditional theory of comparative advantage

Example: Intrasectoral trade of steel sheet for automotive doors



How Has Economics Explained about This?

Smith: Free trade increases national wealth. Absolute advantage theory (inc. cross-border movements)

Ricardo: International specialization based on comparative advantage brings about wealth to every nation. Except when there is a national border, it's not absolute advantage, but comparative advantage.

New classical school: A country with a great manpower is good at an industry that consumes a great deal of manpower. A country with a great capital is good at an industry that takes a great deal of capital.

Product cycle theory: A newly designed product is produced firstly in a developed nation with technological capability. When the design becomes standardized (unvarying routine) the production base moves to a developing nation with low wages.

New trade theory: When economy of scale (The more one produces, the less his cost becomes.) and product differentiation (A well-designed product sells at a higher price.) exist, the production snowballs at a place it happened to begin.

Ricardo's Theory of Comparative Advantage (Case without Trade)

County J •• Workforce=50 million,
2,000 hours/yr, 100 billion man-hours

Country X •• Workforce=200 million,
2,000 hours/yr, 400 billion man-hours

Set of electronic items: 1,000 man-hours/set

2 time as productive

Set of electronic items: 2,000 man-hours/set

Set of mechanical items: 1,000 man-hours/set

4 times as productive

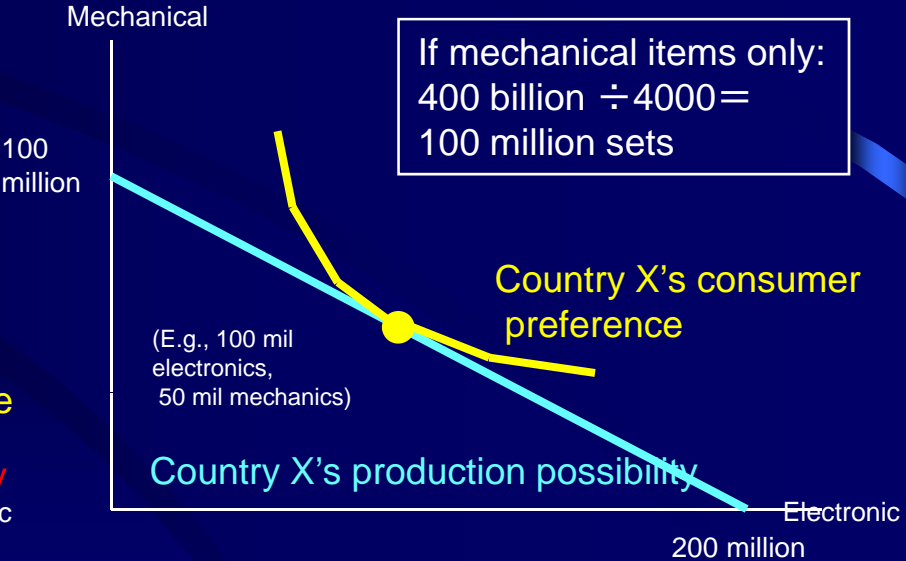
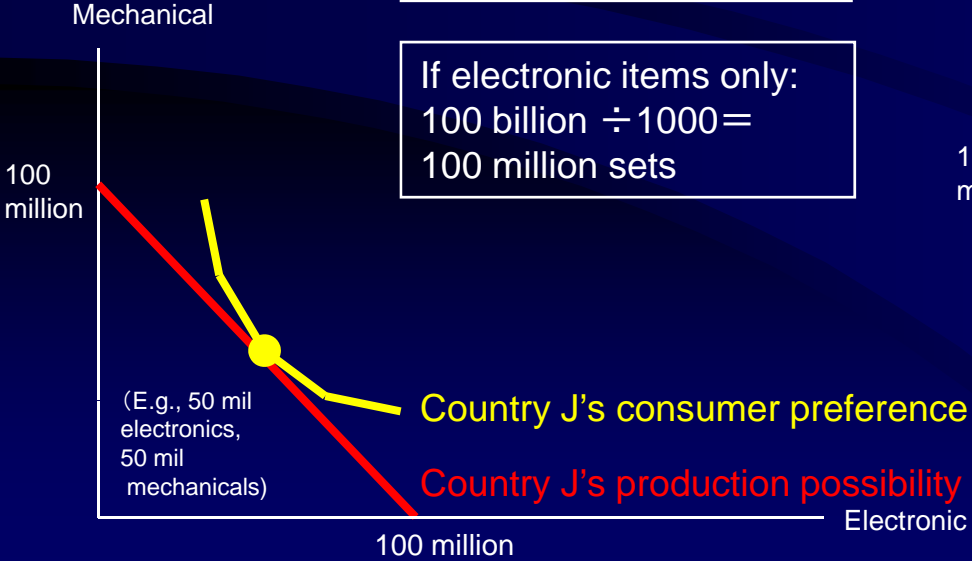
Set of mechanical items: 4,000 man-hours/set

