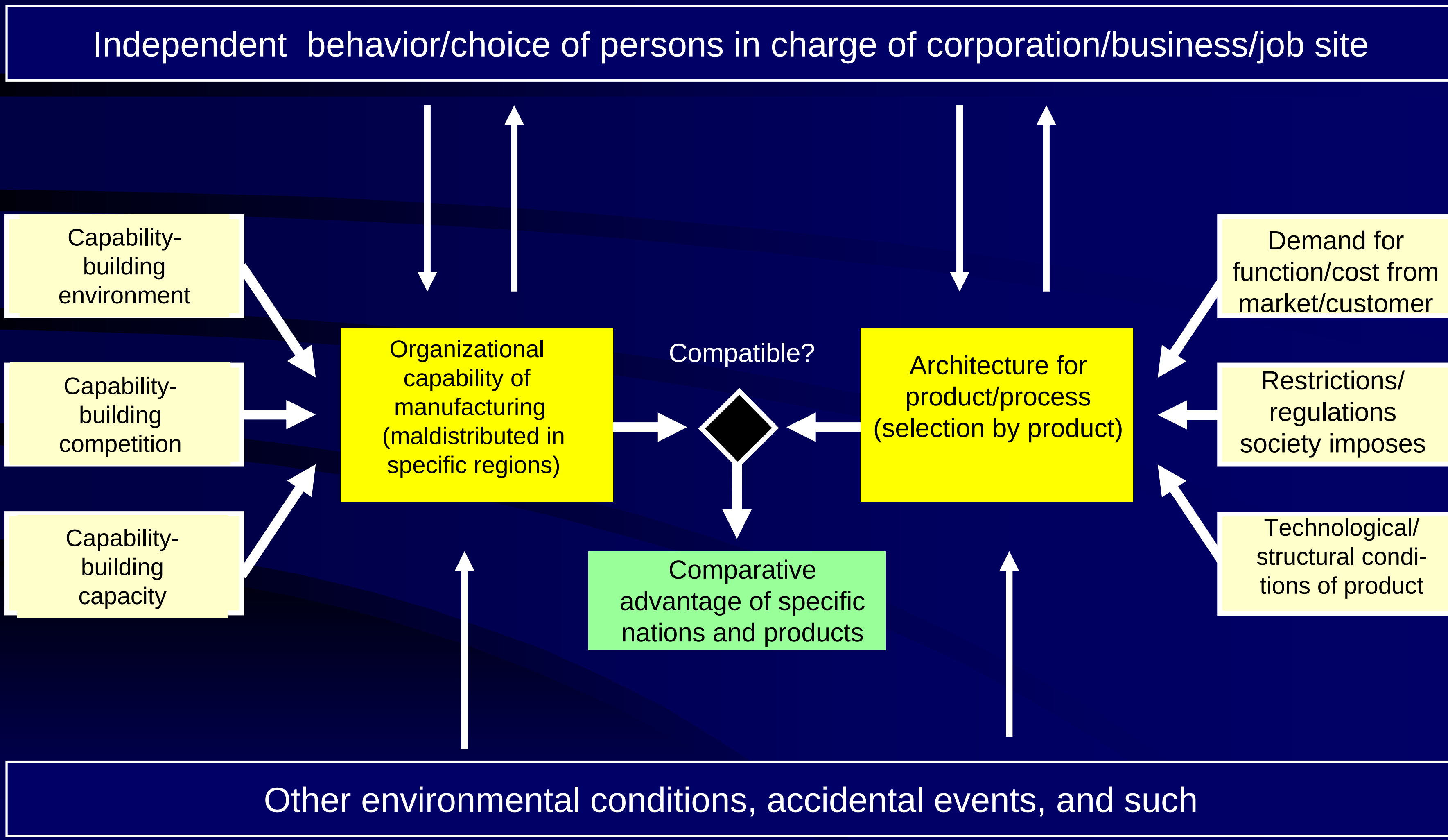
Hypothesis about Compatibility Between Organizational Capability and Architecture—Sketch of Whole Span



Architecture(Basic Ideas Behind Design)

Lapping Type (Integral Type)

And

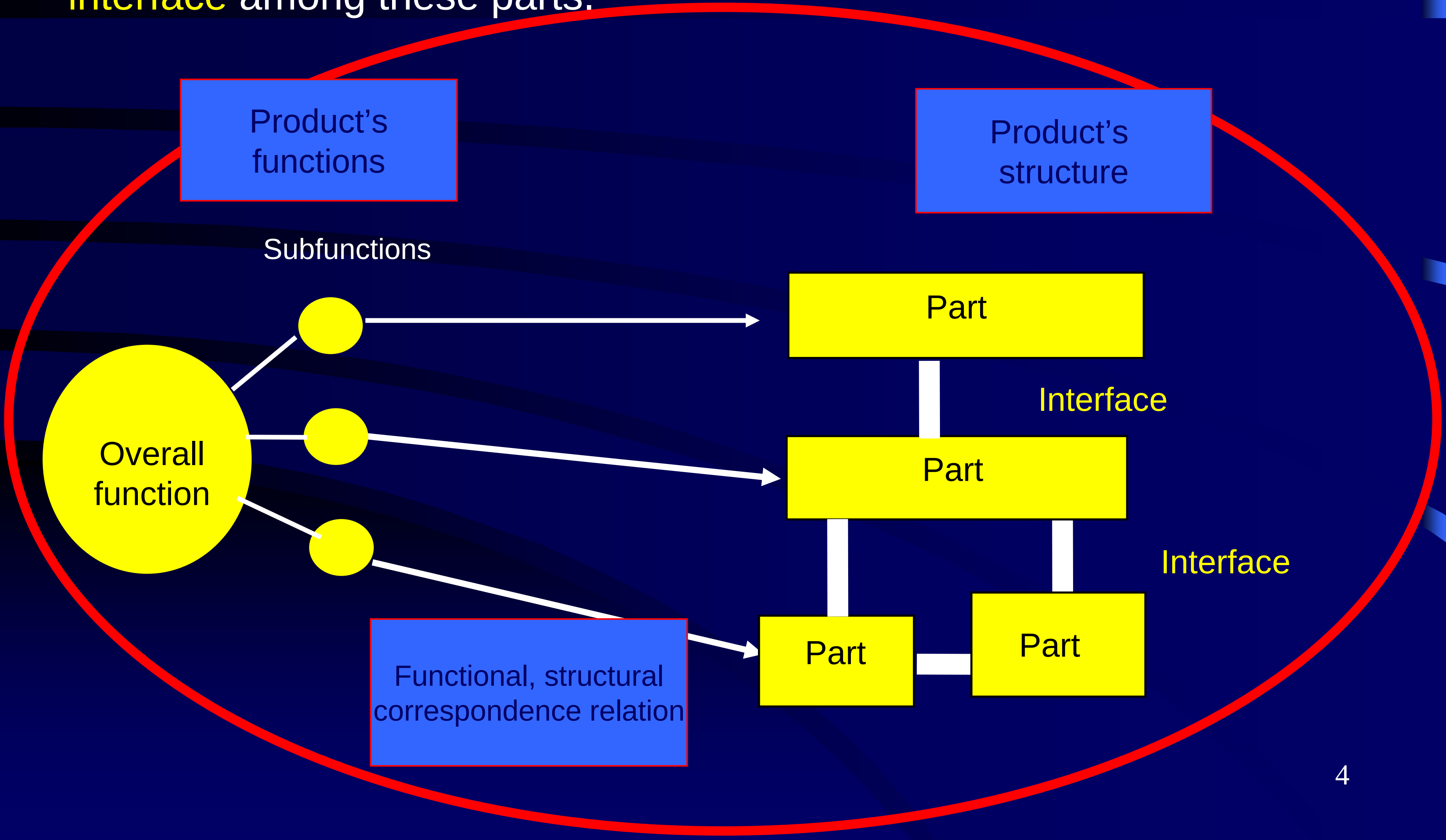
Combination Type (Modular Type)

What Architecture Is: Let's peep into ○ (design)

What sort of thinking does an architect have at designing?

"Architect's Concept" to be Called "Architecture"

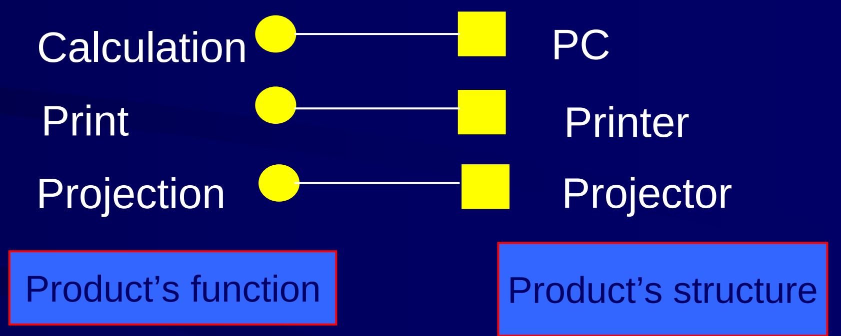
Basic design idea as to how to distribute the functions demanded for a product to each structural part of said product, and how to design the interface among these parts.



Modular (Combination) Architecture and Integral (Lapping) Architecture

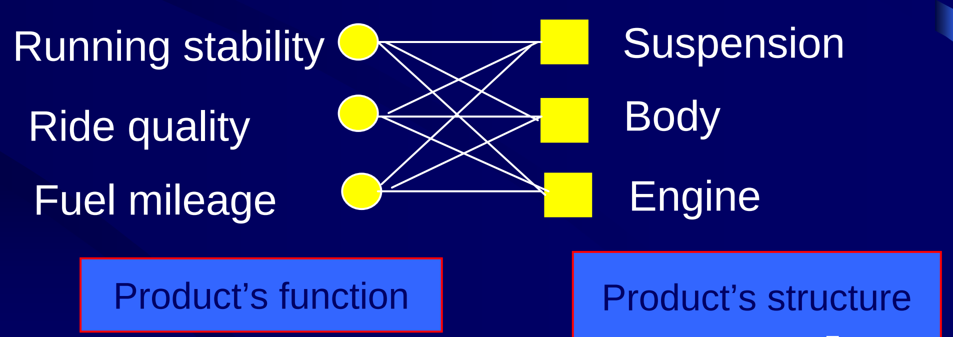
PC's system

Modular Architecture



Motorcar

Integral Architecture



Basic Types of Product Architecture

① **“Combination” type (modular type) architecture**:

Possible to combine function-finishing parts with standard interface

Even with a medley of ready-made parts, a product as a whole fulfills a function.

② “Lapping” type (integral type architecture :

To conduct custom design (optimum design) by mutual adjustment by individual product

Necessary to optimize design by each part in order to fulfill a function of a product as a whole

a. Open architecture: a kind of modular type

Industrially standardized interface beyond corporations

Possible with “a medley of design” among corporations

b. Closed architecture:

Basic design and interface design being finished in-house

Basic Types of Product Architecture

	Integral (lapping)	Modular (combination)
Closed (enclosure)	Closed, integral passenger car, motorcycle game software miniaturized home appliances other	Closed, modular mainframe machine tool Lego
Open (industry standard)		Open, modular PC, its software internet new financial instrument bicycle

http://merc.e.u-tokyo.ac.jp/mmrc/dp/pdf/MMRC238_2008.pdf

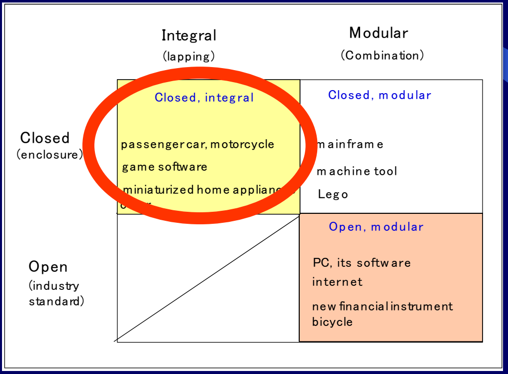
Basic Types of Product Architecture

Optimum-designed exclusive parts

	Integral (lapping)	Modular (combination)
Closed (enclosure)	Closed, integral passenger car, motorcycle game software miniaturized home appliances other	Closed, modular mainframe machine tool Lego
Open (industry standard)		Open, modular PC, its software internet new financial instrument bicycle

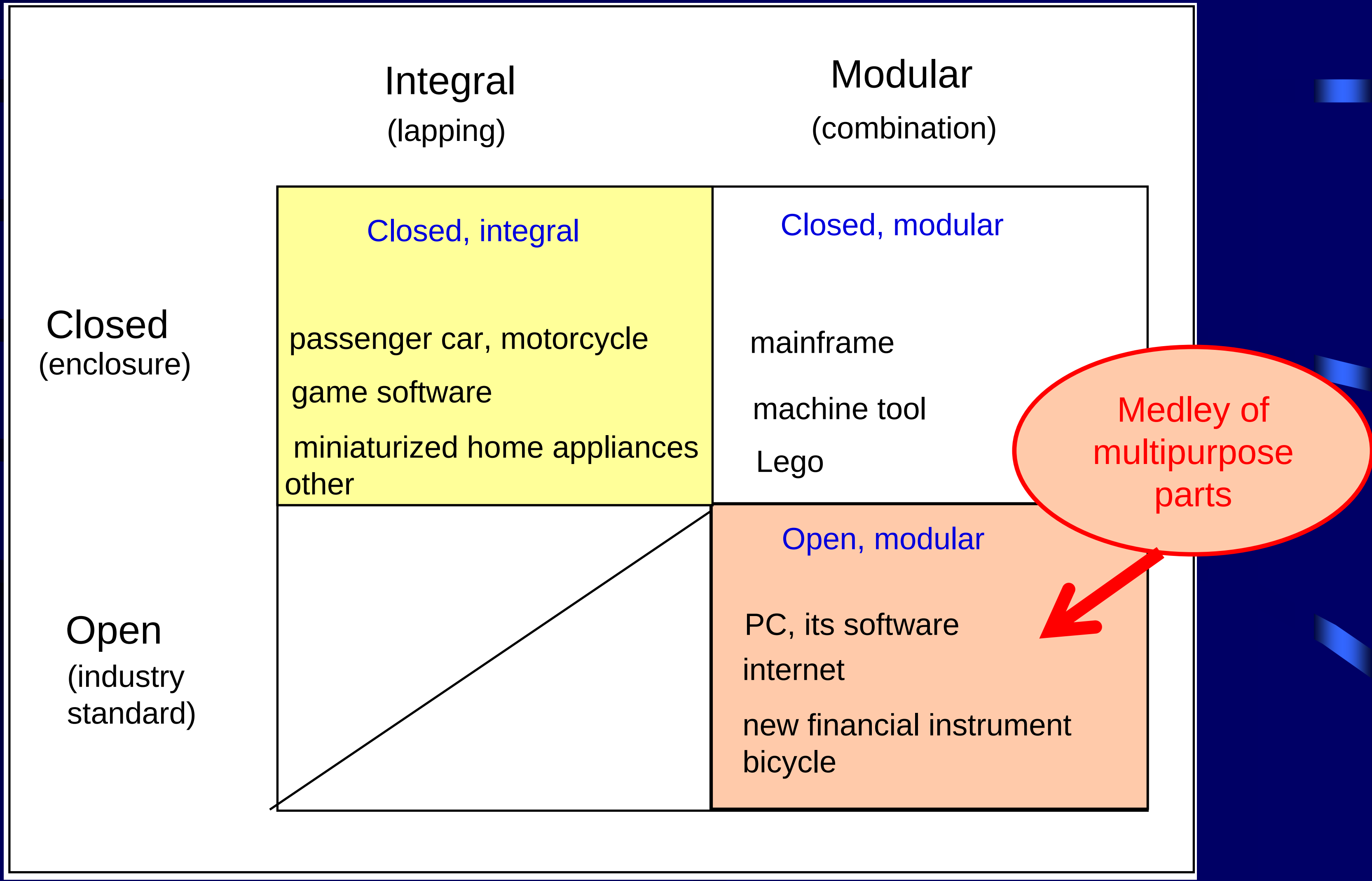
http://merc.e.u-tokyo.ac.jp/mmrc/dp/pdf/MMRC238_2008.pdf

Lapping Type (Closed/Integral) Product: Motorcar



Multipurpose parts (usable for various companies' products) are less than 10%.

