

Lecture No.18: Purchasing Management

1. Concept/Subject/Organization of Purchasing Management
2. Purchasing Cycle and Its Management
3. Purchasing Management and Competitiveness :
Case of Automobile

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1. Concept/Subject (Target)/Organization of Purchasing Management

Purchasing Management is

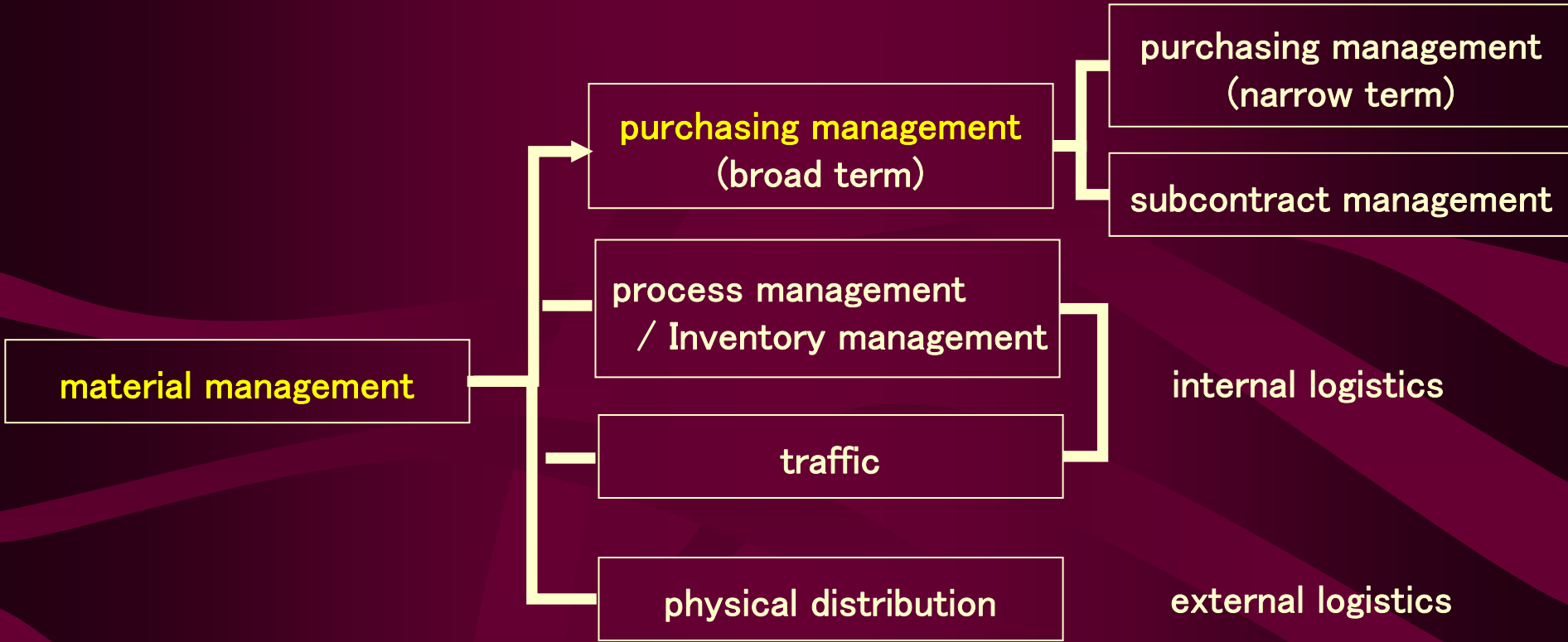
Purchase: standard-specification product (commercial product)

Subcontract: design/specs designated by owner
--- which are being included in "purchasing management"
and "material management" in broad terms

Logistics management =
purchase management + in-house physical distribution management
+ physical distribution of final product

Supply chain management (SCM) =
optimum management of total chain

Range of Material Management



Classification of Material (1)

Direct material : retained in final product

Indirect material : tool, fuel, etc.

Material: low in degree of process

Parts

- formed and fabricated material** (formed, before process)
- single part** (processed)
- composite part** (subassembly)
- functional part** (having clear function)
- module** (function self-contained, high composite level)

Classification of Material (2)

Purchased product --- standard product

Custom-design parts

approved drawing/ consigned drawing items --- detail design by supplier

loan drawing parts/process subcontract items --- detail design by auto companies

Open architecture = putting together industry standard parts being accepted

Closed architecture = variety of company-specific-design parts

Metal mold/jig tool : **no-charge provision** ⇔ **paid provision** ⇔ **self-procurement**

Material : **no-charge provision (paid processing)** ⇔ **paid provision** ⇔ **self-procurement**

Classification of Material (3)

Regular material

Allocated material (purchase in each case of necessity)

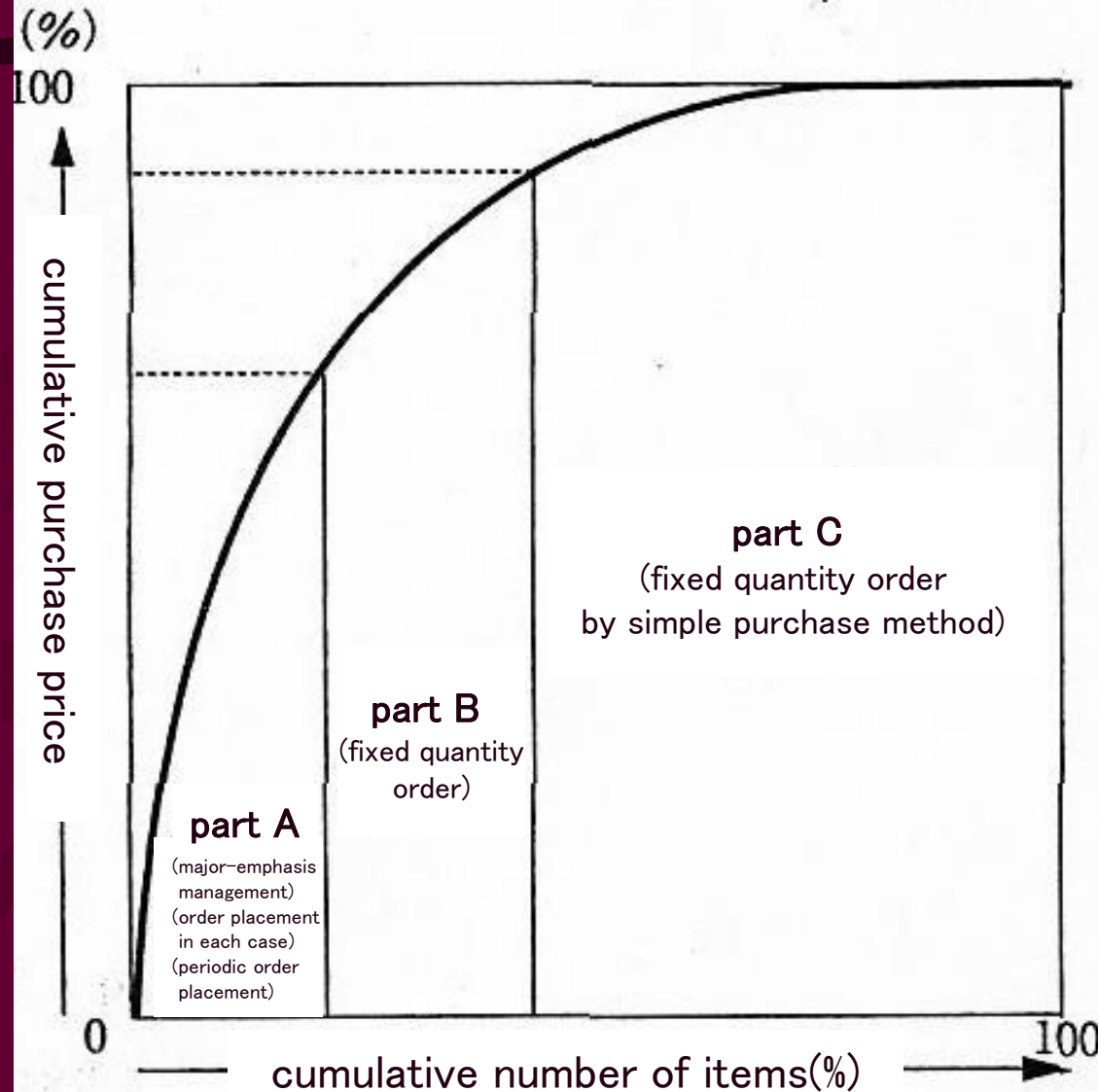
ABC Management

Part A ---- high value → major-emphasis management

Part B ---- medium

Part C ---- low value → abridged management

ABC Management in Purchasing



Note: In parenthesis are examples of typical purchase management method for each category.