If mechanical items only:
 $100 \text{ billion} \div 1000 =$
100 million sets

If electronics items only:
 $400 \text{ billion} \div 2000 =$
200 million sets

If electronic items only:
 $100 \text{ billion} \div 1000 =$
100 million sets

If mechanical items only:
 $400 \text{ billion} \div 4000 =$
100 million sets



Ricardo's Theory of Comparative Advantage (Case with Trade)

Country J: Workforce=50 million, 2,000 hours/yr, 100 billion man-hours

Set of electronic items: 1,000 man-hours/set

Set of mechanical items: 1,000 man-hours/set

2 time as productive

4 times as productive

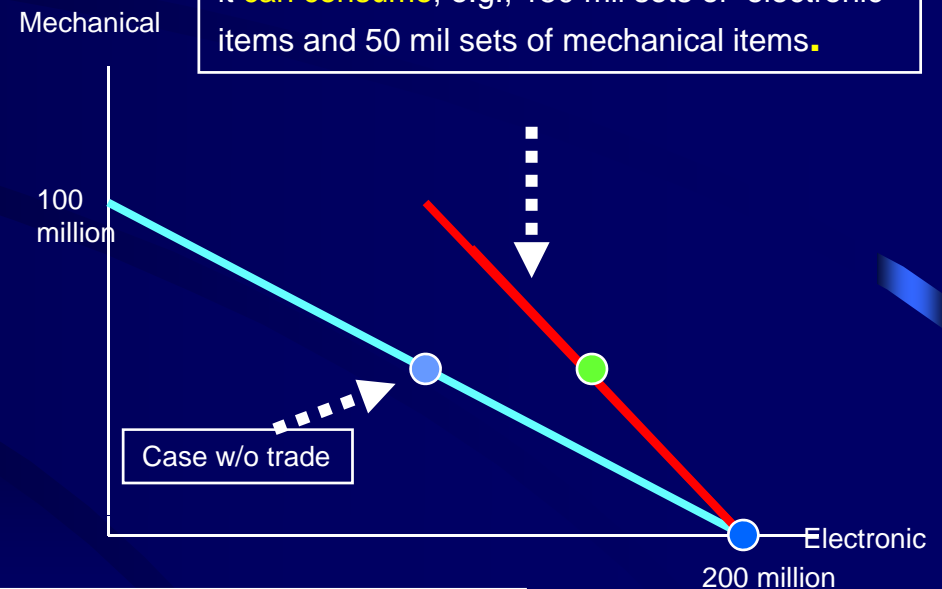
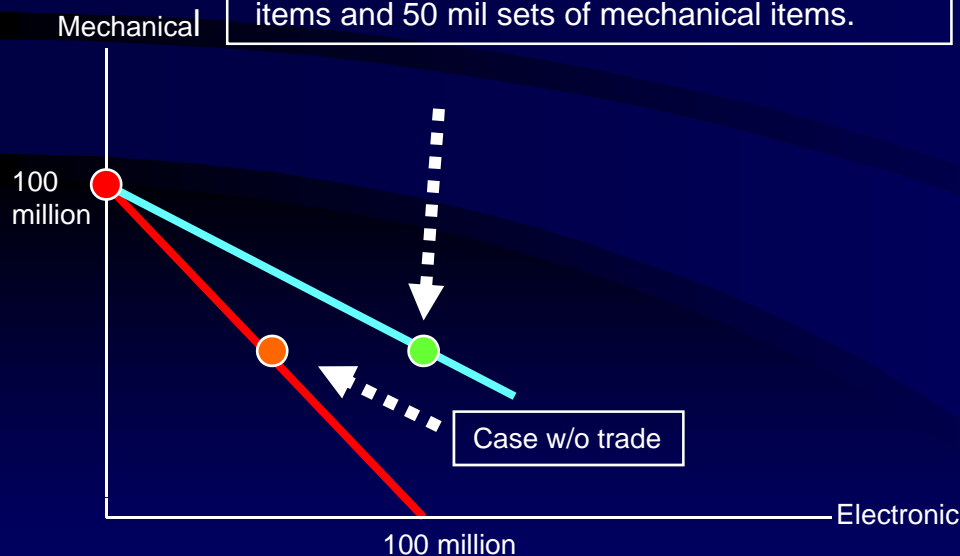
Country X: Workforce=200 million, 2,000 hours/yr, 400 billion man-hours

Set of electronic items: 2,000 man-hours/set

Set of mechanical items: 4,000 man-hours/set

If Country J produces mechanical items only and exchange for Country X's electronic items, it **can consume**, e.g., 100 mil sets of electronic items and 50 mil sets of mechanical items.

If Country X produces mechanical items only and exchange for Country J's electronic items, it **can consume**, e.g., 150 mil sets of electronic items and 50 mil sets of mechanical items.



But these two consumption possibilities are incompatible.

Ricardo's Comparative Advantage (Absolute Advantage and Comparative Advantage)

Country J

Set of electronic items: 1,000 man-hours/set

Set of mechanical items: 1,000 man-hours/set

2 times as
productive

4 times as
productive

Country X

Set of electronic items: 2,000 man-hours/set

Set of mechanical items: 4,000 man-hours/set

Absolute advantage in productivity ▪ ▪ Country J has absolute advantage in both electronic and mechanical items.