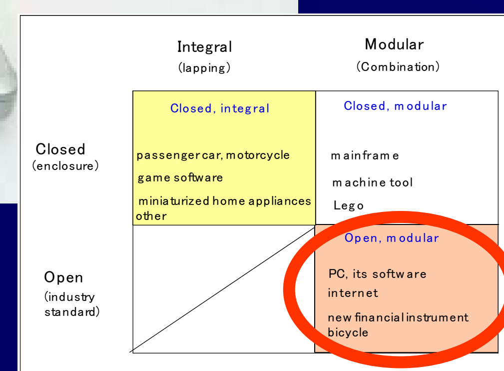
Basic Types of Product Architecture



http://merc.e.u-tokyo.ac.jp/mmrc/dp/pdf/MMRC238_2008.pdf

Open/Modular Type Product (PC System)

‡ Source:http://vol01.eyes-art.com/0922.html



Multipurpose parts (usable for various companies' products) are more than 50%.

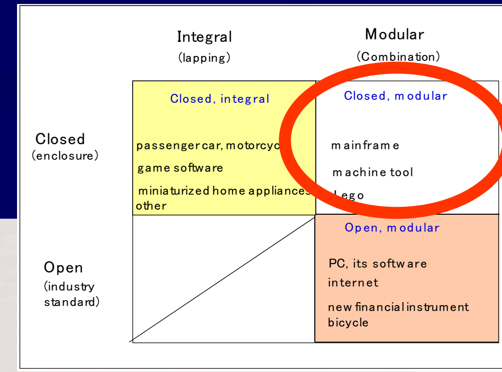
Basic Types of Product Architecture

	Integral (lapping)	Modular (combination)
Closed (enclosure)	Closed, integral passenger car, motorcycle game software miniaturized home appliances other	Closed, modular mainframe machine tool Lego
Open (industry standard)		Open, modular PC, its software internet new financial instrument bicycle

Medley of in-house common parts

http://merc.e.u-tokyo.ac.jp/mmrc/dp/pdf/MMRC238_2008.pdf

Closed/Modular Product (Mainframe Computer)



To make many kinds of products by assembling "in-house common parts"
Design in own company

Closed/Modular (Lego)

	Integral (lapping)	Modular (Combination)
Closed (enclosure)	Closed, integral passenger car, motorcycle game software miniaturized home appliances other	Closed, modular mainframe machine tool Lego
Open (industry standard)		Open, modular PC, its software internet new financial instrument bicycle

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Applied Question: “Motorcar Is Not Motorcar!”

Monocoque RV (closer to closed, integral)

	Integral (lapping)	Modular (Combination)
Closed (enclosure)	Closed, integral passenger car, motorcycle game software miniaturized home appliances other	Closed, modular mainframe machine tool Lego
Open (industry standard)		Open, modular PC, its software internet new financial instrument bicycle

Truck-type RV (closer to closed/modular)

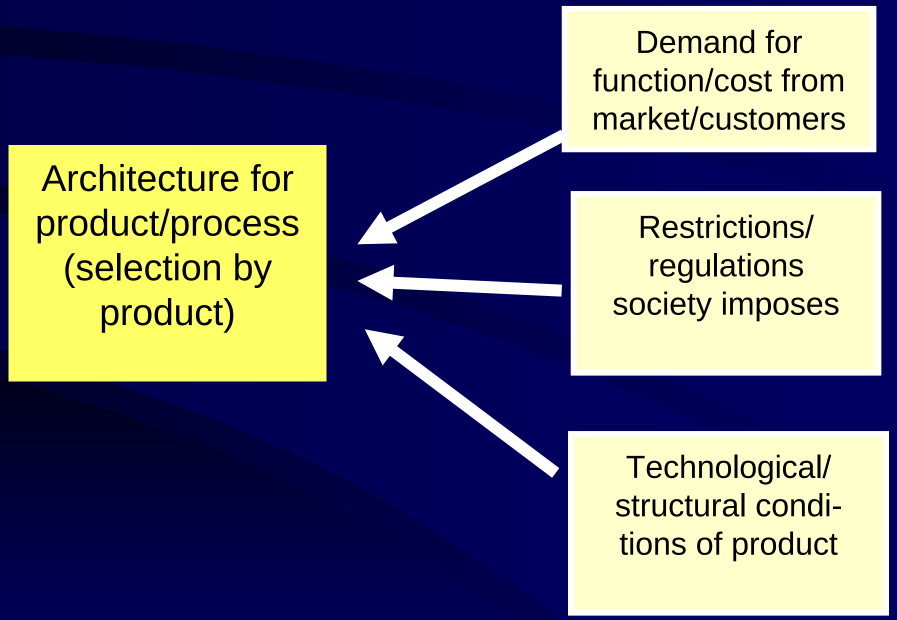
	Integral (lapping)	Modular (Combination)
Closed (enclosure)	Closed, integral passenger car, motorcycle game software miniaturized home appliances other	Closed, modular mainframe machine tool Lego
Open (industry standard)		Open, modular PC, its software internet new financial instrument bicycle

Passenger Car of Chinese Regional Enterprise (Geely) (closer to pseudo-open, modular)

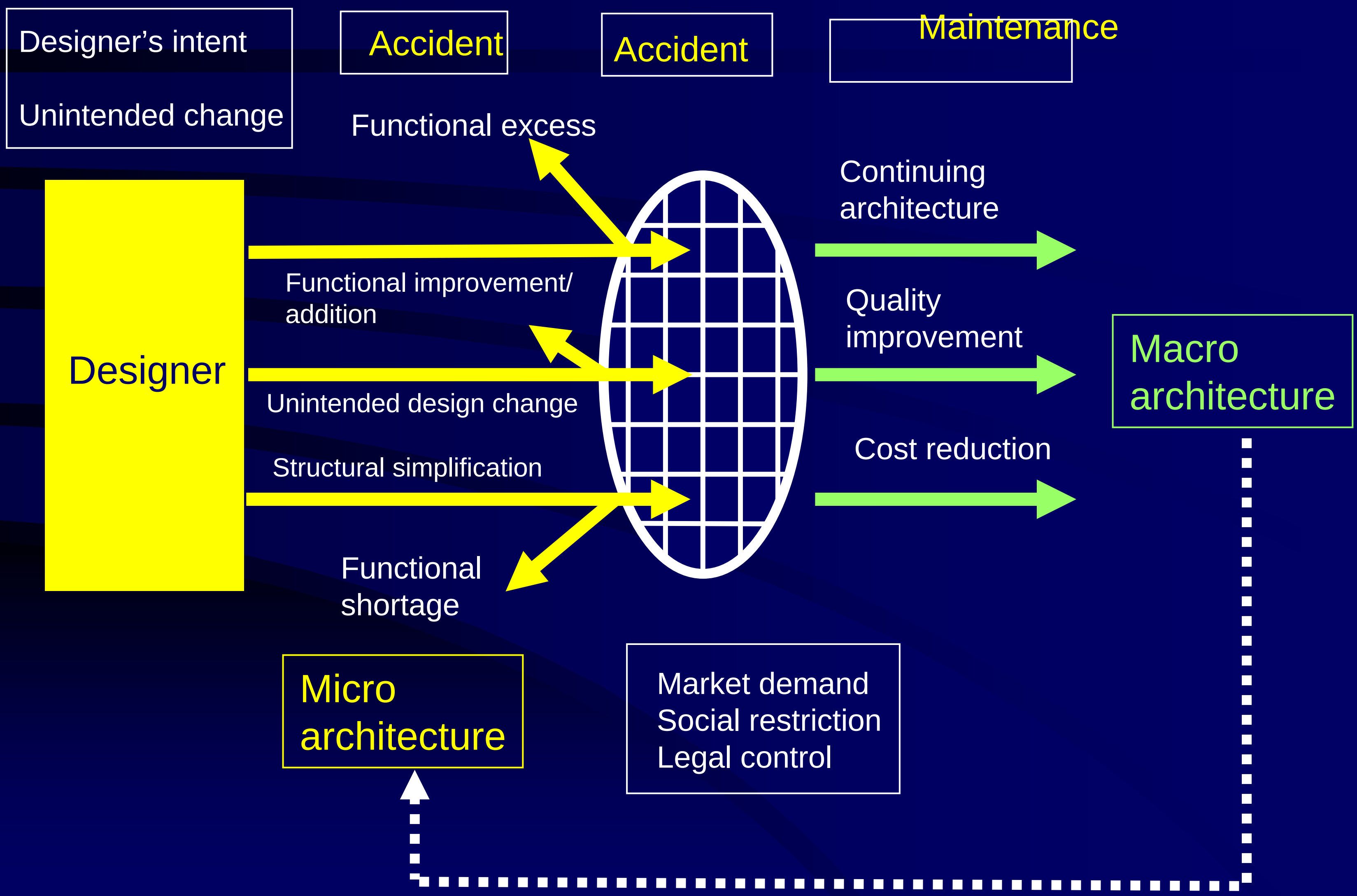
‡

Evolution of Architecture

— Macro Architecture and Micro Architecture —



Evolutionary Framework of Design and Architecture



Macro Architecture and Micro Architecture

Micro architecture ・・ to consider that it's selected by market, society, and technology (weeding out)

Architecture of an overall product = an aggregate value of architectures of parts'

Macro architecture influences a course of action of industrial climate and organizational capability.

And through which macro architecture exerts an influences on micro architecture.

Micro architecture ・・ for a designer to select proactively (accident)

Even with the same product, the architecture differs depending on vertical and horizontal parts.

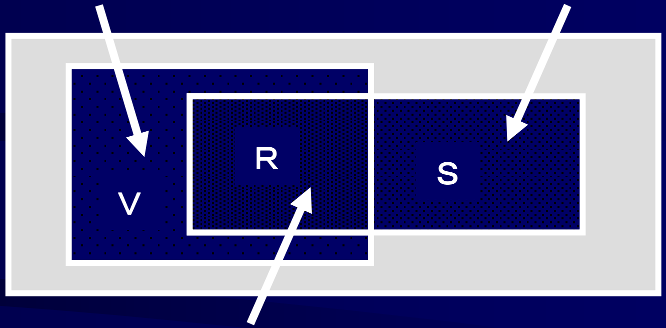
Before the fact, a designer intends to simplify structural design, functional design.

After the fact, micro architecture that has not been weeded out accumulate to become macro.

Relations Among Accident, Weeding Out and Maintenance of Artifact (Architecture)

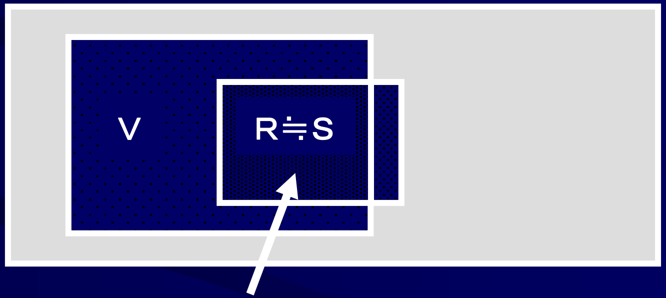
Collection of varied artifacts＝ V　　Collection of survivable artifacts not weeded out ＝ S

① General case



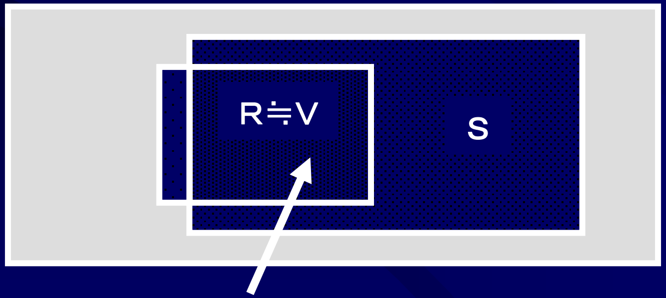
Collection of maintained (under observation) artifacts R ＝ V ∩ S

② Case of high environmental selection pressure



Collection of maintained (under observation) artifacts ＝ R ＝ V ∩ S ≒ S

③ Case of low environmental selection pressure



Collection of maintained (under observation) artifacts ＝ R ＝ V ∩ S ≒ V

Selection of Macro Architecture ･･ Hypothesis

- Technological progress expands performance/cost curves. (e.g.. Shintaku)

･With the same category of products (functional proposition), performance/cost curves differ by architecture.

･Customers with different orientations (price emphasis, performance emphasis) select different architectures (e.g., Nobeorka)

It's likely that price-oriented customers select modular type, while performance-oriented ones select integral type.

･Customers (market, society), macro architecture (technology), adjustment method (system) are likely to be selected simultaneously.

Modular type tends to select market adjustment method, while integral type is apt to select organizational adjustment method.