Purchasing Organization

Grown to an independent division gradually (particularly in large companies)

Purchasing staff size : 1–2% of factory employees in many industries

Japanese auto companies: tendency to have compact size

Concentration/Decentralization of Purchasing Organization

Head-office level ↔ business division level

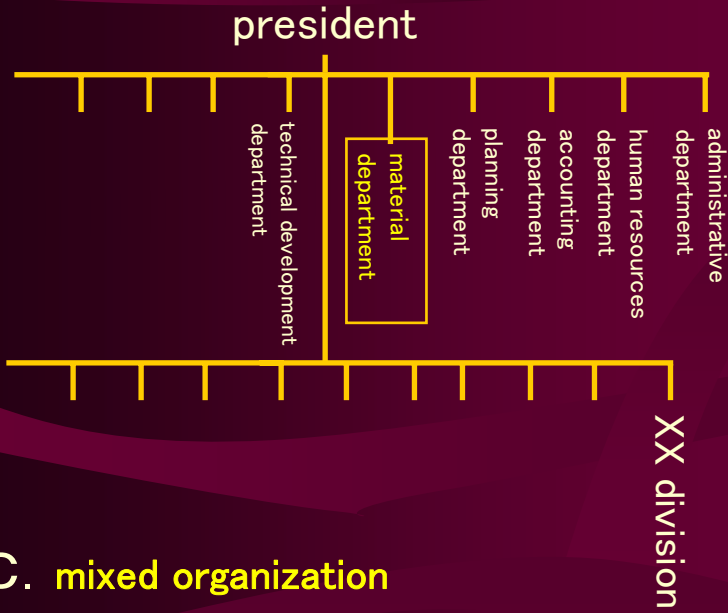
Concentrated purchasing system : scale merit, mutual flexibility