Comparative advantage in productivity ▪ ▪ In terms of Country J's productivity, which multiple is larger, electronic items or mechanical items.

2 times in electronic items, 4 times in mechanical items.

If limited to 2 products in the world, Country J has comparative advantage in mechanical items. And so does Country X in electronic items (albeit lower in its productivity).

If the wage per hour is, for example, ¥3,000 in Country J and ¥1,000 in Country X (3 times as high) ▪ ▪

For a set of electronics items, $3,000 \times 1,000 = ¥3$ million in Country J, and in Country X, $1,000 \times 2,000 = ¥2$ million (advantage)

For a set of mechanical items, $3,000 \times 1,000 = ¥3$ million (advantage), and $1,000 \times 4,000 = ¥4$ million.

Ricardo's Comparative Advantage (Absolute Advantage and Comparative Advantage)

Country J

Without Trade ..

Domestic price of electronic items = ¥3 mil
Domestic price of mechanical items = ¥3 mil

Consumption of electronic items, e.g.,
¥3 mil x 50 mil sets = ¥150 trillion

Consumption of mechanical items, e.g.,
¥3 mil x 50 mil sets = ¥150 trillion

Total consumption of ¥300 trillion is possible.
(GNP)

With Trade ..

Import price of electronic items = ¥2 mil
Domestic price of mechanical items = ¥3 mil

Country J exports 50 mil sets of mechanical items
Unit price = ¥3 mil, total export amount =
¥150 trillion

Country J imports 75 mil sets of electronic items
Unit price = ¥2 mil, total import amount =
¥150 trillion

Country X

Without Trade ..

Domestic price of electronic items = ¥2 mil
Domestic price of mechanical items = ¥4 mil

Consumption of electronic items, e.g.,
¥2 mil x 100 mil sets = ¥200 trillion

Consumption of mechanical items, e.g.,
¥4 mil x 50 mil sets = ¥200 trillion

Total consumption of ¥400 trillion is possible.
(GNP)

With Trade ..

Domestic price of electronic items = ¥2 mil
Import price of mechanical items = ¥3 mil

Country X exports 75 mil sets of electronic items
Unit price = ¥2 mil, total export amount =
¥150 trillion

Country X imports 50 mil sets of mechanical items
Unit price = ¥3 mil, total import amount = architecture

Ricardo's Comparative Advantage (Case with Trade)