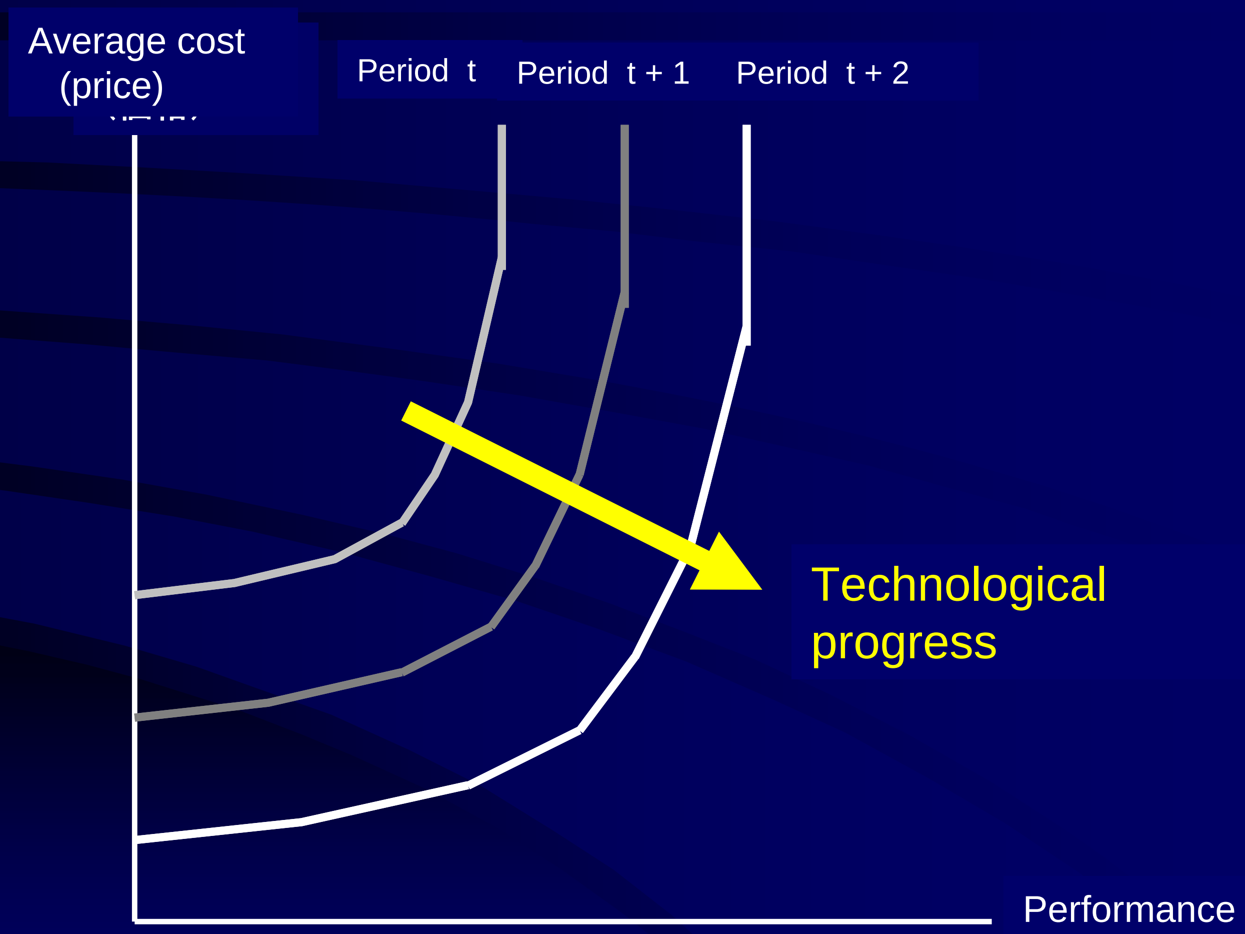
Modular type tends to select diversified-type of, while integral type is apt to select converged-type of, intra-industrial structure.

･When organizational adjustment capability enhances relatively, integral type is likely to be selected among given products.

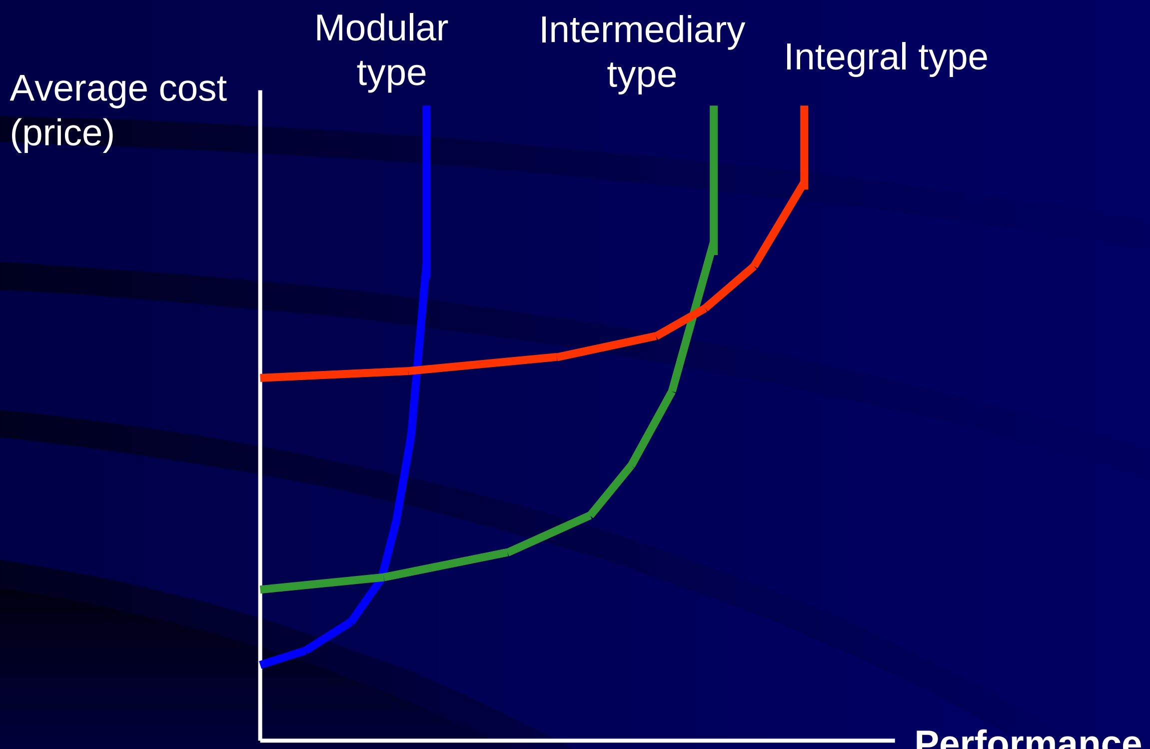
When market adjustment capability enhances relatively, modular type is apt to be selected among given products.

･In the area of intermediary architecture, an intermediate adjustment method like relational trading is likely to be selected.

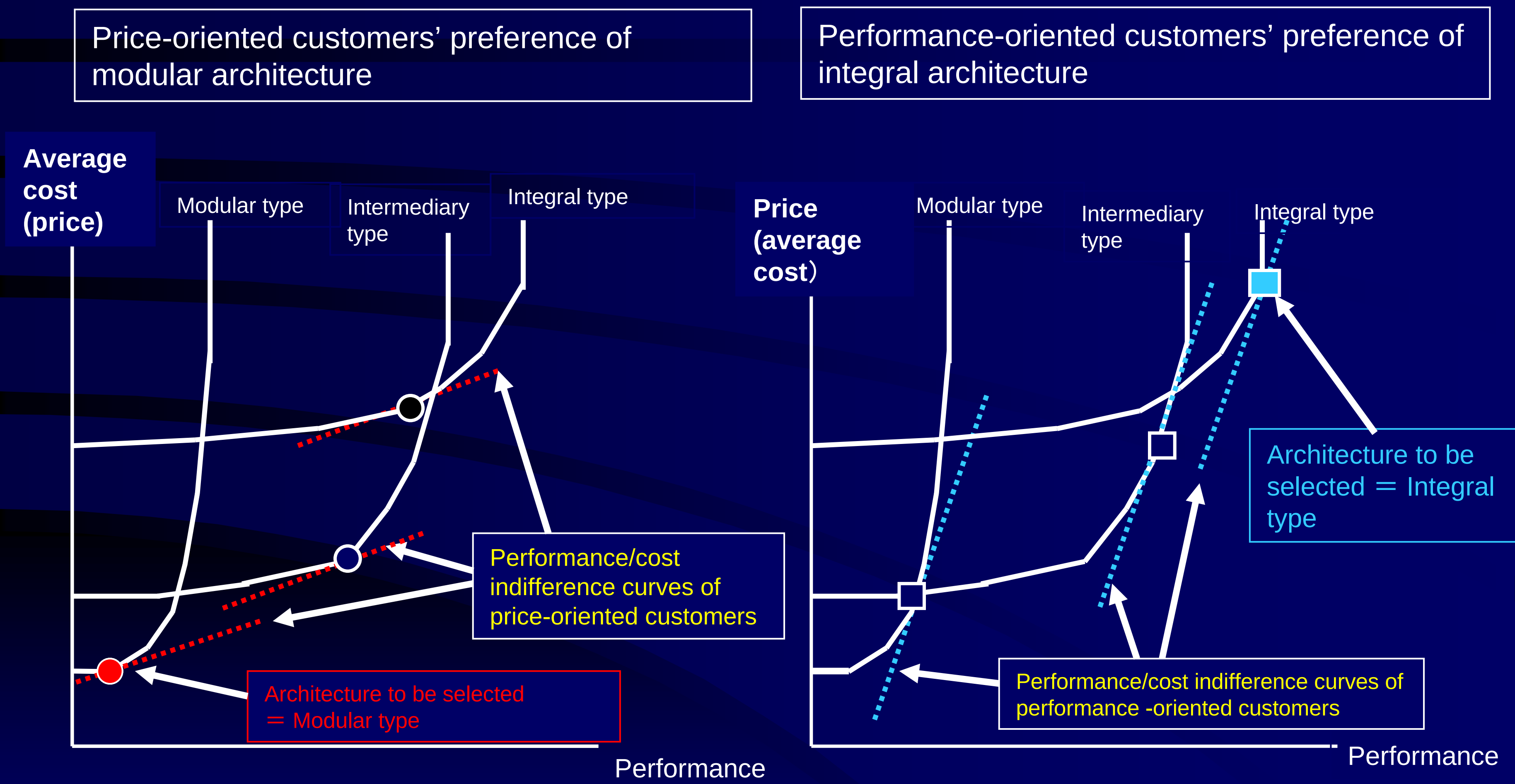
Performance/Cost Curbs ･･ Technological Progress



Architecture and Performance/Cost Curves



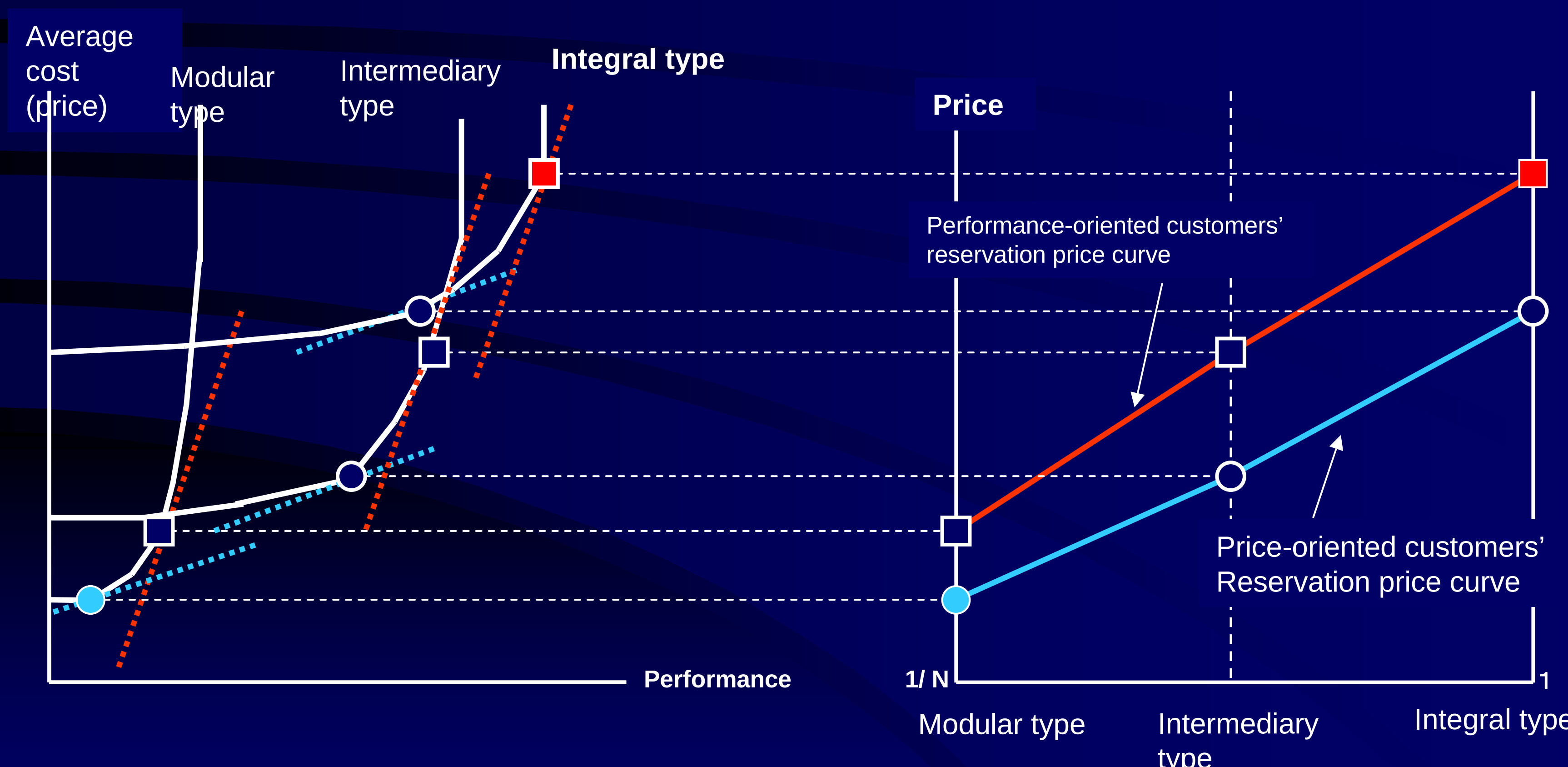
Choice of Architecture by Price-oriented Customers and Performance-oriented Customers



Architectural Spectrum and Permissible Range
（Reservation Price）

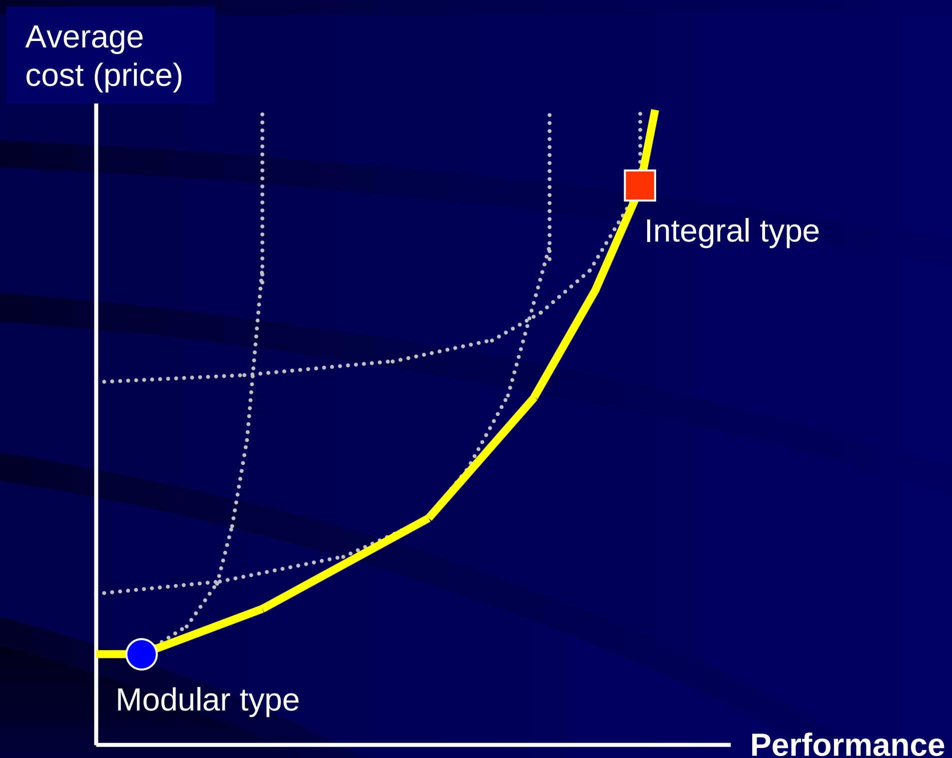
Customers’ type, architect, and performance/cost curbs