Decentralization purchasing system : flexible response, fostering manager

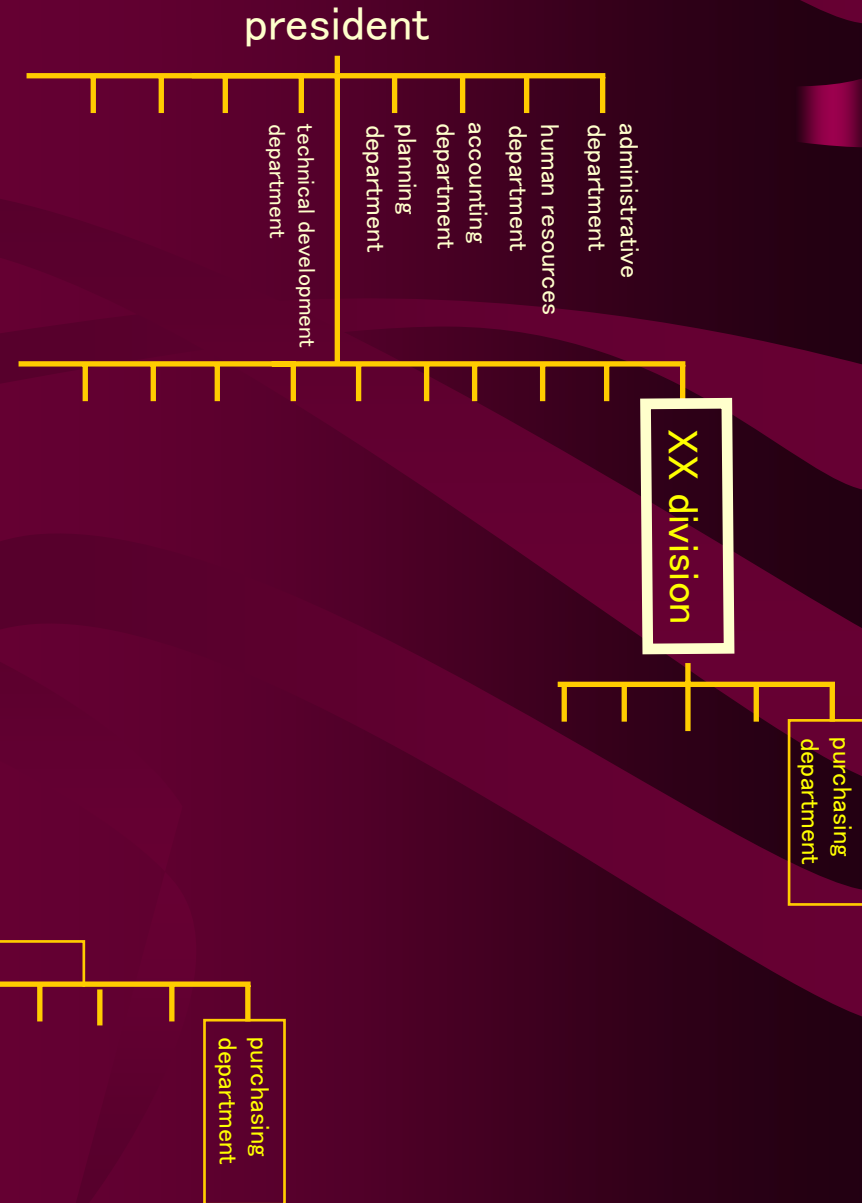
Cooperation with other divisions

Positioning of Purchasing Division in Total Company Organization

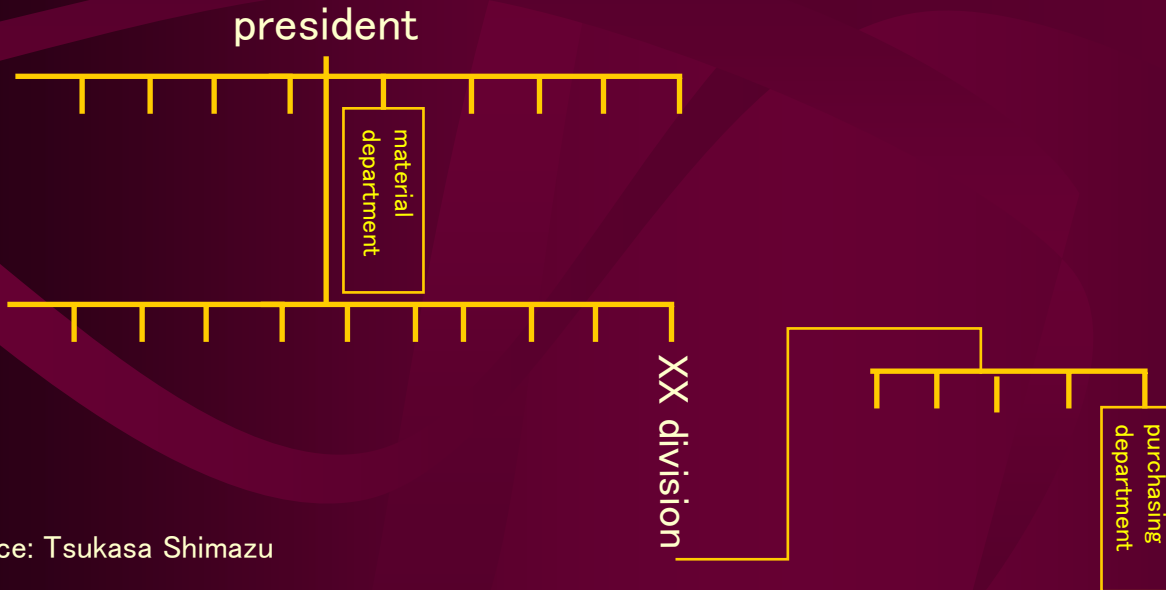
A. independent purchasing organization



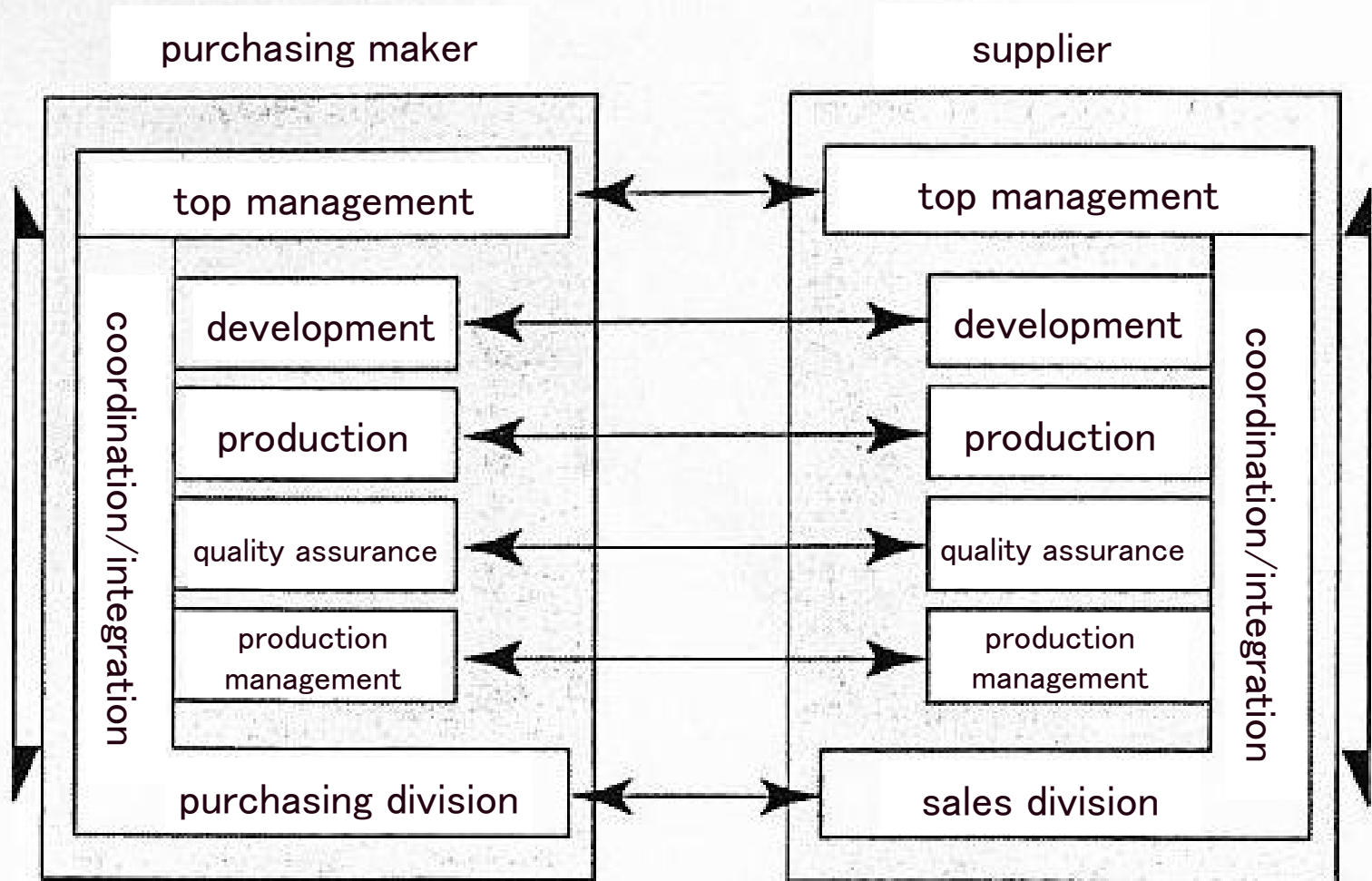
B. purchasing organization within division



C. mixed organization

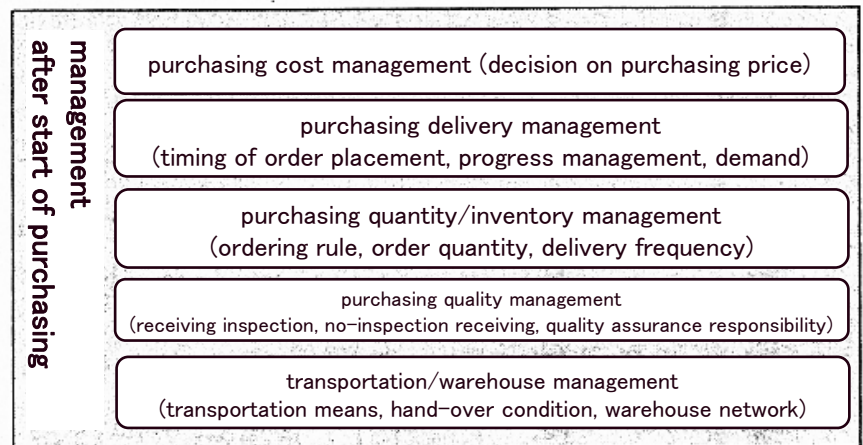
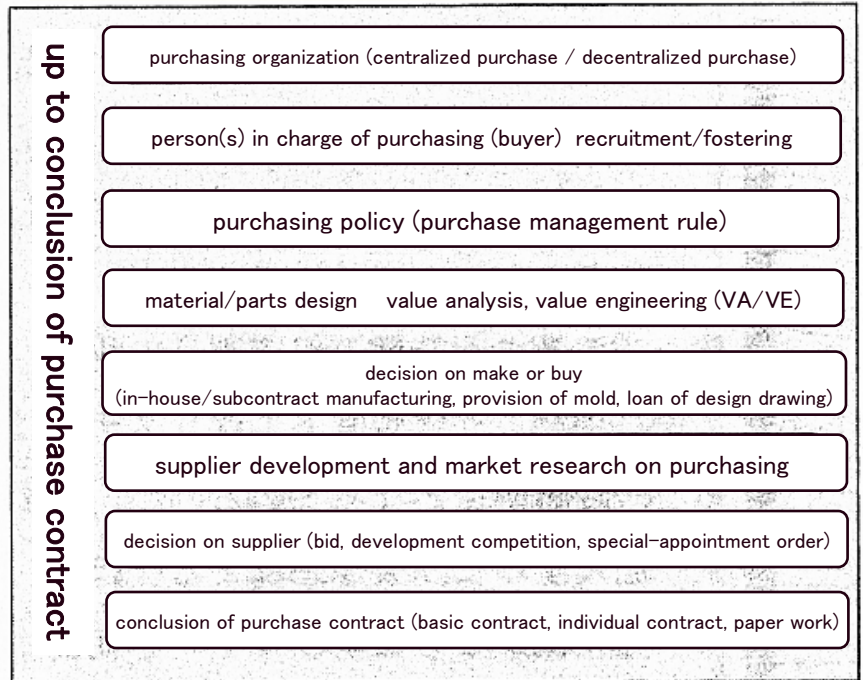


Phase Interface and Coordination Among Divisions



2. Purchasing Cycle and Its Management (volume product)

Structure of Purchasing Management



Model of Purchasing Management Policy

Article	Item	Article	Item
1	purpose	13	individual contract
2	definition	14	simplification of purchase office work
3	applicable range	15	securing of delivery time
4	purchasing category	16	provision and loan of property
5	data maintenance	17	receiving inspection
6	execution of advantageous purchase	18	disposal of defects
7	selection of quoter	19	payment
8	selection of estimate and supplier	20	training/fostorage of trading partner
9	handling of estimates	21	storage of document/ledger sheet
10	purchase approval	22	report
11	informal notice of order	23	training/assistance
12	basic contract	24	institution of business procedure regulation

Purchasing Policy

To put a through purchasing policy into a manual as purchasing management policy.

VA (Value Analysis) / VE (Value Engineering)

$$\text{value} = \text{function} \div \text{cost}$$

From function's view point, eliminate excessive facility, waste in design.