Country J: Workforce=50 million,
2,000 hours/yr, 100 billion man-hours

Set of electronic items: 1,000 man-hours/set

2 times as
productive

Set of mechanical items: 1,000 man-hours/set

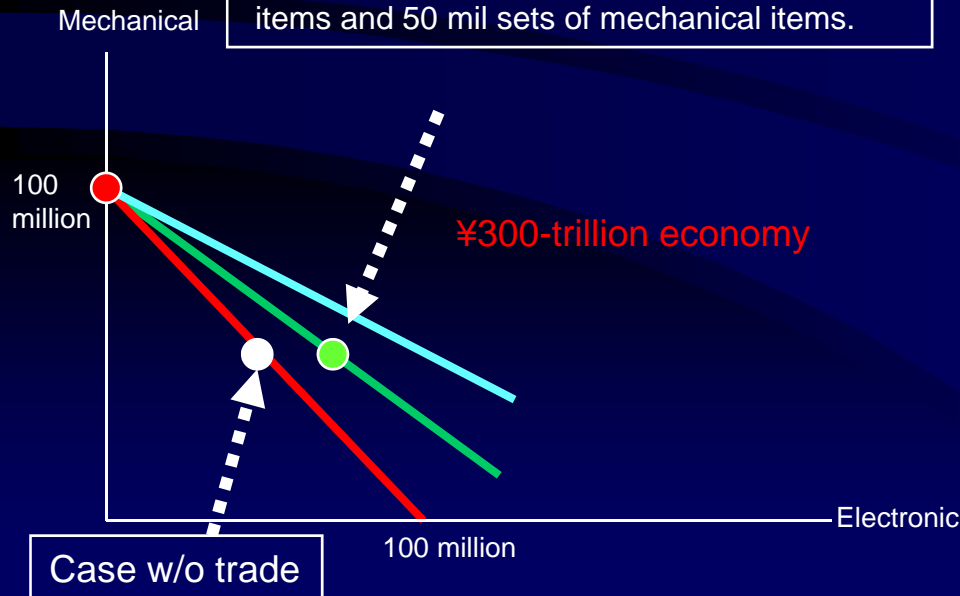
4 times as
productive

Country X: Workforce=200 million,
2,000 hours/yr, 400 billion man-hours

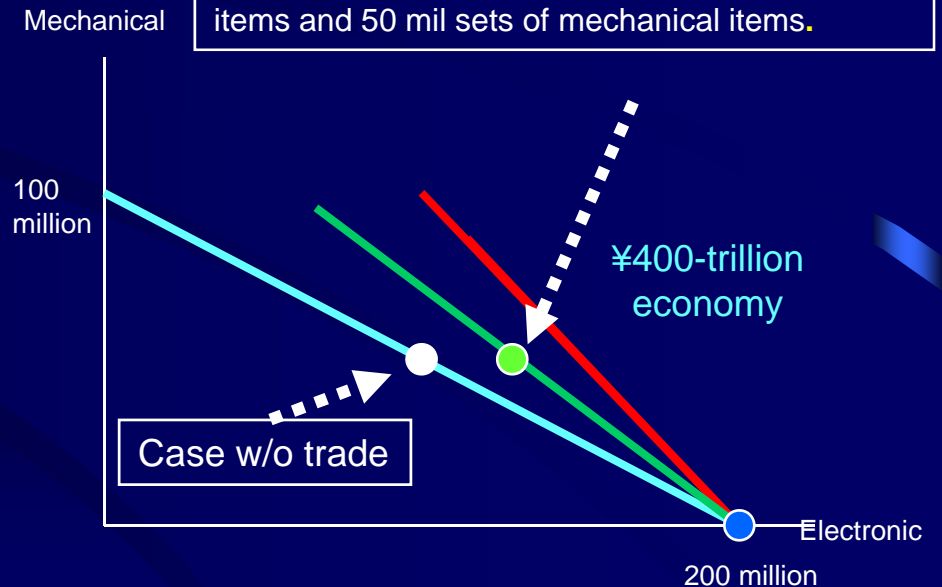
Set of electronic items: 2,000 man-hours/set

Set of mechanical items: 4,000 man-hours/set

If Country J produces mechanical items only and exchange for Country X's electronic items, it can consume, e.g., 75 mil sets of electronic items and 50 mil sets of mechanical items.



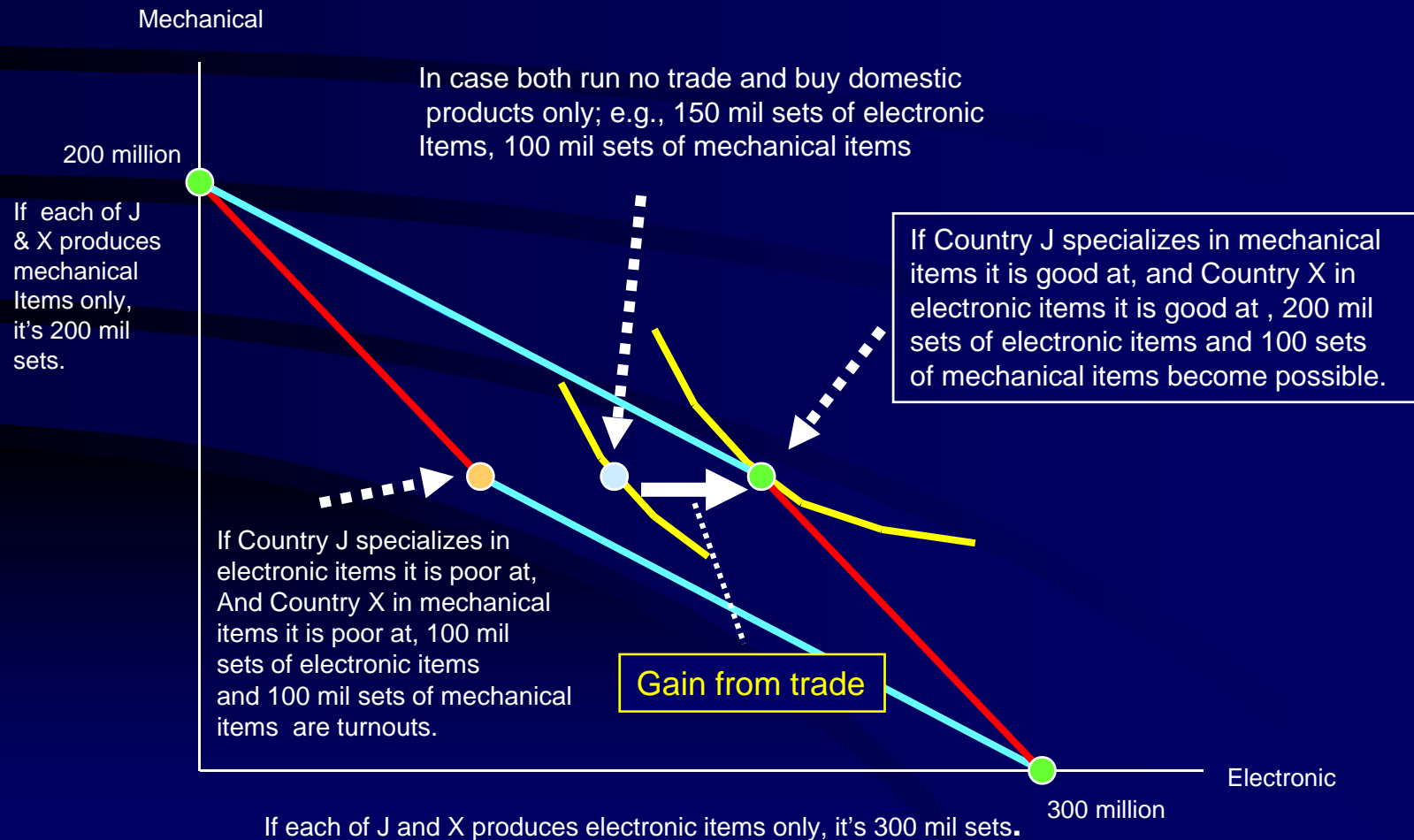
If Country X produces mechanical items only and exchange for Country J's electronic items, it can consume, e.g., 125 mil sets of electronic items and 50 mil sets of mechanical items.