Customers’ type and reservation price curve

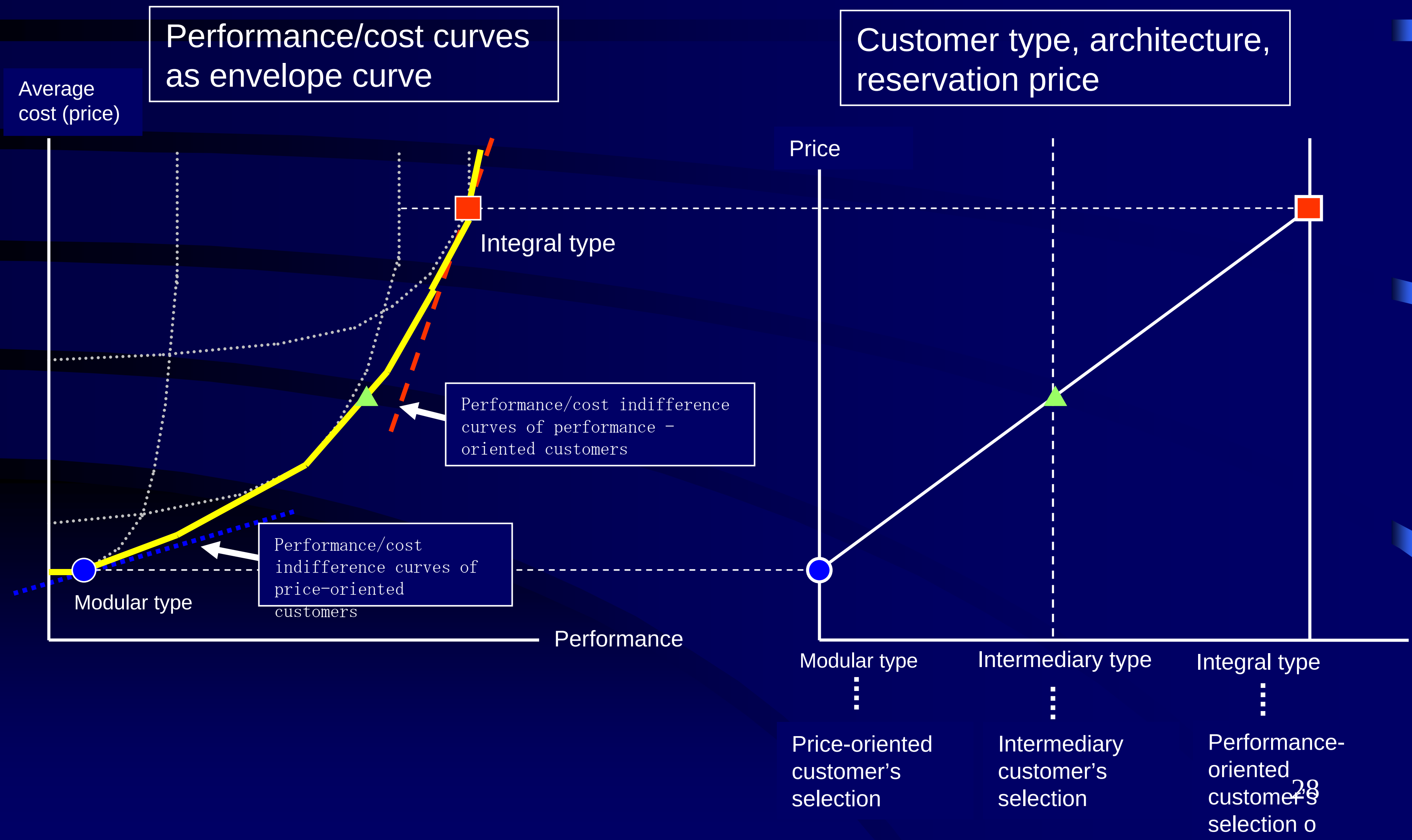


Architectural Spectrum

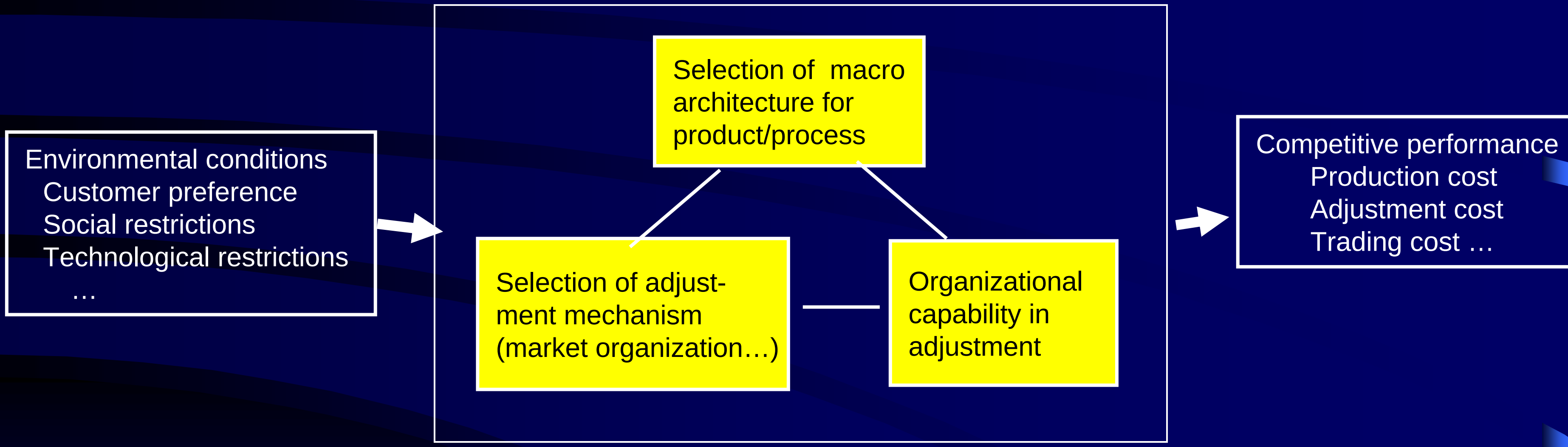
Comprehensive Performance/Cost Curves As Envelope Curve



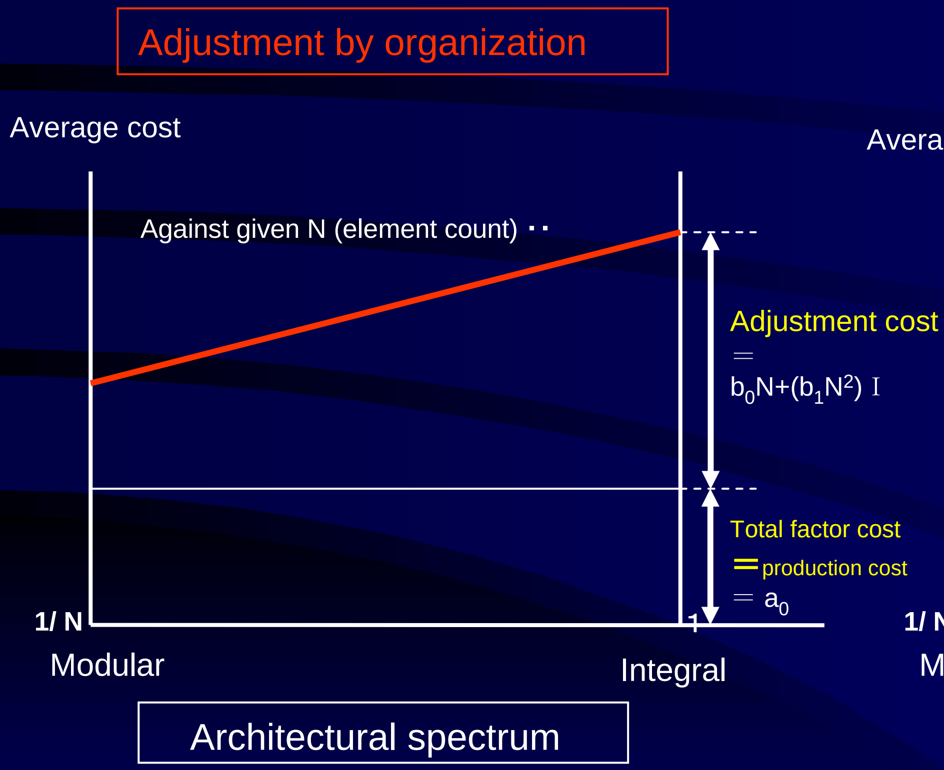
Relation Between Customer Type and Architecture Selection

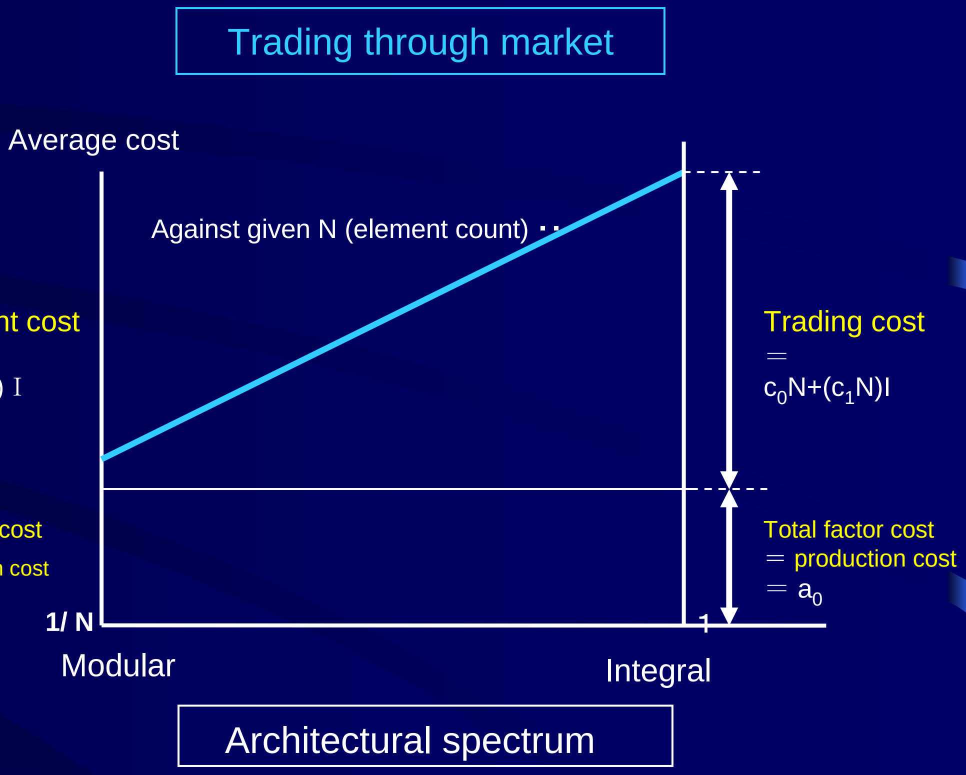


Interdependence Among Architecture, Organizational Capability, and Adjustment Method