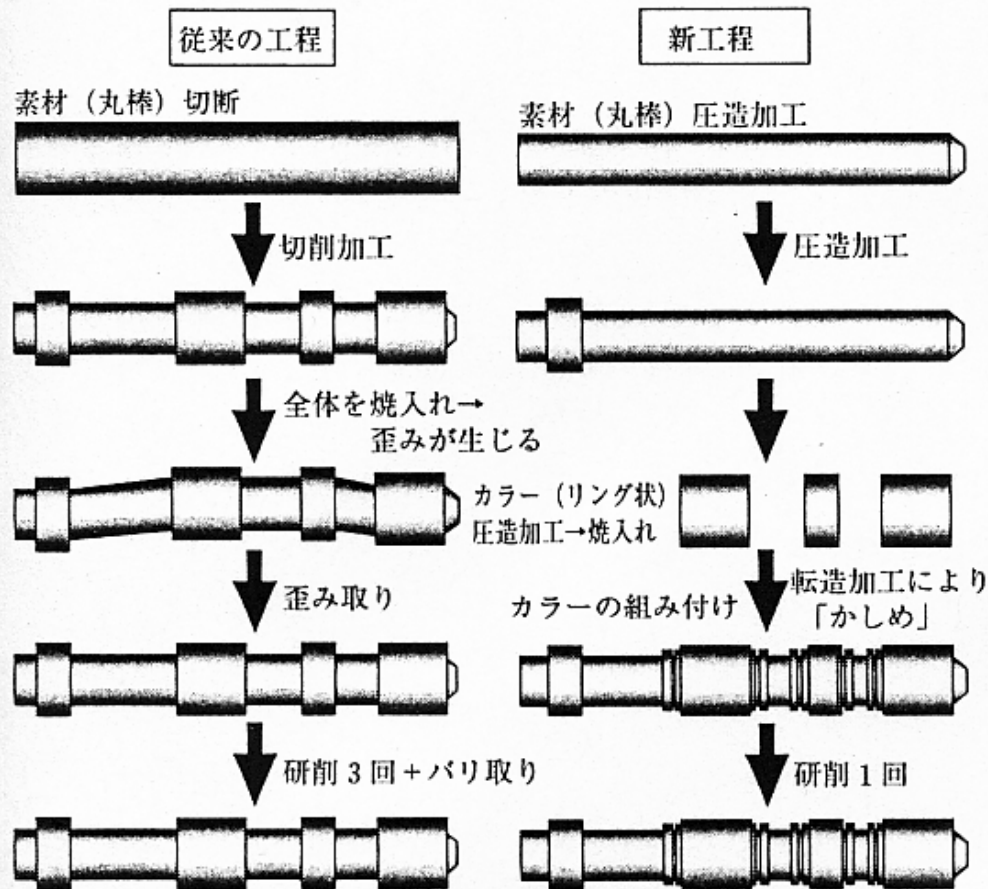
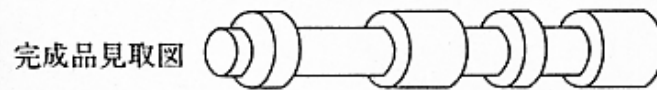
VA: volume production stage **VE**: development stage

People buy "function", not Mono (article).

Example of VE --- same in function, but largely different in cost

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Example of VA at Aoyama Seisakusho ("caulking" process method for oil switch valve)



成果：切削工程・歪み取り・バリ取りの省略、研削回数削減などにより、材料費などを大幅に低減。
(世界初。特許取得済)

出所：青山製作所

GEのVA Check list

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Decision on Self-Manufacturing or Subcontracting (make or buy)

Draw **a border line** in product/process system

Its judgment criteria?

Japanese auto companies

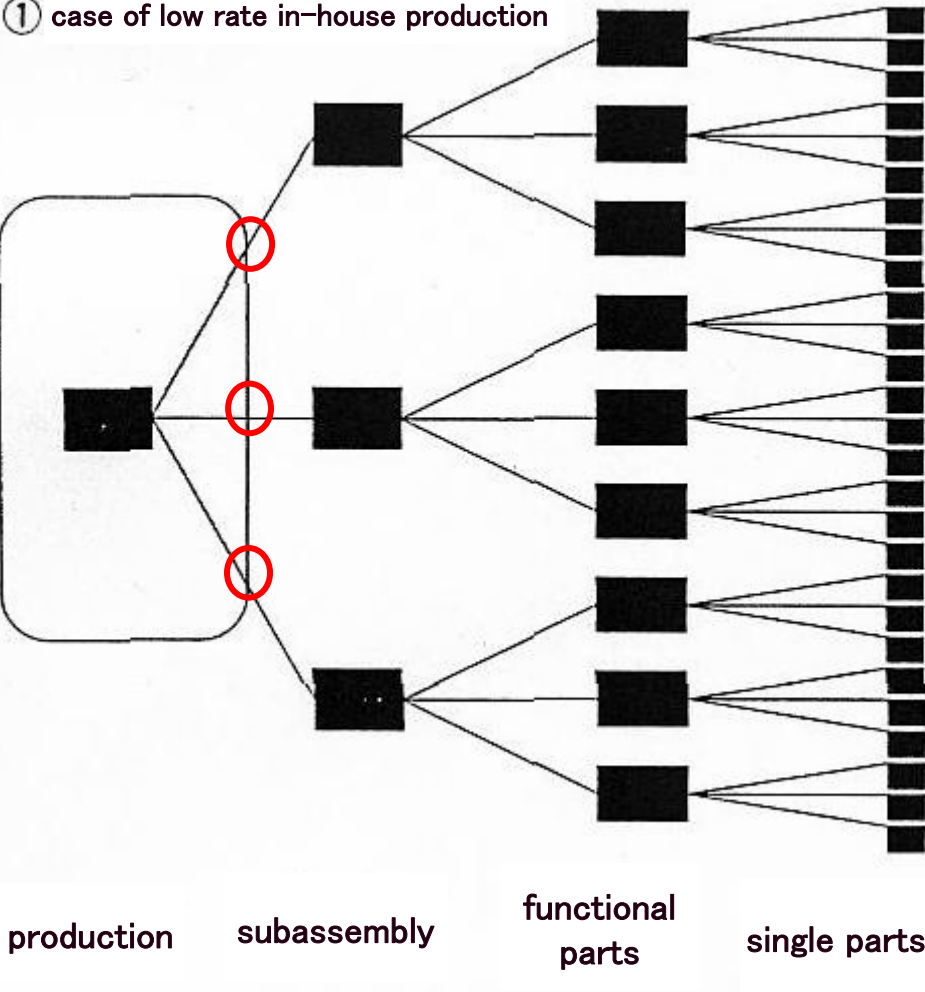
- tendency for low in-house production
delivery in subassembly
relatively few primary makers

Used as a buffer in business depressions?