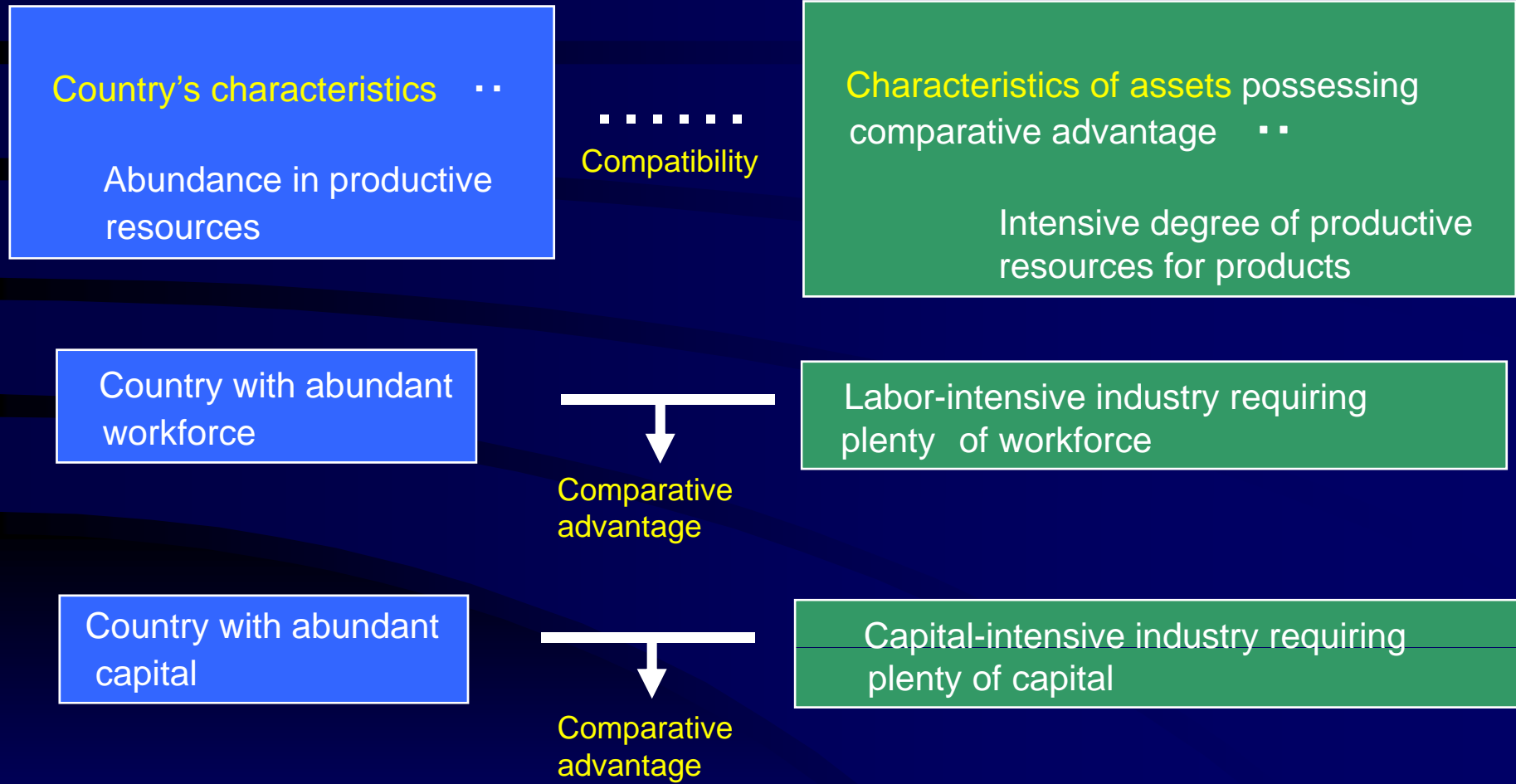
Ricardo's Comparative Advantage (Production and Demand of Entire World)

Country J: Workforce=50 million,
2,000 hours/yr, 100 billion man-hours

Country X: Workforce=200 million,
2,000 hours/yr, 400 billion man-hours



Comparative Advantage Theory of New Classical Economics: Fundamental Logic Structure