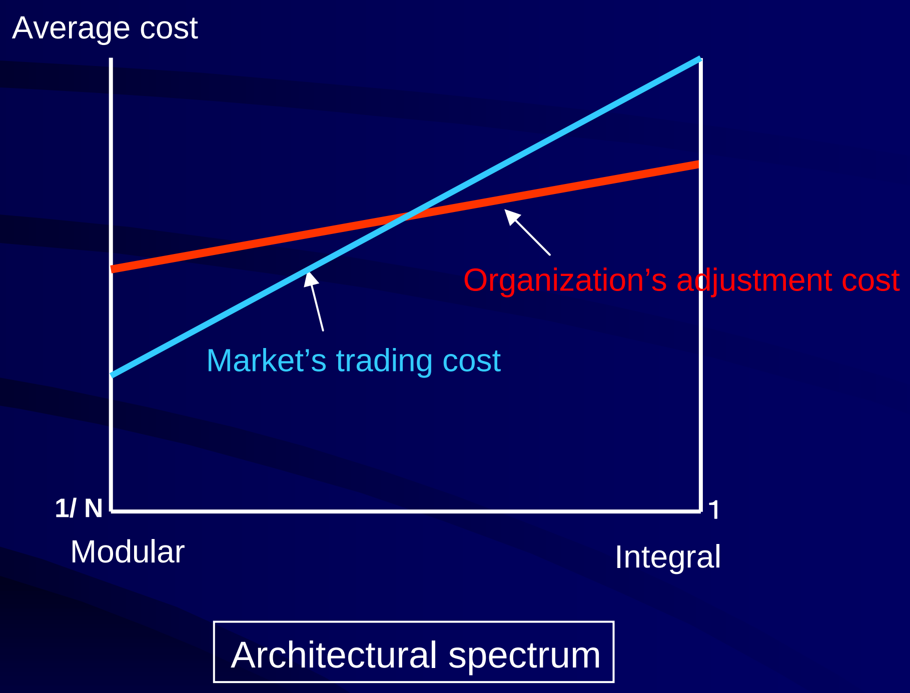


Architecture and Production Cost/Adjustment Cost/ Trading Cost

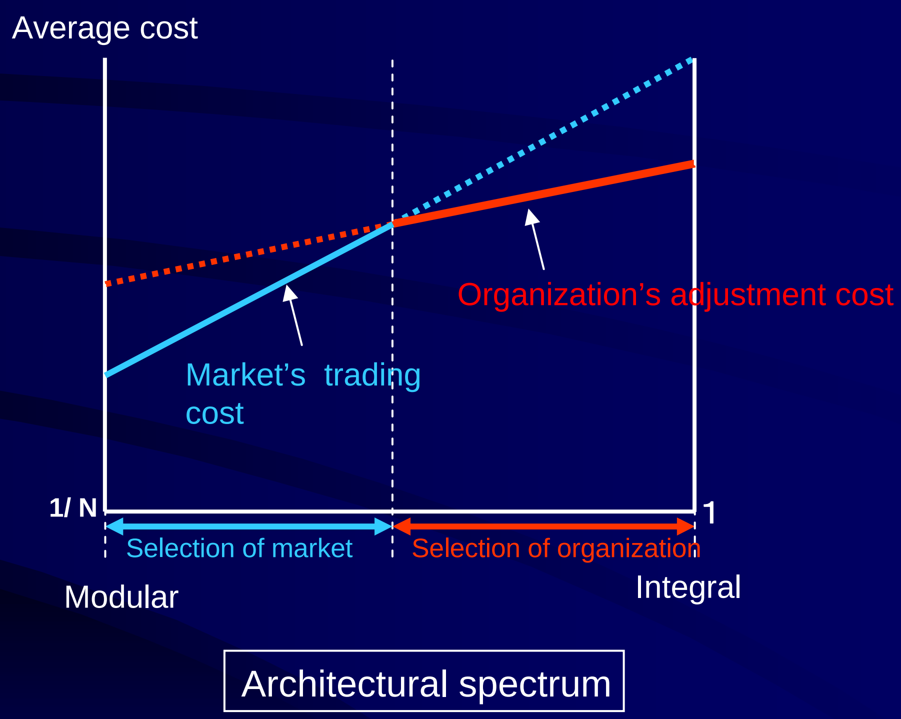




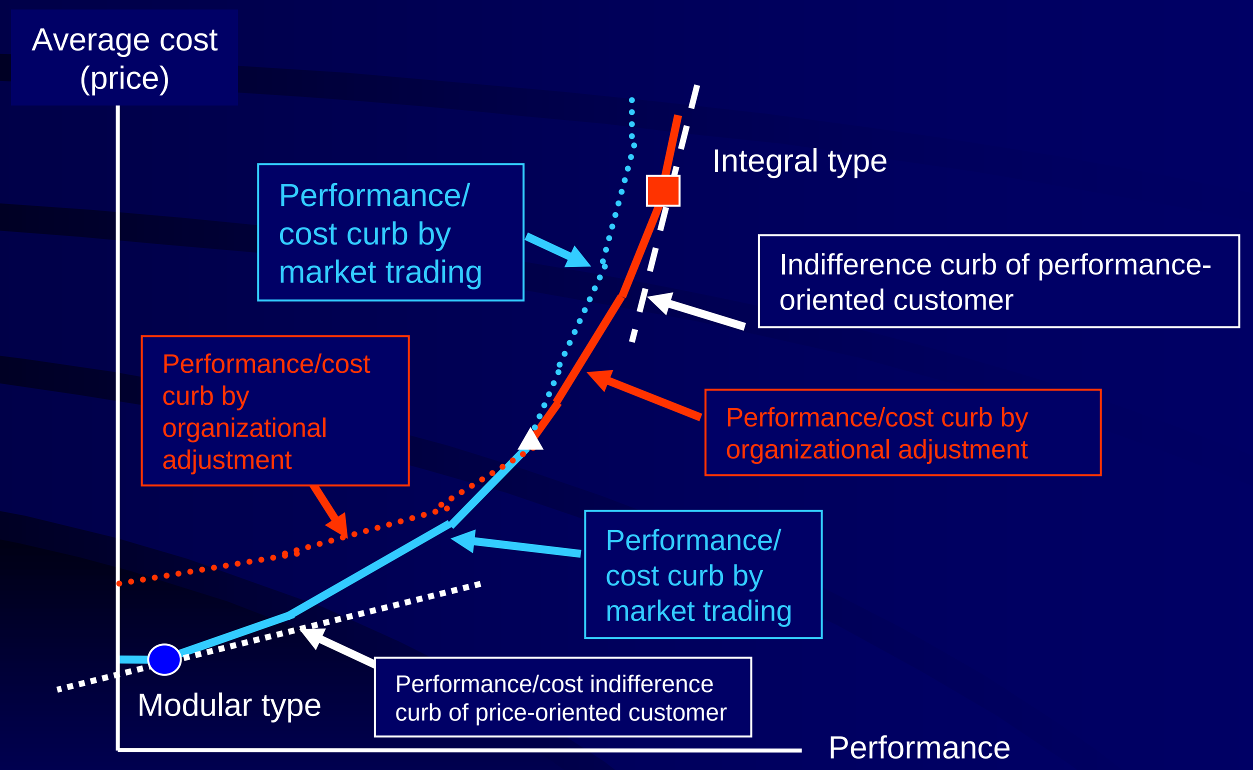
Adjustment Cost Curve and Trading Cost Curve



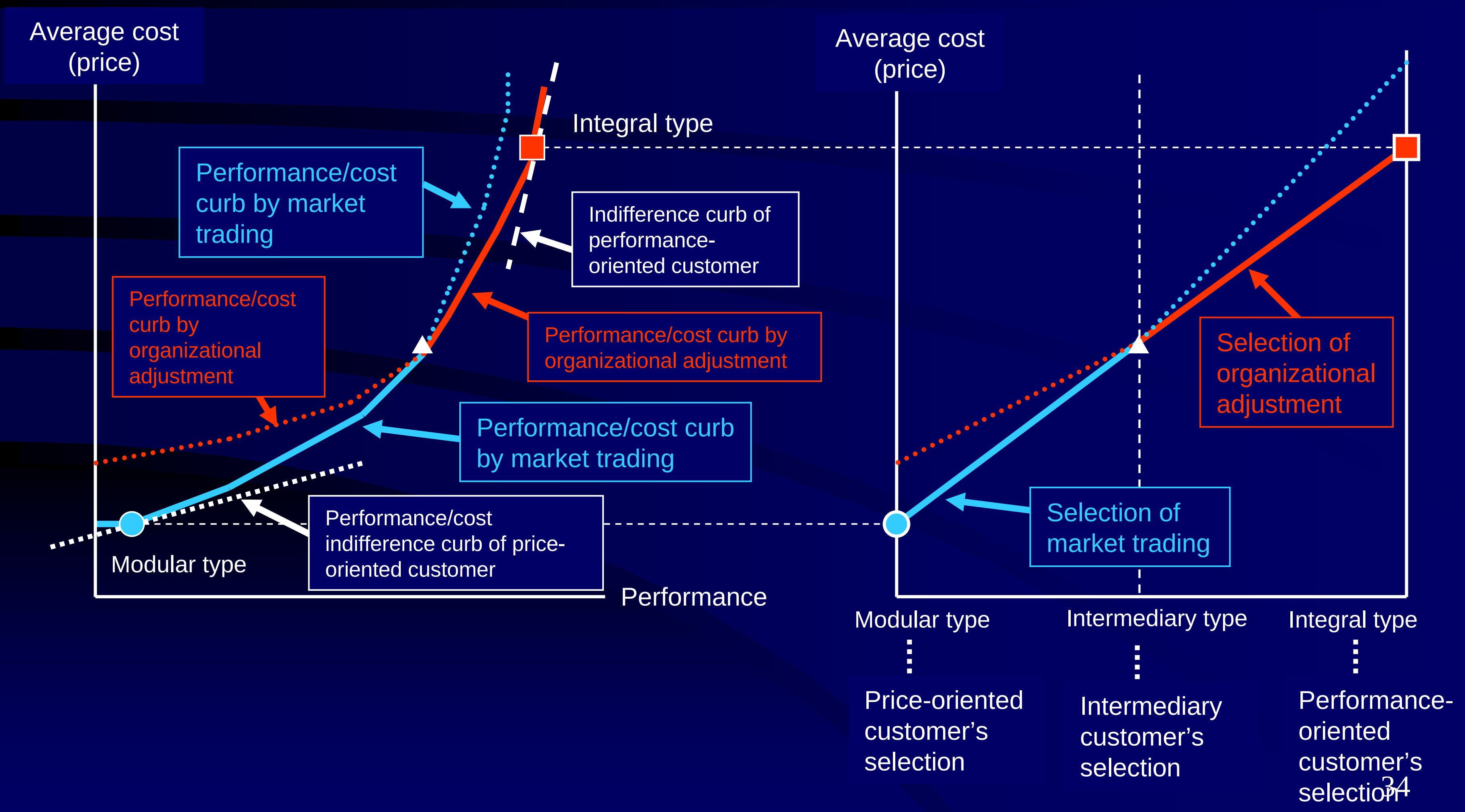
Selection of Adjustment Mechanism



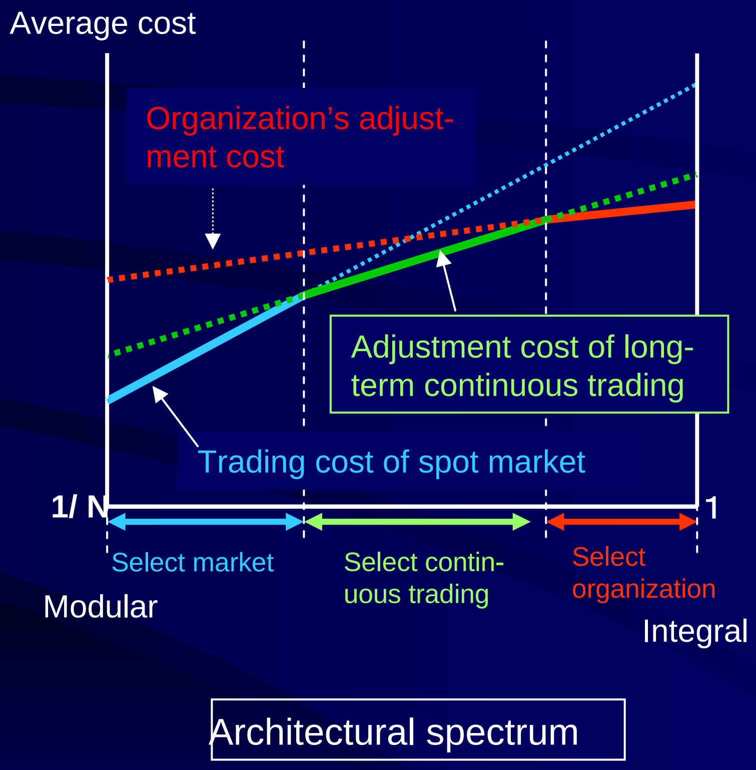
Conformity Relation Among Customer Type, Architecture, and Adjustment Mechanism



Conformity Relation Among Customer Type, Architecture, and Adjustment Mechanism



Selection of Long-term Continuous Trading



Global Focus on Knowledge/Winter Semester 2008

Globalization and Industry: Evolution of Organizational Capability and Comparative Advantage in Architecture (3)

The University of Tokyo

(December 11, 2008)

Takahiro Fujimoto

Professor of Faculty of Economics, The University of Tokyo

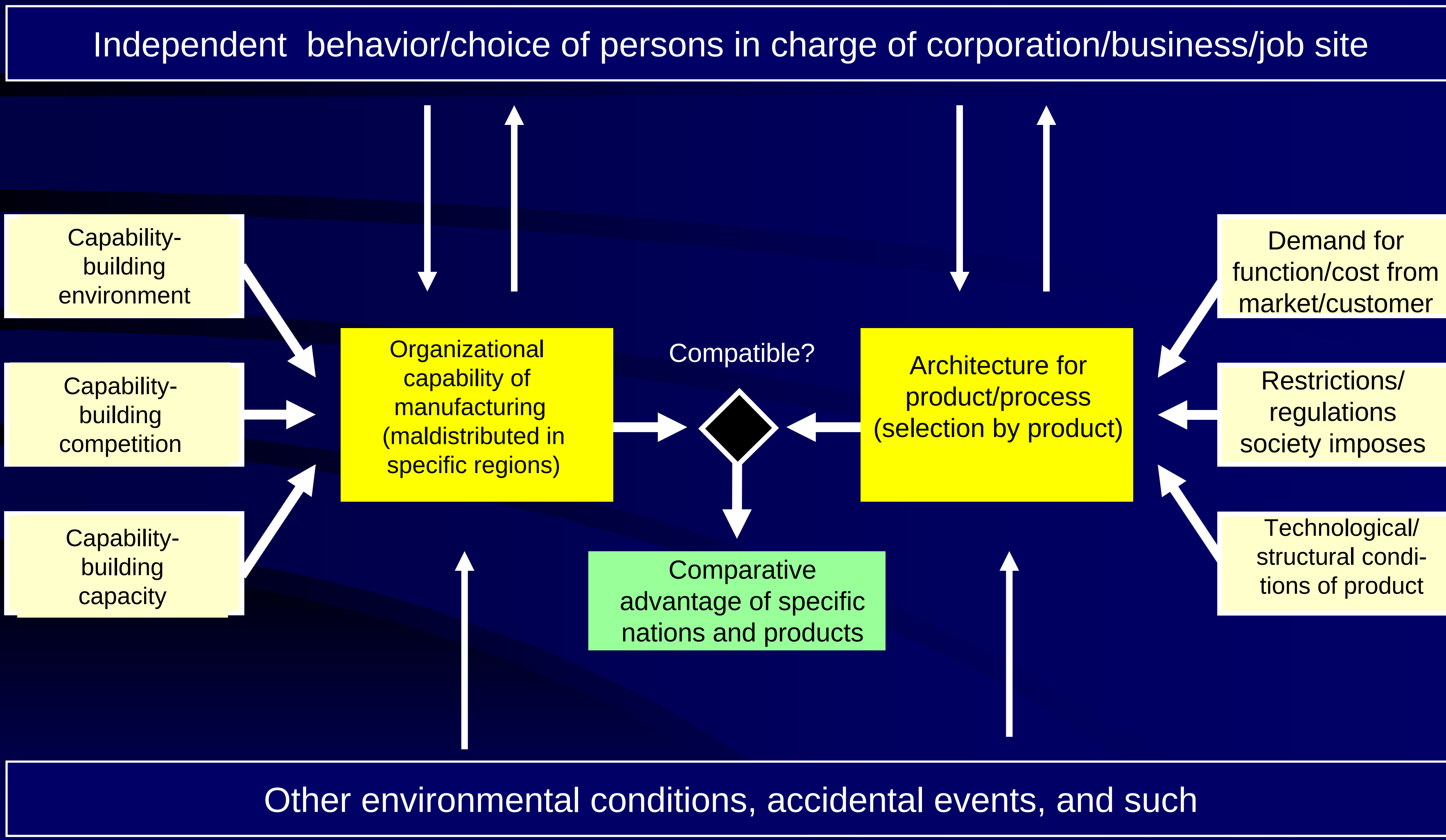
Executive Director, Manufacturing Management Research Center

Senior Research Associate, Harvard Business School

Design and Comparative Advantage of Japanese Industry

—To observe chemistry between organizational capability and architecture.

Hypothesis about Compatibility Between Organizational Capability and Architecture—Sketch of Whole Span



Strategic Theory and Industrial Theory of Architecture

There is a certain chemistry between a corporation's organizational capability of manufacturing and a product's architectural features.

If compatible, international competitiveness of the job site tends to be strong.

If incompatible, international competitiveness of the job site tends to be weak.