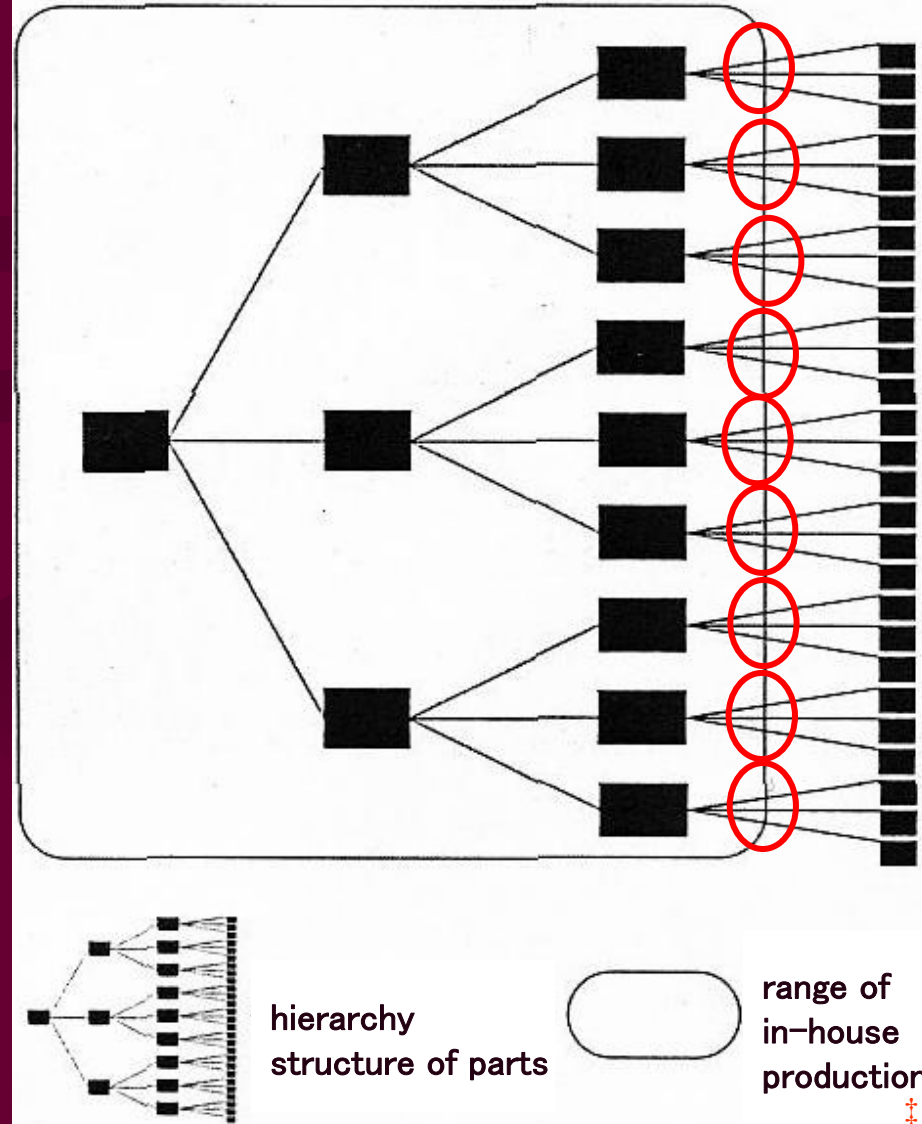
- not so much in Japanese auto makers

Rate of In-House Parts and Number of Trading Parts Suppliers

① case of low rate in-house production

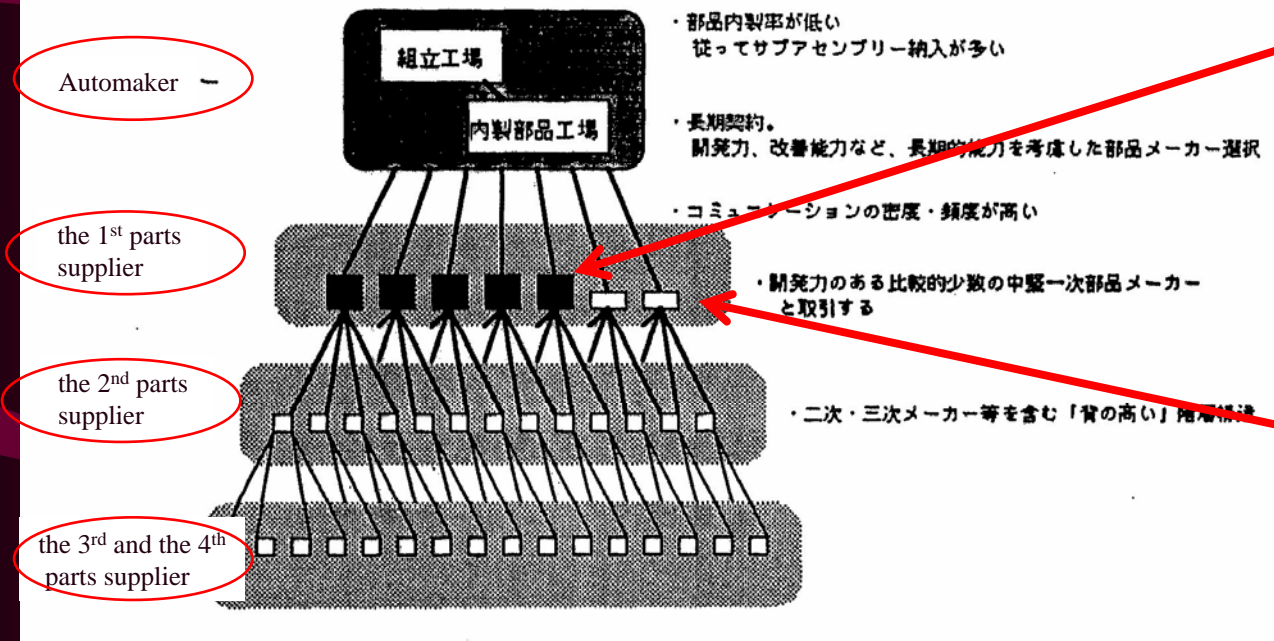


② case of high rate in-house production



Comparison of Parts Suppliers' System in Japan and America (1980s)

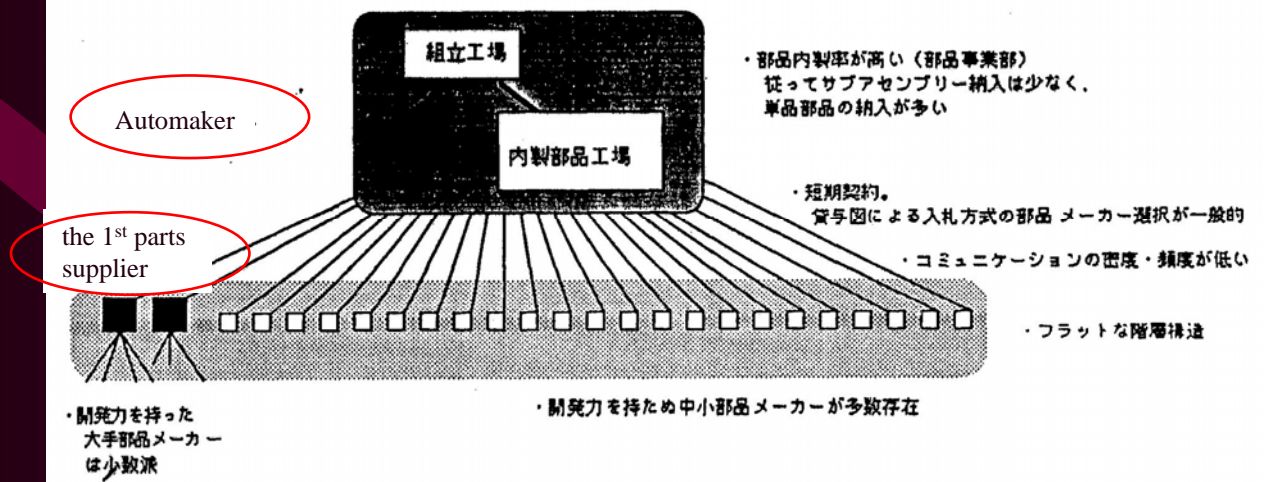
Supplier system in Japan (1980s)