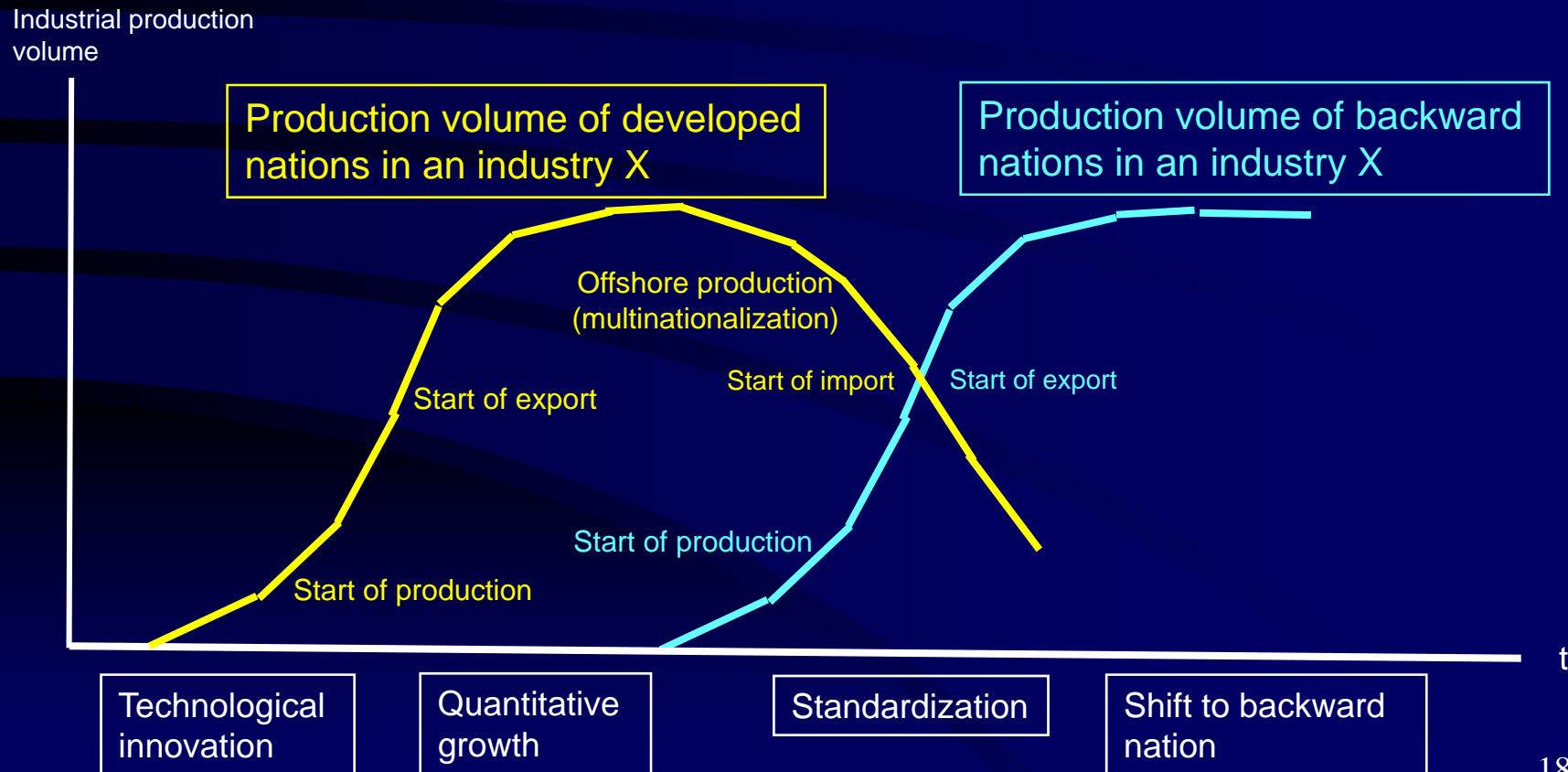


However . . . it eliminates gaps in industrial productivity by country. (reality?)

Product Cycle Theory (Staggered Morphology)

A newly designed product is produced firstly in a developed nation with technological capability.

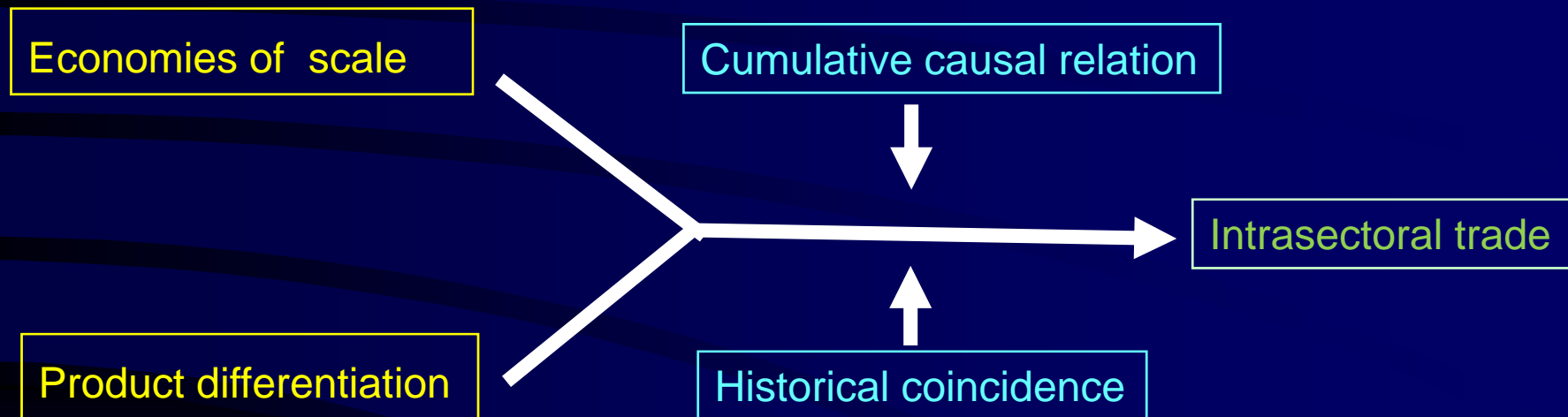
When the design becomes standardized (unvarying routine) the production base moves to a developing nation with low wages.