(1) Strategic theory･･to look at chemistry between individual corporations and their organizational capabilities → competitiveness of Japanese corporations

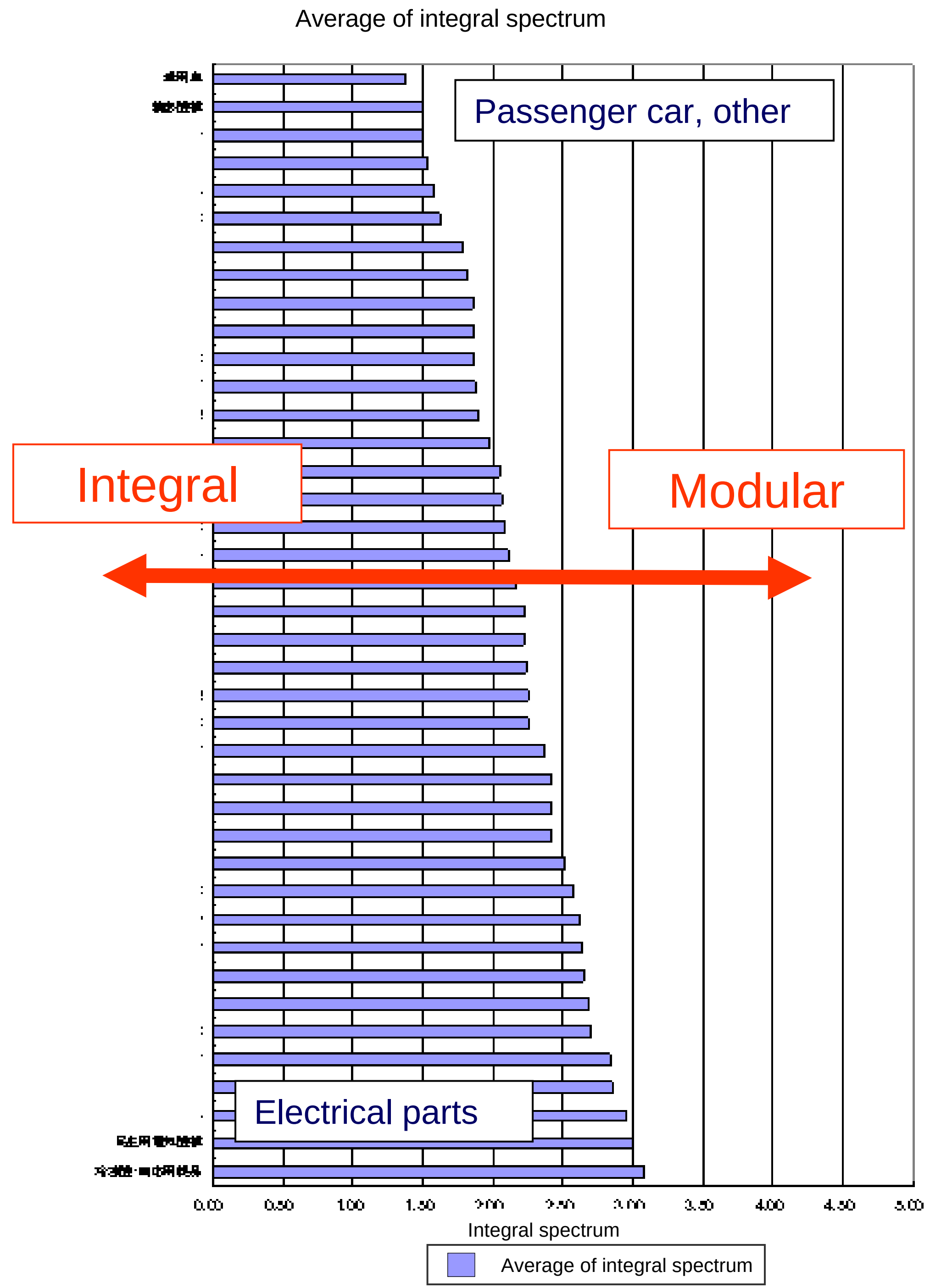
(2) Industrial theory･･to look at chemistry between a group of corporations in a certain region or industry and organizational capabilities they tend to possess → competitiveness of Japanese corporations

Hypothesis: Product Architecture Japan Was Strong in ･･･ " Lapping" and "Enclosure"

	Integral (lapping)	Modular (combination)
Closed (enclosure)	Field Japan was strong in? passenger car, motorcycle game software miniaturized home appliances other	mainframe machine tool Lego
Open (industry standard)		American (Chinese)firms are strong? PC, its software internet new financial instrument bicycle

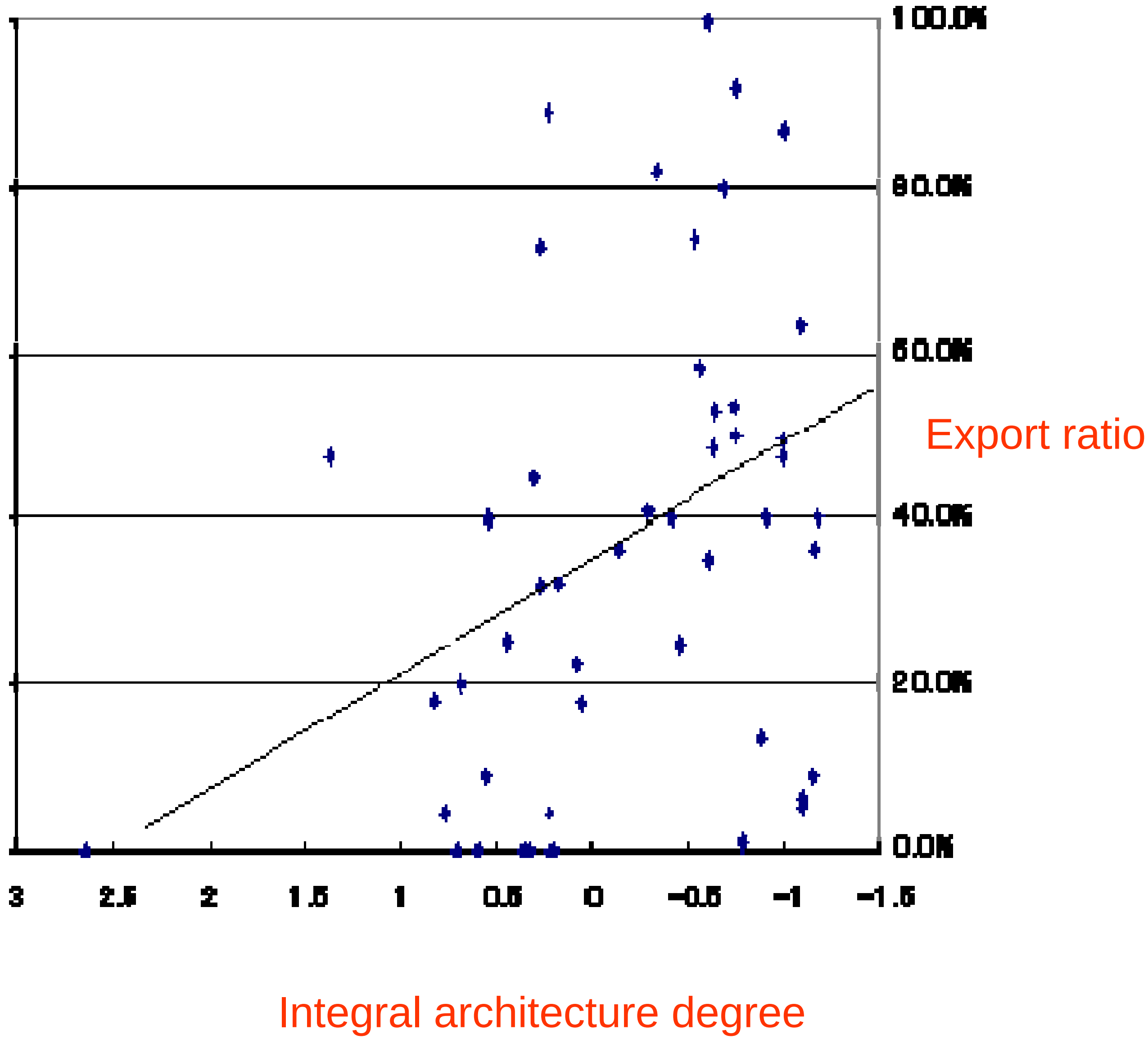
http://merc.e.u-tokyo.ac.jp/mmrc/dp/pdf/MMRC238_2008.pdf

Measurement of Product's Integral Degree and Modular Degree



Joint survey
conducted by the University of Tokyo and
Ministry of Economy, Trade and Industry

Japanese Firms are Strong in "Lapping Products."



Process Architecture of Outside Plate for Motorcar

Function / Process	Surface Appear-ance	Corrosion Resist-ence	Dent Resist-ence	Form-ability	Weld ability	Paint ability	Dimen-sional Accuracy	Rigidity
Iron Making								
Converter	○	○	○	○	○			
Secondary refining	○	○	○	○	○			
Continuous casting	○			○				
Hot Rolling	○			○				
Pickling	○							
Cold Rolling	○		○	○			○	○
Continuous Annealing	○		○	○	○	○	○	
Continuous Galvannealing	○	○	○	○	○	○	○	

Integral Architecture Index = 0.48 = 33 ÷(9X8)

Relatively integral

C Ge and Fujimoto, University of Tokyo

Process Architecture of Inner Plate for Motorcar

Function / Process	Surface Appear-ance	Corrosion Resist-ence	Dent Resist-ence	Form-ability	Weld ability	Paint ability	Dimen-sional Accuracy	Rigidity
Iron Making								
Converter		○		○	○			
Secondary refining		○		○	○			
Continuous casting				○				
Hot Rolling				○				
Pickling					○			
Cold Rolling				○	○		○	○
Continuous Annealing				○			○	

Integral Architecture Index = 0.23 = 15 ÷(8X8)

Relatively modular

C Ge and Fujimoto, University of Tokyo

Hypothesis: "Geopolitical" Distribution of Specialty Architecture

Attributable to differences in history and an initial condition, there is a tendency that exceptional organizational capability is maldistributed by country.

→ Compatible "specialty architecture" is not the same.

Japan：integrating force → lapping products (operation-emphasis)

Europe：expressive power → lapping products (design- and brand-emphasis)

USA：imaginative power → modular products (knowledge-intensive)

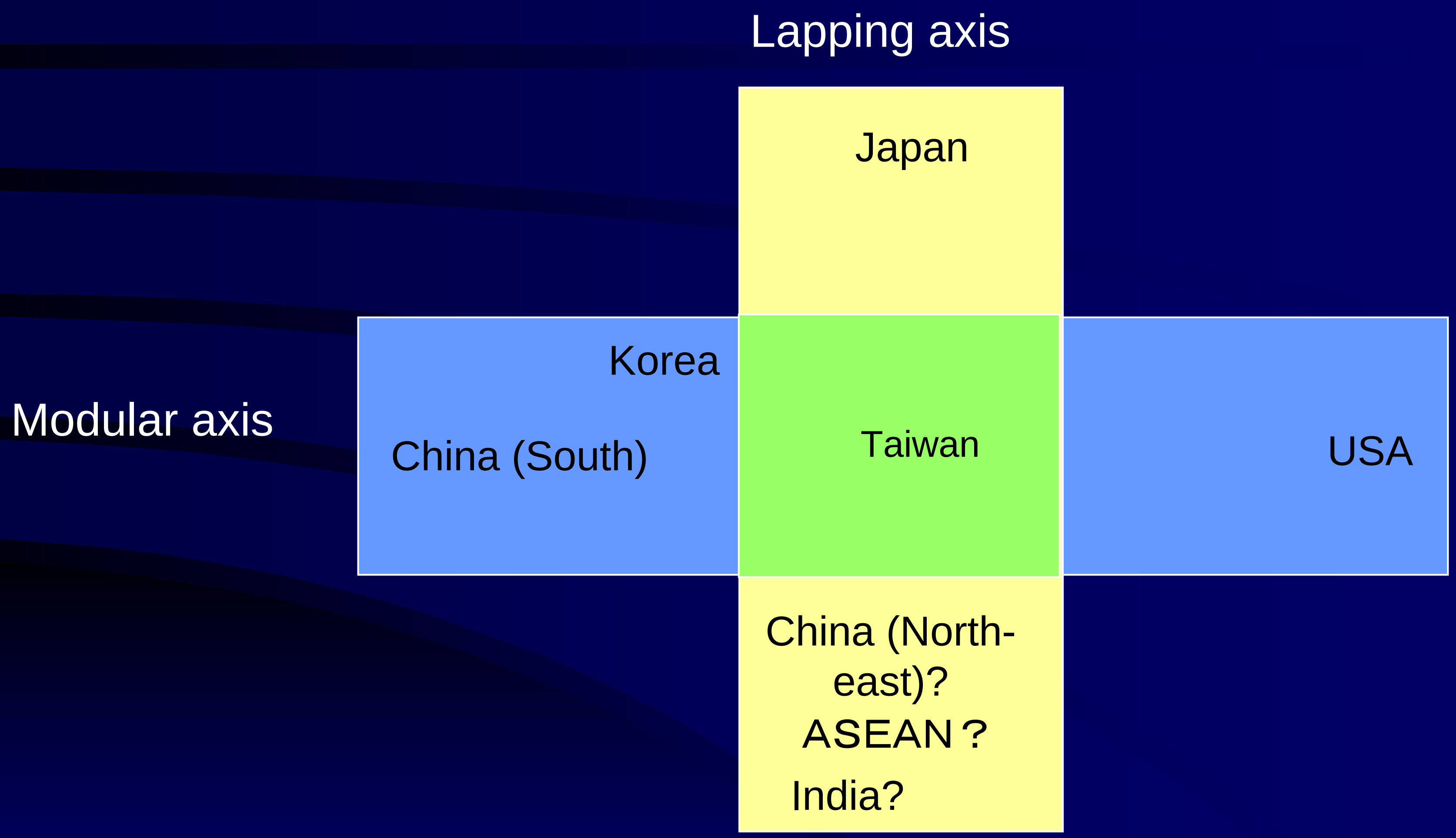
Korea：concentration power → modular products (capital-intensive)

China：mobilization power → modular products (labor-intensive)

ASEAN: fixing power？ → labor-intensive lapping products (different from China?)

Taiwan: conversion power? → flexible switching and proper use of modular and lapping

Competitive advantage in Pacific Rim: Lapping Axis and Modular Axis



Points to Notice for Theory of "Fight It Out With Lapping"

▪The key is "to build lapping into important positions." Modulation of lapping and combination.
▪▪▪ Be careful not to be "plastered with lapping," which is likely to be overly designed, excessively costly.

▪An absolute premise is "integrated-type manufacturing capability." Lapping without capability building is meaningless. Japanese semiconductor industry ▪▪▪ no "destitute youth": Was it an integrated-type manufacturing?

▪As long as technology and markets allow, engineers should do the maximum possible to "modularize" (before the fact). But Japanese corporations are strong in "lapping" products which do not allow that as the result (after the fact).

▪Architecture is determined by customers. There's no future for self-complacent lapping products.