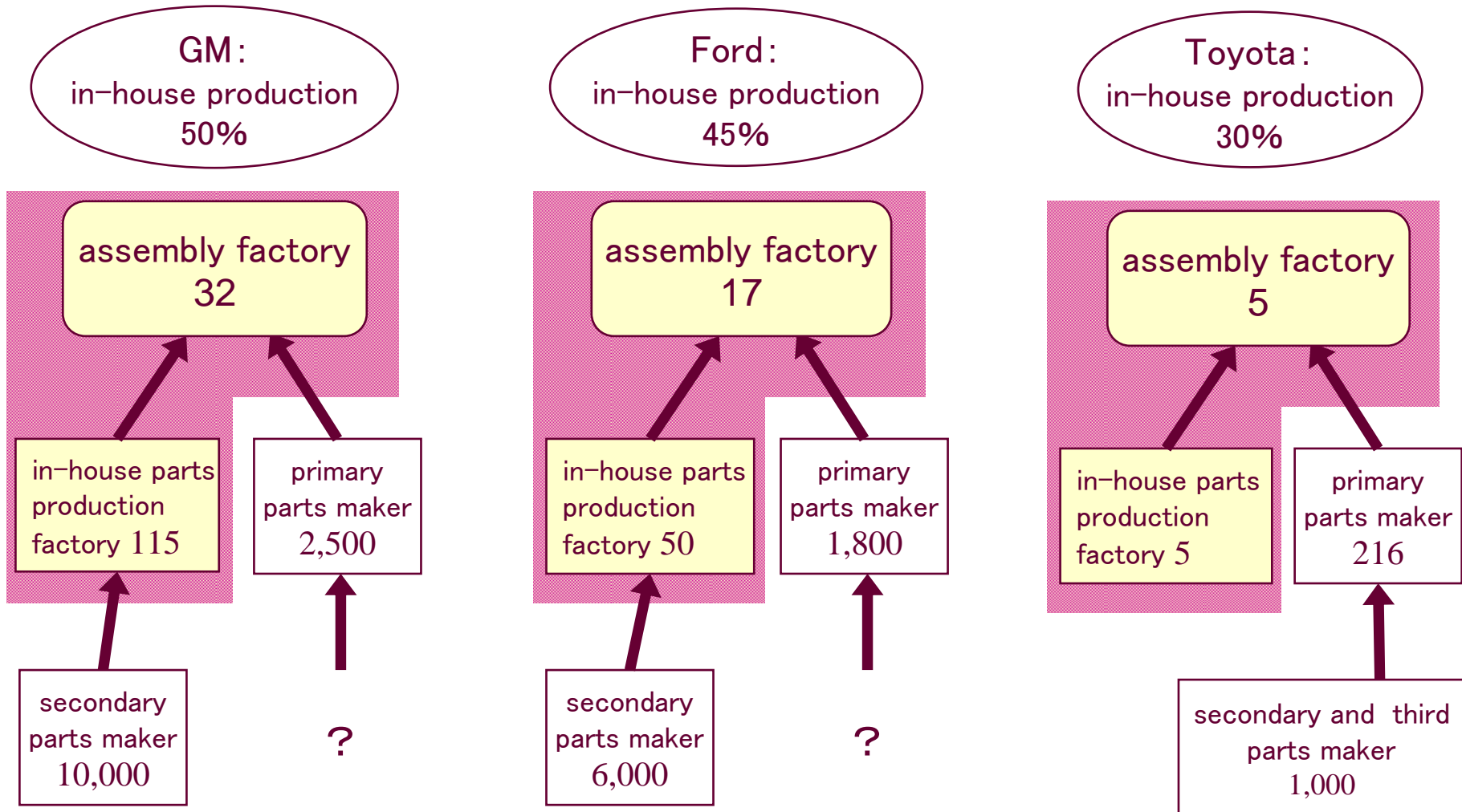
parts makers with design skills

parts makers with no design skills

Supplier system in America (1980s)



Comparison of Parts Procurement Structure in Japan and America (1980s)



Approved Drawing Method and Loan Drawing Method

Problem on separating design works into in-house or subcontracting (custom design parts)

Loan drawing : detail design by ordering party

Approved drawing : detail design by order-receiving party
(drawing owned by supplier)

Consigned drawing : detail design by order-receiving party
(drawing owned by automobile companies)

Design sub-contract

→ development efficiency, time reduction (“Leave it to a specialist.”)
parts' produce-ability (easiness of making)

Types of Automobile Parts Trade : From Viewpoint of Outsourcing Design

		work allocation on the parts			responsibility/authority		type of trade	
		parts manufacturing	detail design	basic design	ownership of drawing	quality assurance responsibility		
in-house production		C	C	C	C	C	organization	
outside production	loan drawing method	S	C	C	C	C	relational contract	
	black box method	consigned drawing method	S	S	C	C		C
		approved drawing method	S	S	C	S		S
	ready-made parts	S	S	S	S	S	market	

Note: C signifies auto maker, and S parts maker. Reference was made to Banri Asanuma "Company Organization in Japan" Toyokeizai Shinposha regarding to "type of trade". For simplification, work allocation relative to development works, etc., on metal molds/jig tools were omitted.



Allocation of Development Work in Finished Car Maker and Parts Maker

1. Ready-made parts
(supplier proprietary parts)

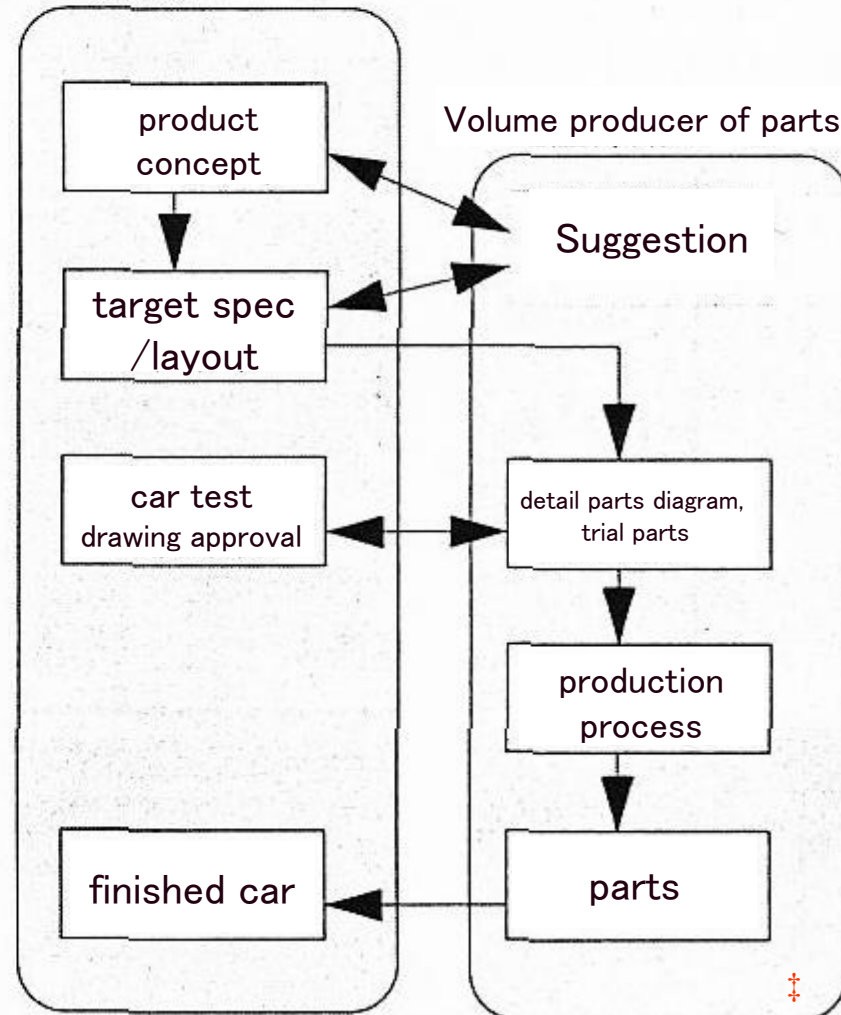
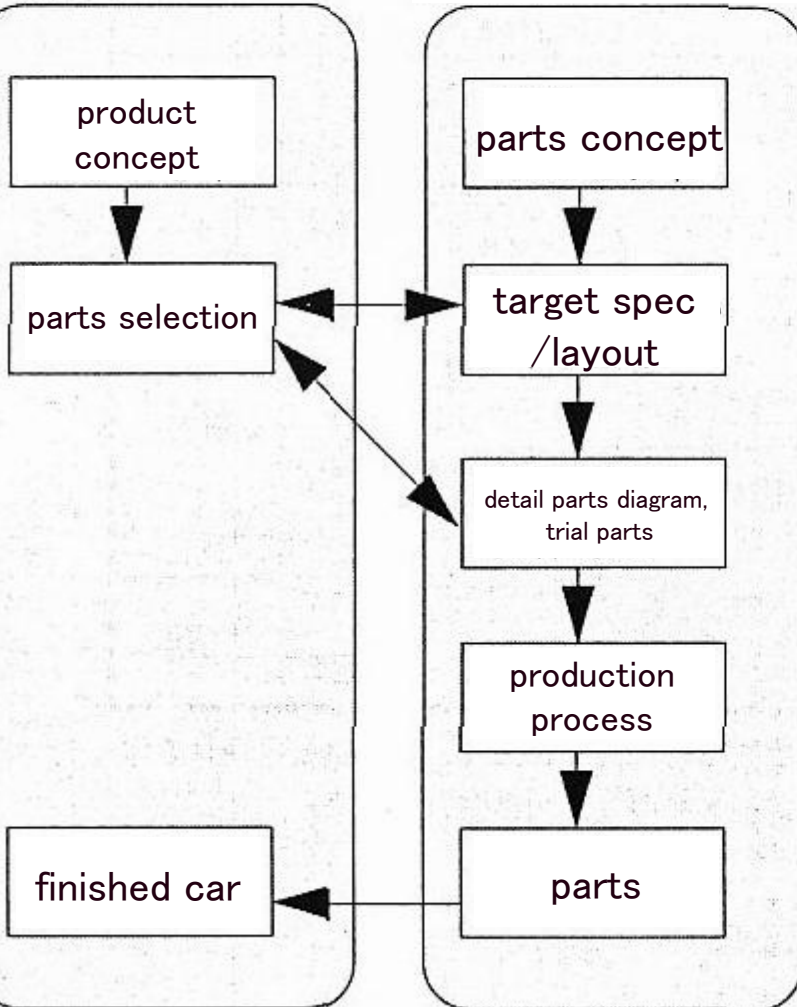
2. Approved drawing method/consigned drawing method
(black box parts)