New Trade Theory (P. Krugman, others)

When **economies of scale** (The more one produces, the less his cost becomes.), and **product differentiation** (A well-designed product sells at a higher price.) exist,

The production snowballs at a place it has happened to begin.



- but, is it merely coincident that the production of a product A starts in a country X? Is it not natural that the production begins at a place the product **design** has been drawn?

How Should We Explain about This? . . . Comparative Advantage Theory in Broad Sense

The basic logics of comparative advantage theory are effective now. Nonetheless . . . **minute intra-industry trade?**

There are many phenomena that cannot be explained by the “**theory of comparative advantage in a narrow sense**” which a standard economics expounds.

Too many phenomena to be accounted for with “labor intensive, capital intensive, technology intensive”

What’s missing? . . . Standard economics overlooks the problem of a “**design.**”
The design includes assets; producing how many and at what price?

Isn’t it possible to consider the “**theory of comparative advantage in a broad sense**” that makes a “design” endogenous?

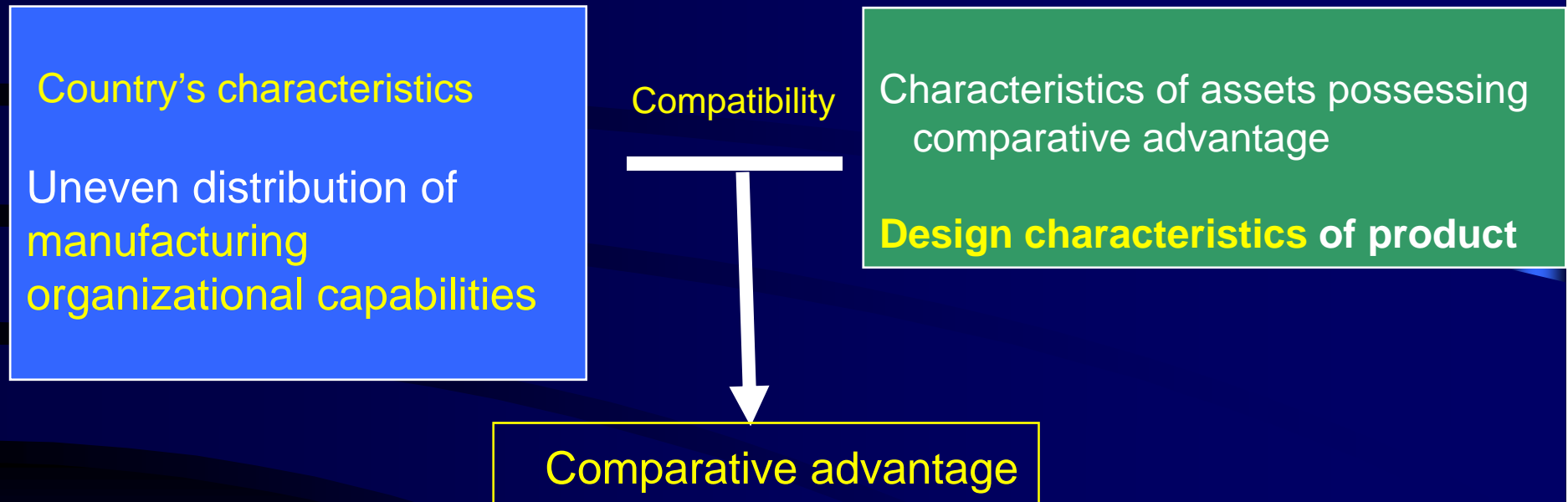
How about marrying an economic concept of **comparative advantage** with an engineering idea of a **design**?

I.e., let us consider the “**theory of comparative advantage in a broad sense**” widening the scope to design activities.

Theory of open manufacturing: Conception starting from the design; **creation, transcription, transmission, and interpretation of design information**

Development, production and sales, all of which are “workshops”: the sites where runs design information leading to customers

Theory of Comparative Advantage in Design



By linking an engineering concept of **design** with an economic idea of **comparative advantage**, is it not possible to explain a new phenomenon of “**minute intra-industry trade**” under globalization?

Theory of Comparative Advantage in Design (Architecture)

A foothold location for **creation of design information** (development) goes in advance of one for **transcription of design information** (production).

Stated from the standpoint of the **open manufacturing**, **location for design stronghold** should be emphasized more.