Whether or not one can have a customer said, "Sure enough, a lapping product is distinguished," is the dividing line between a "brand" and "over design."

Is reproduction done for a "freak" (customer with peculiar tastes)? Motorcar, *manga*, audio …

▪If one fires in rapid succession "lapping products originated from deep down" to wholeheartedly make a brand from an advanced development, one does not lose easily. The key is to bring out to the maximum the potential of "integrated-type manufacturing."

How to Evaluate Chinese Manufacturing

An overreaction (“factory-of-the-world theory,” “threat theory” intoxicated by the atmosphere) ought to be avoided.

Diversity of China (regional, industrial …)

Canton River Delta and the electronics industry model (low wages, single-skilled workers) do not represent all; changes take place fast.

Don’t regard the electronic equipment industry in the same light as the automobile industry. They are considerably different!

Product architectures are different (lapping/combination).

Levels of “manufacturing capability” in production sites are, in fact, different.

Foreign capital, nongovernmental powerful firms, private enterprises in surrounding areas, state enterprises ・・・diverse

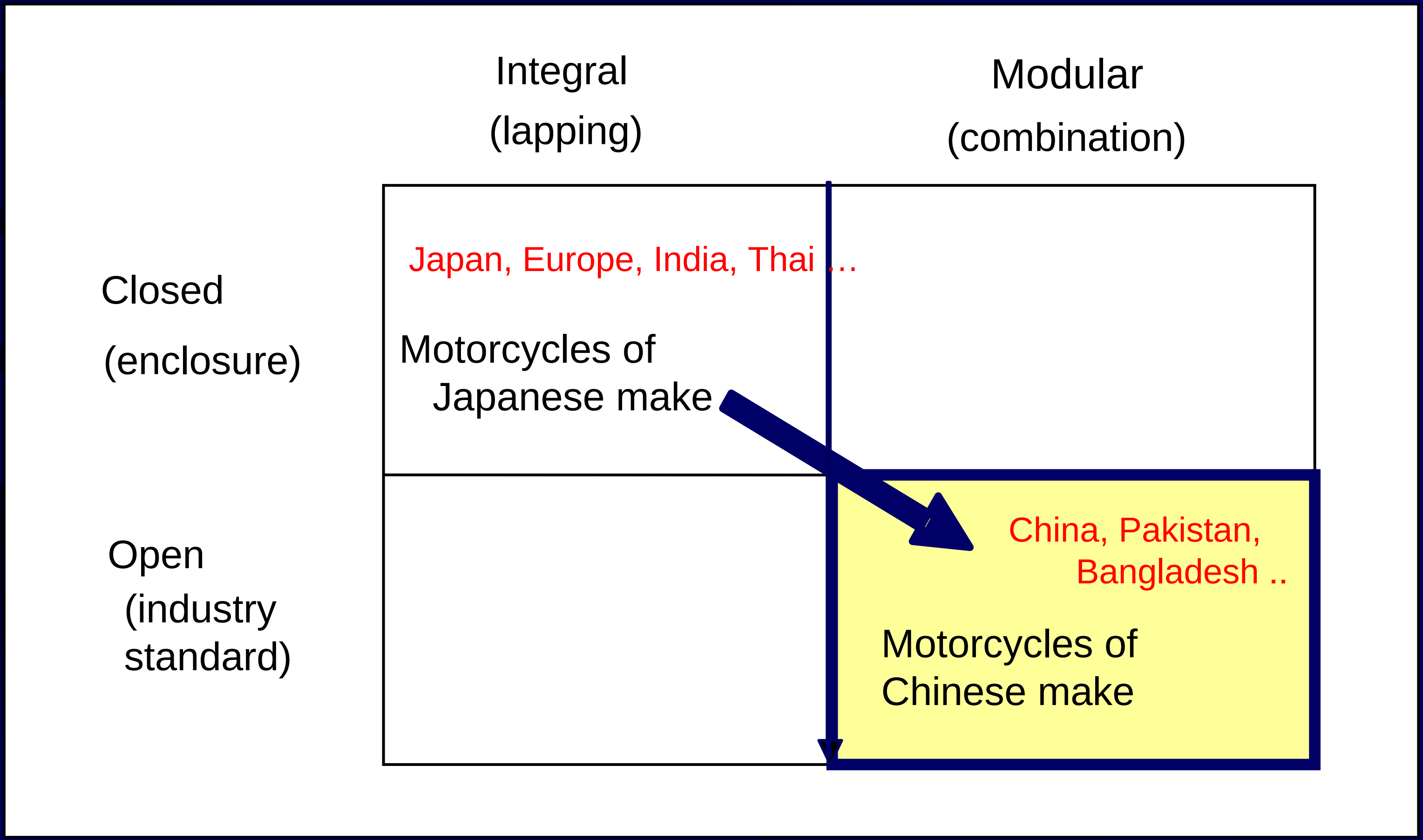
Adaptation of architecture・・ Pseudo-open type architecture

Rush of merchant-capital type ventures

Technological lock-in

Foreign capital cannot assume a ruling power with finished goods? (TV, white goods, two-wheelers, bicycles ・・） Preferably, there’s a chance in component business?

Did architecture of Chinese two-wheelers shift from closed/integral to open/modular?



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Example of Variation Expansion

From one ENG（125cc)

Variation extension of 9 models in total

From one FRM
(copies of CHA125)

Variation extension of 4 models in total

50cc

90cc

100cc

125cc

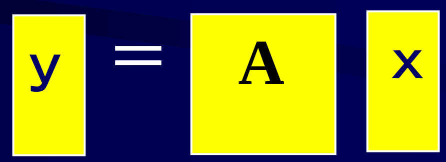
‡

Ultra-microscopic Foundation of Comparative Advantage in Architectural

— From perspective of design process theory —

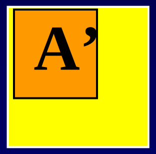
"Simultaneous Equations" of Design and Two-tiered Coordination

- Coordination ＝ defined as an "activity to converge design parameter to an optimum value"
- A design problem can be approximated by simultaneous linear equations (axiomatic system design logic)
- y ＝ A x y＝function vector, x＝ structure vector, A= function structural matrix



If A is diagonal matrix, it's a pure modular design (assuming the order of x and y to be identical).

・・・However, because of bounded rationality, let's assume that only a part of the formula (A') is made out.

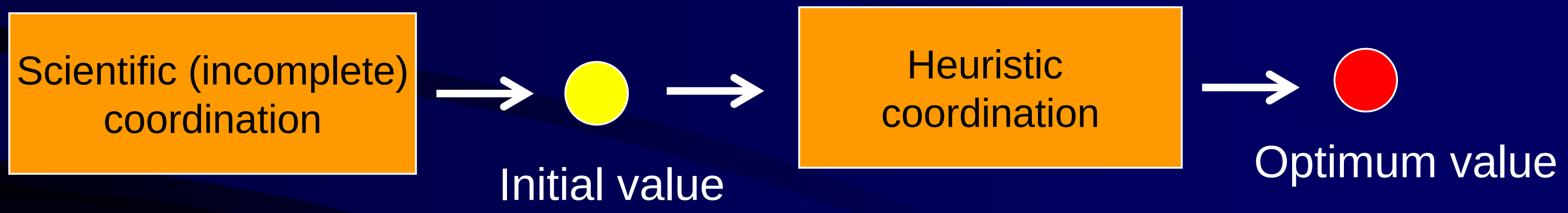


“Simultaneous Equations” of Design and Two-tiered Coordination

- Because of bounded rationality, let’s assume that only a part of the formula (A’) is made out.

▪ ▪ ▪ First, let’s solve this incomplete equation.

1st step (scientific coordination) ▪ ▪ ▪ initial value of trial and error
2nd step (heuristic coordination) ▪ ▪ ▪ to be converged to an optimum value through trial and error



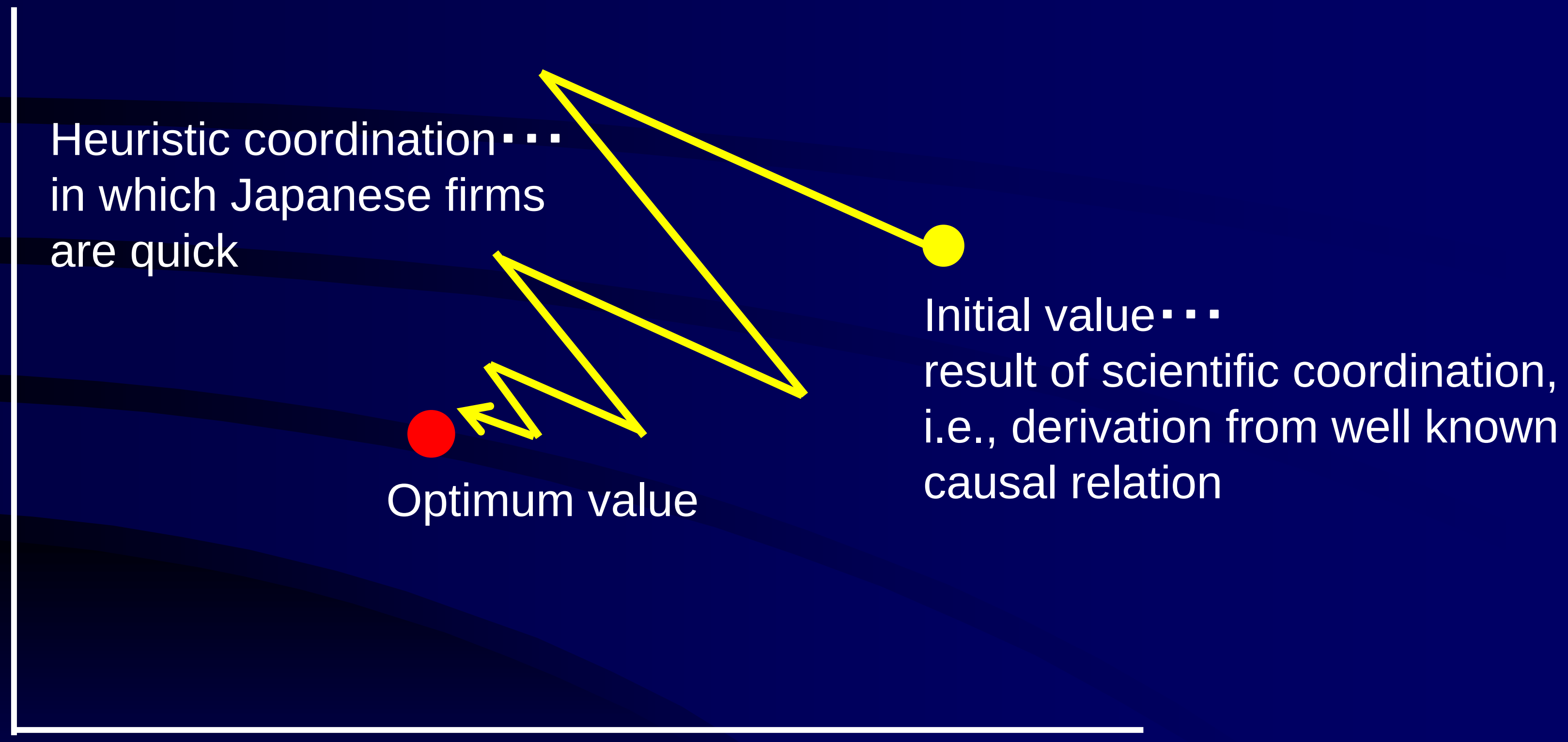
(1) Organizational capability in scientific coordination ▪ ▪ ▪ percentage of scientific knowledge obtained before the fact

→ initial value’s distance from an optimum value

(2) Organizational capability in heuristic coordination ▪ ▪ ▪ multiskilled designer’ teamwork of

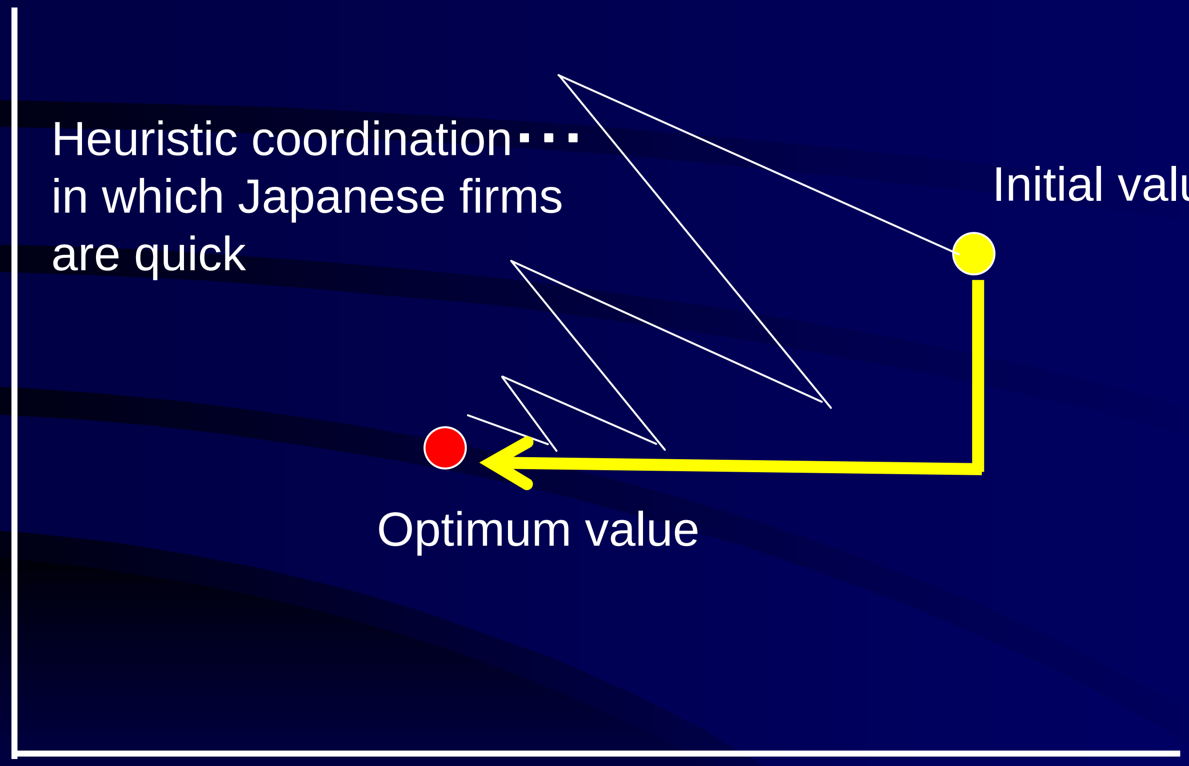
→ speed in coordination

Japanese Corporations' Predominance in "Heuristic Coordination"