Finished car maker

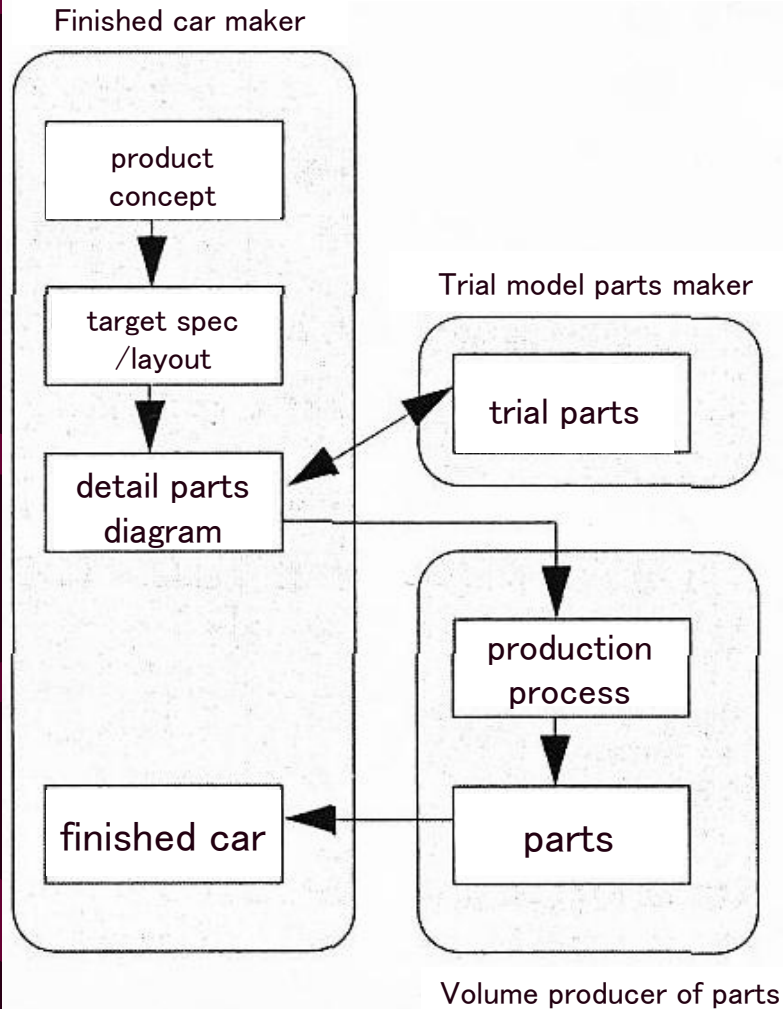
Volume producer of parts

Finished car maker

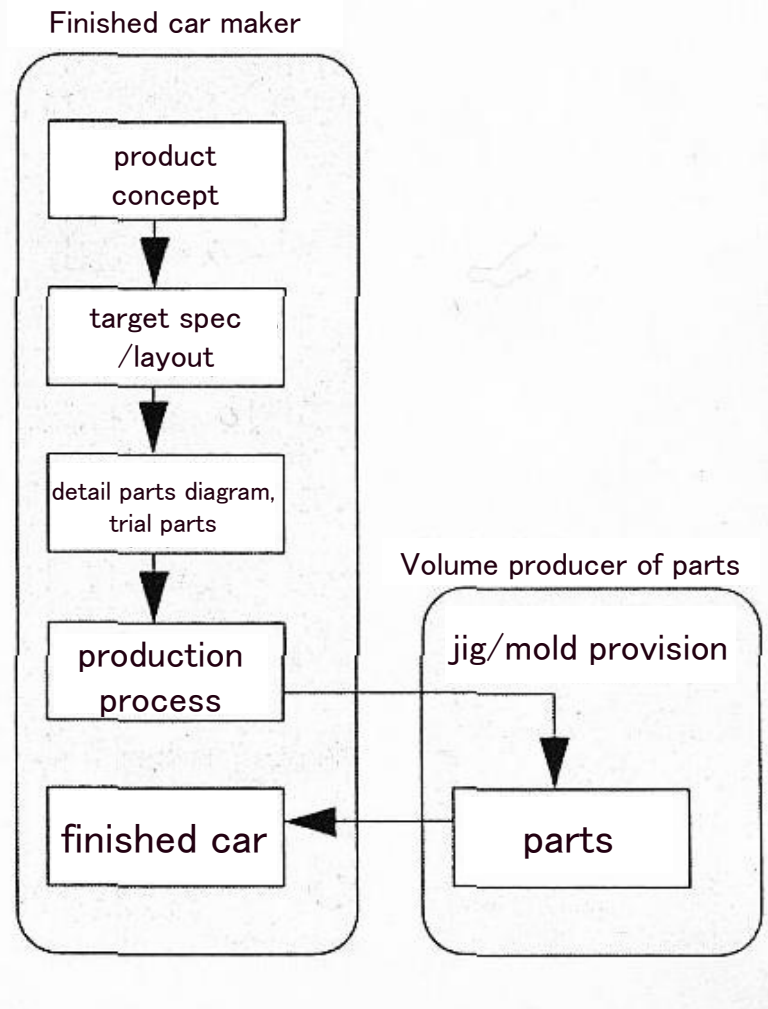
Volume producer of parts



3. Loan drawing method (functional parts model)
(detail-controlled parts)



4. Loan drawing method (body parts model)
(detail-controlled parts)

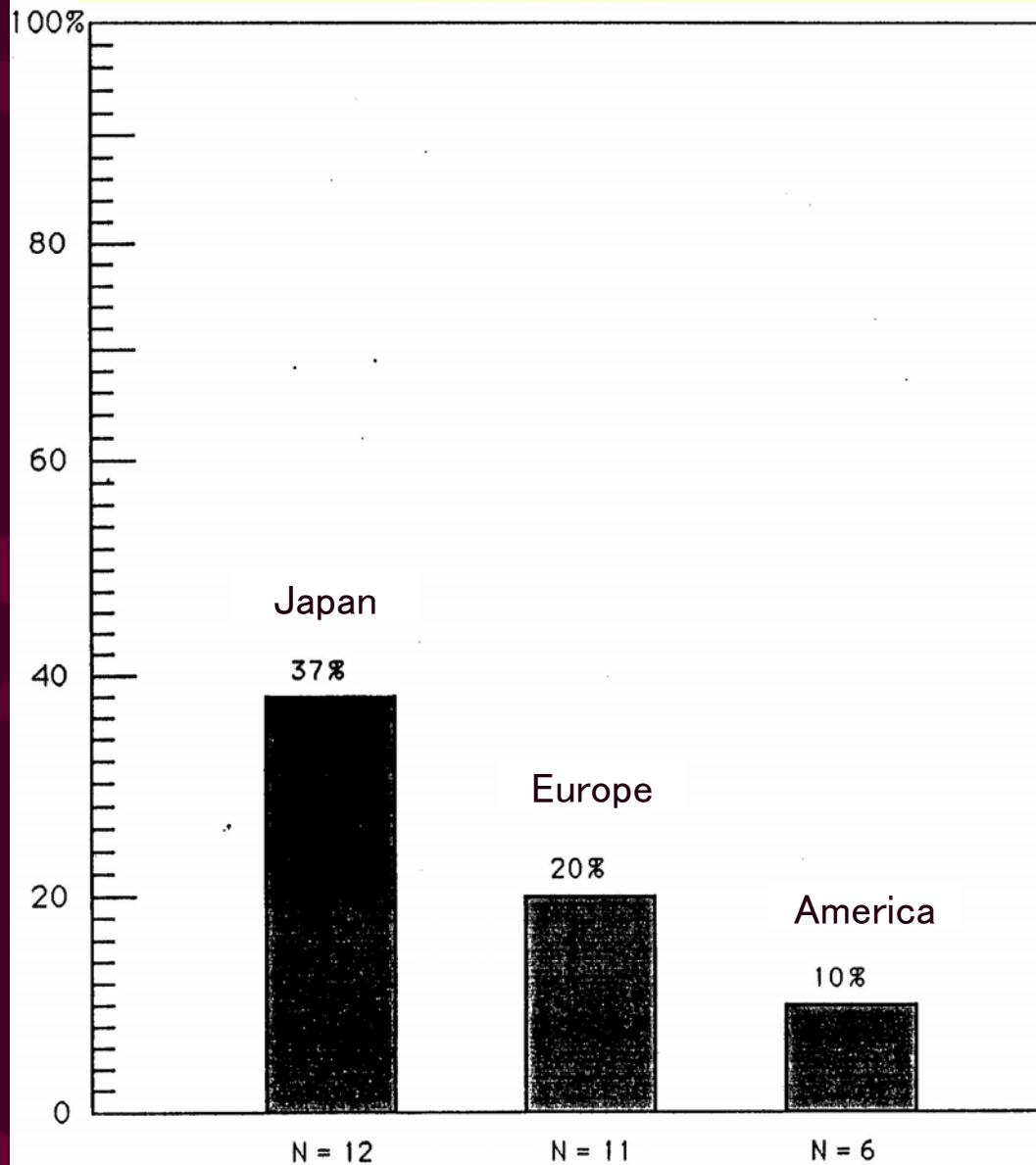


Legends : main information stock

—▶ main information flow



Involvement in Development of Parts Maker



Estimated share of parts by parts' makers against total parts development man-hours.