Nonetheless, this has not been squarely taken up to date.

- ① Theory of comparative advantage in a narrow sense · · · focused on production location, overlooked a designing location
- ② Product cycle theory · · · emphasized developmental location, which, however, was concluded as being “the U.S.”
- ③ New trade theory · · · paid attention to cumulative effect of production location, but occluded by calling it “coincidence”

A greater importance ought to be attached to **comparative advantage in design**, or **decision on location for a design stronghold**.

A way of thinking originated from this, an idea coming out of job sites · · · **the theory of comparative advantage in architectural**

Its premise · · · While capital moves, organizational capability doesn't move easily and is **unevenly distributed in countries**.

To Verify Globalization from this Standpoint Again · ·

What moves around globally · · · capital, fund, goods, services getting on electronic media

Era when capital selects countries (Ryoji Musha, *Theory of New Imperialism*)

Financial instruments made into digital information goods · · · flying around globe in a flash

“Globalization” started from the U.S. = notable constriction to American standards

What hardly moves around globally · · · **people, organizational capability** · · **staff unevenly distributed**

America has collected immigrants for 200 years · · but capable countries are limited

China made “short-term domestic immigrants” out of its inland workers (not foreign immigrants)

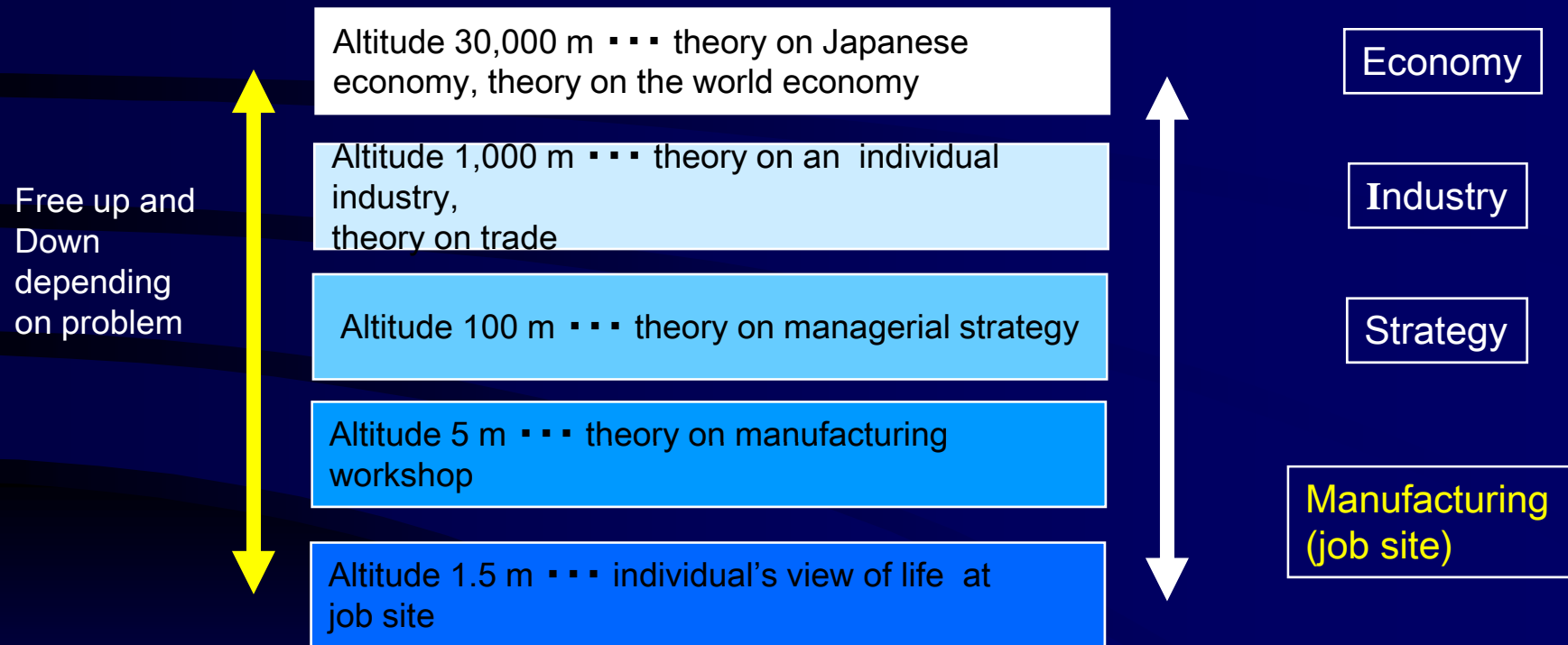
Organizational capability evolves in an emergent manner pursuant to a particular nation’s history.

Organizational capability is fostered by capability-building environment and capability-building competition.

An international transfer of organizational capability is possible with multinational corporations, but takes time.

Accordingly, based upon **unevenly distributed organizational capability**, a nation’s industry builds comparative advantage, grows specialized, and divides the work internationally.

Strategic Theory Originated from Manufacturing Job Site . . . for which advanced and flexible raising and lowering are needed



Viewpoint of manufacturing workshop for an analysis of globalization