American Corporations’ Predominance in Modularization

Shortcut effect due to removal of interdependency

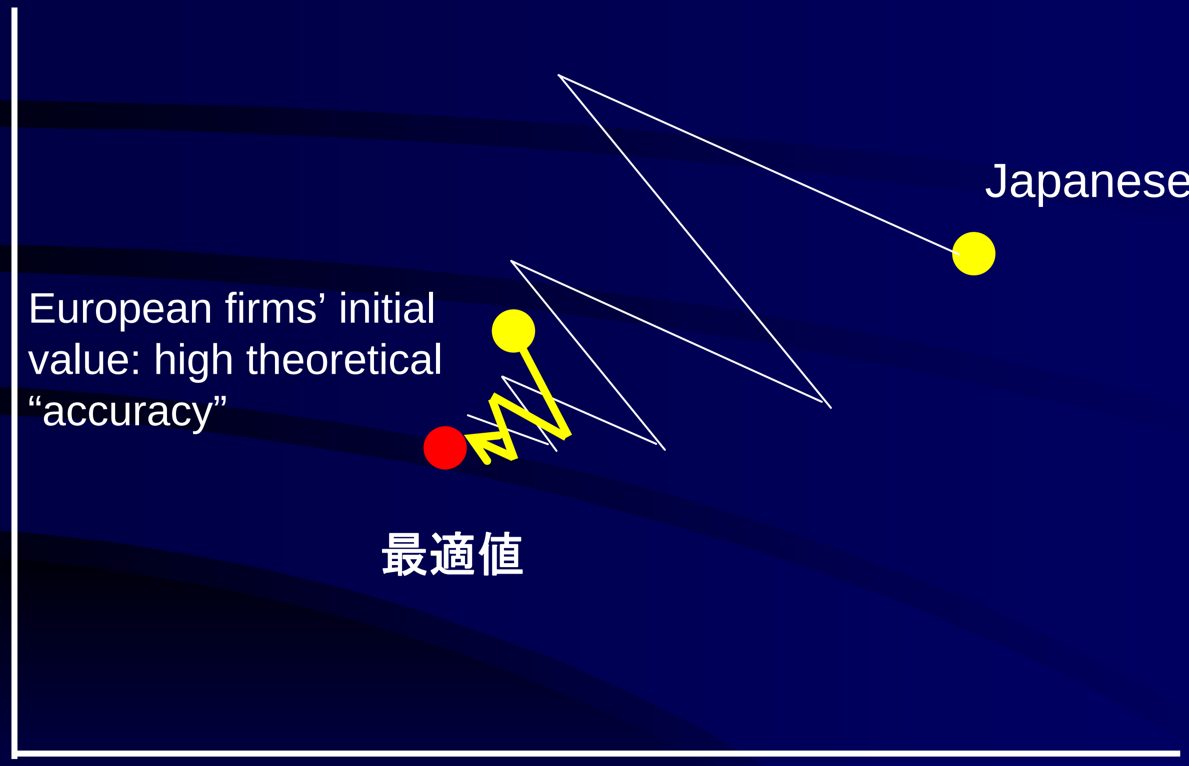


(1) Japanese firms are poor in scientific knowledge before the fact and depend on trial and error after the fact.

(2) U.S. firms take a shortcut with modularization (simplification of equation).

European Corporations' Predominance in "Scientific Coordination"

"The hare and the tortoise" phenomenon



(1) Product's "lapping degree" is extremely high (complicated simultaneous equations).
(2) Japanese firms are poor in scientific knowledge before the fact and depend on trial and error after the fact.
(3) European firms have many variables and causal formulas grasped before the fact (scientific coordination power).

Example: Simulation Analysis
(From Research by Osumi and Fujimoto)

・・・Wise Tortoise and Imprudent Hare

1. Design Process Model

Axiomatic design

From Suh(1990)

Causal relation Structural parameter Functional requisite parameter

$$A \cdot DP = FR$$

$$A = \begin{bmatrix} a_{11} & a_{12} & \Lambda & a_{1m} \\ a_{21} & a_{22} & & \\ M & & O & \\ a_{m1} & & & a_{mm} \end{bmatrix} \quad DP = \begin{bmatrix} DP_1 \\ DP_2 \\ M \\ DP_m \end{bmatrix} \quad FR = \begin{bmatrix} FR_1 \\ FR_2 \\ M \\ FR_m \end{bmatrix}$$

Axiomatic design and architecture

Modular type

A in A · DP = FR is:

$$\mathbf{A=}\begin{bmatrix} a_{11} & 0 & \Lambda & 0 \\ 0 & a_{22} & & \\ M & & O & \\ 0 & & & a_{mm} \end{bmatrix}$$

Integral type

A in A · DP = FR is:

$$\mathbf{A=}\begin{bmatrix} a_{11} & a_{12} & \Lambda & a_{1m} \\ a_{21} & a_{22} & & \\ M & & O & \\ a_{m1} & & & a_{mm} \end{bmatrix}$$

Semi-modular type

A in A · DP = FR is:

$$\mathbf{A=}\begin{bmatrix} a_{11} & 0 & \Lambda & 0 \\ a_{21} & a_{22} & & \\ M & & O & \\ a_{m1} & & & a_{mm} \end{bmatrix}$$

Configuration of Simulation

【Example of problems given to designers】 ＊Case of A being 2×2 matrix

In design space, find DP* that satisfies the following:

FR* **A** **DP**

$$\begin{bmatrix} FR_1{}^* \\ FR_2{}^* \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} DP_1 \\ DP_2 \end{bmatrix}$$

$$\begin{cases} FR_1{}^* = a_{11} \cdot DP_1 + a_{12} \cdot DP_2 & \text{(Formula 1)} \\ FR_2{}^* = a_{21} \cdot DP_1 + a_{22} \cdot DP_2 & \text{(Formula 2)} \end{cases}$$

Here, function FR* is a given optimum value provided by customer demand. A's factors are all constant.

Two-tiered Design Process Model

Influence of prior causal knowledge → Tentative placement of interim solution (1st step)

Initial value (interim solution)

$$\begin{cases} DP_1^0(\hat{a}_{11} \sim \hat{a}_{12}, FR_1, FR_2) \\ DP_2^0(\hat{a}_{21} \sim \hat{a}_{22}, FR_1, FR_2) \end{cases}$$

Influence of integrated-type organizational capability → Optimization process (2nd step)

Optimum solution

$$\begin{cases} DP_1^*(a_{11} \sim a_{12}, FR_1, FR_2) \\ DP_2^*(a_{21} \sim a_{22}, FR_1, FR_2) \end{cases}$$

Simulation parameter (exogenous variable)

＜Indices of complexity (product features)＞

●Architecture
Complexity：integral ＞ modular

●A's element count
Complexity enhances as element count goes up like 2×2，3×3，4×4 …

＜Indices of organizational capability＞

●Trial speed
Computational effort workable within one period; its size corresponds to that of organizational capability.

● Convergent method (trial and error)
on)
②Concurrent development (competition)

＜Indices of market condition＞

●Convergent condition
Threshold value of divergence from optimum value **FR*** for ending the simulation. Which shows that the smaller it is, the severer the market demand for the attainment of demanded function is.

＜Indices of prior level of scientific technology＞

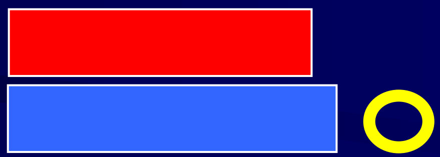
●A's incompleteness (law accuracy of initial value)
The higher scientific technological level is, the smaller the divergence between the initial value **DP**^{0} and the optimum value **DP*** becomes.

Summary of Simulation Results:
Are Japanese firms good at developing “medium-degree of lapping” products by coordination?

Modular product・・・little disparity in design costs due to limited trial and error

Firm J’s design cost

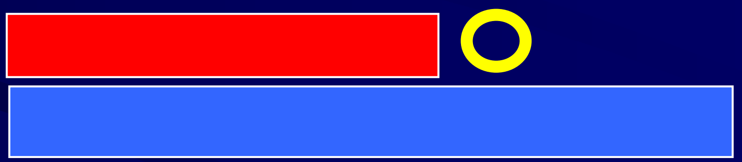
Firm A’s design cost



Medium-degree of lapping product・・・clear disparity in design costs due to much trial and error

Firm J’s design cost

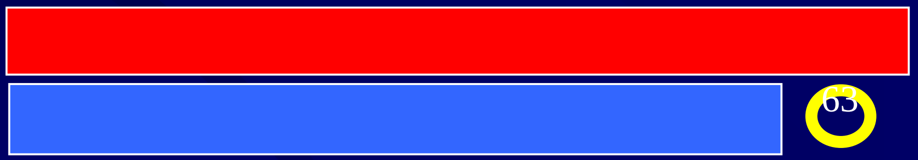
Firm A’s design cost



Excessive lapping product・・・ reversal being possible with varying degrees of scientific coordination

Firm J’s design cost

Firm A’s design cost



Summary: Theory of Comparative Advantage in Architecture

- Merger between design conception (science origin) and Ricardo-ish comparative advantage theory

- Magnitude of productivity differentials is the decisive factor in comparative advantage.

- To consider: Product cost ＝ production cost ＋ design cost

- As for production cost, the traditional discussion will do just as well.

- Regarding design cost, cost differentials in design parameter coordination should be looked at.

- Design cost ＝ cost of scientific coordination ＋ cost of heuristic coordination

- Provided that coordination speed of design parameter (job-site's trial and error) of Japanese corporations is fast･･･

  Japanese corporations' comparative advantage in design costs comes into being in "lapping type" products that are large in module count, limited in established scientific knowledge (i.e., highly dependent on job-site's trial and error).

Multinational Corporation's Selection of Design Location

Multinational Corporation and Globalization

Genealogy of the theory on multinational corporations

① Multidomestic corporation (multinational corporation):

Offshore production strongholds aimed at each country's market; to build advantage over local corporations. Why can a multinational corporation, being an outsider, get the better of local corporations being familiar with own market?: transfer of organizational capability of the mother country, and power as an oligopolistic large company. A discussion assuming each country's protectionism, barrier (individual conquest by country)

② Global corporation (transnational corporation):

Offshore production strongholds aimed at international competitive advantage; to compete also with own corporation's strongholds in other countries. Why is the stronghold in a country where a multinational corporation is located stronger than own corporation's stronghold in other countries?: transfer of organizational capability of the mother country, capability-building environment in the locale, international competitiveness in local stronghold. A discussion assuming relaxation/ annulment of each country's protectionism and barrier.

Actual corporation ・・・mix of the two ・・・①make where one sells ②make where one is advantageous

Conditions for Location Selection: From Position of Manufacturing Theory

① Location selection for sales job site・・・Market location being the basis.
To locate a sales stronghold closely contacting the market (recipients of design information)

② Location selection for production job site・・・Constraints of media being effective
Production-factor location attracted by superior process media (manpower, material..)
Local-market location because of transportation cost of product media
Location close to design job site solicited by design information
Organizational-capability location induced by organizational capability maldistributed in a country

③ Location selection for development job site・・・Little constrains of media
Market information being sticky → Market location
Technological information being sticky → Technological location
Organizational capability being maldistributed by country →
Organizational-capability location for products with good architectural chemistry

Whole Concept of Multinational Corporation under Globalized Economy

① Globalization of economy ＝ Exposure of comparative advantage/disadvantage

↓

② Multinational corporations change their stance ･･･

They not only “make in a market,” but also “make in a place where there is advantage.”

↓

③ The location selection by multinational corporations accelerates globalization (international specialization).

The location selection by multinational corporations exerts a great influence on the industrial structure; their responsibility is significant.

Mistake no. 1 ･･･ Mistake to keep a job site that cannot remain in Japan → Verdict by market

Mistake no. 2 ･･･ Mistake to transfer a job site that can remain in Japan → Evidence difficulty to be found

The head office of a multinational corporation must accurately grasp organizational capability, competitiveness, and potential ability in each country’s stronghold.

Small and Medium Enterprises Fighting within the Country: Example of Kaihara

Located in Fukuyama District (that produces *Bingo kasuri*) in Hiroshima Prefecture; the workforce of 765, established in 1893.

Devised laborsaving machinery for indigo dyeing and thread-binding machines; in the ’60s, however, the business declined as the agricultural population decreased despite the conversion from farming clothes. A recovery from the brink of failure was jeans (1970) starting with denim-yarn dyeing. By reproducing robe-dyeing technology on its own, the firm increased productivity and came to life again taking advantage of a jeans boom.

Self-manufactured cotton-carding in ‘77, cotton spinning in ‘90; implemented vertical integration and process lapping that carried quality to extremity; the tradition of machinery artifice, with an in-house design of robe-dyeing equipments; alos active in capital investment.

Levi and Edwin use Kaihara frequently with special orders for high-grade jean cloth, as well as Uniqlo, World, and department stores.

Produces the entire quantity in the vicinity of Fukuyama, two thirds of which are exported; the prices are 3 times as expensive as those made in China.

Essentially hires all workers as regular employees locally; still turns stable gains.

The key to differentiation of jeans lies in cotton-carding and washing-out work after finish. Kaihara holds a highly developed technology, but is engaged neither in washing-out or sewing. (Inter, Shimano) The firm provides jeans makers with the texture and its treatment knowhow as a package as solution.

Summary

—Toward “Good Current” Across Japan—

Summary (1): Organizational Capability

- "Open manufacturing" ・・・ to make a "good current of design information" headed to customers
- "Strategic theory originated from manufacturing workshop": let's have a perspective capable to freely pump and dump the "altitude."
- Organizational capability, hidden competitiveness, apparent competitiveness, earning power ・・・ let's measure all of them and redress their balance.
- Let's have "business-model planning power" that links organizational capability in manufacturing with earning power.
- Let's analyze job sites of development, production, purchase, and selling from the perspective of "creation and transcription of design information."
- Ratio of net working hours ＝ ratio of hours to transcribe design information; futility＝ time not to transcribe information
- Let's enhance transcription density of design information, and improve production lead time and productivity.
- Let's enhance transcription accuracy of design information, and improve quality.
- A Japanese blue chip corporation (Toyota) possesses the capability of "integrated manufacturing" based upon multiskilled teamwork.
- Let's learn from Toyota ①organization capability in manufacturing, ②improvement capability, and ③ evolution capability.

Summary (2): Architecture

- ”Product architecture” means a design conception that links a product’s functional factors and structural factors.
- Fundamental types are integral (lapping), modular (combination), open, closed.
- Get down to an altitude of 5M, come near the job site and actual article, and form a clear view of the product’s architecture without a prejudice.
- It’s likely that a product of good chemistry between organizational capability and architecture becomes a strong product (specialty).
- As a result of evolution, organizational capability in manufacturing tends to be maldistributed in certain countries, regions, and corporation.
- Japanese corporations (Toyota and others) that have “integrated type” organizational capability are strong in lapping-type architecture.
- “Geopolitics of design conception”: China and USA are good at modular, while ASEAN and India are closer to lapping.
- Pay attention to positioning strategy for architecture; “way to make profit” differs by position.
- Architecture is determined by customers in the end. “Freaks” support lapping.
- Cooperation between “techies who understand strategy” and “clerks who understand design” supports a good manufacturing corporation.

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