Reference: Clark, Fujimoto "Product Development Performance." 1991

Comparison of Parts Supply Companies by Area 資料: ウォマック他「リーン生産方式が世界の自動車生産をこう変える」

Average of each region	Japanese enterprise in Japan	Japanese enterprise in the US	The US enterprise in the US	Each country enterprise in Europe
Results. ①:				
Metal mold change time (one minute)	7.9	21.4	114.3	123.7
Window time of new metal mold (week)	11.1	19.3	34.5	40.0
number of business gradings	2.9	3.4	9.5	5.1
Number of machines a worker.	7.4	4.1	2.5	2.7
Stock level (Sunday).	1.5	4.0	8.1	16.3
Delivered frequency during a day.	7.9	1.6	1.6	0.7
The number of faulty components (one-finished car). ②	0.24	—	0.33	0.62
Participation in design phase③:				
Design rate (% that occupies it at all design time) by part company.	51	—	14	35
Parts by which part company has patent (%).	8	—	3	7
Parts made Black Box (%).	62	—	16	39
Parts that automaker designed (%).	30	—	81	54
Relation to manufacturer④ :				
Number of companies of parts for each assembly hall.	170	238	509	442
Stock level (eight sample parts on day).	0.2	1.6	2.9	2.0
Proportions of parts delivered by just-in-time (%).	45.0	35.4	14.8	7.9
Ratio of parts delivered alone (%).	12.1	98.0	69.3	32.9

注と出典: ①日本(18社)、米国(米国企業10社、日本企業8社)、欧州(18社)、計54社の調査結果。T. Nishiguchi, Strategic Dualism: An Alternative in Industrial Societies, Ph.D. Thesis, Nuffield College, Oxford, 1989, Ch. 7, pp. 313-347 から引用。 ②1988年版J.D.Power Initial Quality Surveyから算出。 ③29車種の開発段階を調査したクラークと藤本の下記研究による。K.B. Clark, T. Fujimoto, & W.B. Chew, “Product Development in the World Auto Industry,”

Brookings Paper on Economic Activity, No. 3, 1987, p. 741; T. Fujimoto, Organizations for Effective Product Development: The Case of the Global Motor Industry, Ph.D. Thesis, Harvard University, 1989, Table 7.1.

④出典は、

IMVP World Assembly Plant Survey, 1990.

Purchasing Market Research

Research on candidates of suppliers

overall industry, by product, by supplier

To what extent does suppliers' side present information?

Mutual trust promotes information sharing.

new products exhibition, global design competition,

benchmarking (reverse engineering),

individual business meeting, purchasing market research

Selection of Supplier (competition among suppliers)

Purchase at stores (ready-made product)

Bidding

Unconstraint contract :

selection by judgment of person in charge of purchasing
(e.g., **development competition**)

Design Outsourcing System and Competition Pattern

(1) Case of model change (N=201)

Design outsourcing system / Competition pattern	Loan drawing method	Approved drawing method	Ready-made product
Bid	45%	9%	8%
Development competition	5%	49%	33%
Nominated contract for one company	48%	48%	42%
Other	10%	5%	25%
Total	* (100%)	* (100%)	* (100%)

* : Total does not accord with 100% due to multiple answers.

(2) Case of new model (N=201)

Design outsourcing system / Competition pattern	Loan drawing method	Approved drawing method	Ready-made product
Bid	53%	11%	0%
Development competition	7%	64%	50%
Nominated contract for one company	38%	31%	33%
Other	10%	6%	25%
Total	* (100%)	* (100%)	* (100%)

* : Total does not accord with 100% due to multiple answers.

Multiple-Sourcing or Single-Sourcing? (case of automobile)

Design of individual part --- **single sourcing** being majority
as many orders include design

Part category ----- **multi sourcing** being majority
to secure potential competitive pressure

Procurement Status of Electronic Control Fuel Injector by Auto Maker

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Parts Supplier Dispersivity of Japanese Auto Makers

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Criteria on Supplier Selection

Long term/ multidimensional evaluation?

Bargaining based on negotiation power?

--- Knowledge on ordering side,
capability on joint problem solving being questioned

Purchasing Contract

In Japan, many are in two steps.

Basic contract ---- base for continuous business

Individual contract --- individual order
(two specify product code, quantity, delivery)

Purchasing procedure (document)

purchase request → request for estimate → estimate → order sheet
→ confirmation of receiving order (contract established)
→ delivery note, etc.(delivery) → check sheet, etc. (receiving inspection)
→ bill

Computerizing commercial trade information --- **EDI** (electronic data exchange)

Closed type EDI (own format)

Open type EDI (standardization of transmission rule in industry)

CALS (between companies including design information)

Constitution of Basic Business Contract Agreement (Home Electric Appliances)

Section	Article
1. Basic principle	
2. Contract	basic contract and individual contract, content of individual contract, conclusion of individual contract, change of individual contract
3. Order	order, unit
4. Provision / Loan	provision of raw material, etc., receiving/other of provisioned material, owner ship of provisioned material, disposal of remains of provisioned material/other, loan of machine/mold/other, handling of provisioned material and loan article, decrease/loss/mutilation/other of provisioned /loan material/article
5. Time of delivery	delivery date, change in delivery date
6. Delivery	delivery/inspection/hand-over, delivery of shortage or substitute, take back of failures or over-delivery, discounting operation, ownership transfer of subject article
7. Payment	due date, method of payment, setoff
8. General information	management of drawing, etc., risk bearing, defect liability, industrial property right, prohibition on making/sale, confidentiality, repeat order, disposition of rights/obligations
9. Announcement / notice	announcement on business suspension, reporting requirements
10. Annulment of contract	contract termination, measures after termination of contract, claim for damage, remaining duties
11. Solution with discussion	solution through discussion
12. Effective period	effective period

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3. Purchasing Cycle and Its Management (after volume production)

Purchasing cost management

Estimate of appropriate price

market price

comparison with precedent

intuition and experience (buyer's skill)

buildup of manufacturing cost

functional price analysis (price to match function: reasoning)

Opportunistic bargaining renders negative effect in long run.

Cost planning, cost improvement to be done in corporation with supplier

Delivery Management in Purchasing (press)

(1) Order in appropriate timing

(2) Progress management and press after ordering

Progress management, MRP, Kanban, etc.

Cause of delivery delay

--- ordering side; receiving side; failure in coordination

Purchasing Volume Management

Material requirement plan (MRP)

(reference chapters on process management, inventory management)

Logistics/Warehouse Management

Selection of transportation means (truck, railway, ship, airplane)

Selection of hand out condition

FOB auto maker (truck arranged by parts maker)

FOB parts maker (truck arrange by auto maker)

Mixed –loading method

Design of Warehouse Network

Warehouse dispersion --- low speed and cheap transportation mode?
(high inventory cost)

Warehouse concentration --- high speed and expensive transportation mode?
(high transportation cost)

Inbetween format?

Purchasing Quality Control

Extension of inter-company quality control

(1) reinforcement of receiving inspection

(2) **delivery without inspection** ("building quality into product")

Defect found in receiving inspection --- claim for damage

Defect not found in inspection --- **liability for defect warranty**

3. Purchasing Management and Competitiveness : Case of Automobile

Purchasing cost of material/parts occupying majority of manufacturing cost (70%, 80% in automobile)

Competitiveness of Japanese manufacturing industries has been supported by the **supplier** system.

"3 Devine Treasures" of Supplier System in Japanese Automobile Industry

- (1) Continuous trading for long term
- (2) Capability-building competition among limited number of suppliers
- (3) "Leave things in bundle" (division of labor in batch ordering model)

These three contribute to the automobile industry in a mutually complementary form.

(Fujimoto/ Nishiguchi /Suzuki edition "Supplier System" Yuhikaku