

**조달 物流 개선을 위한
協業 프로세스 요소 고찰**

**(An investigation of collaboration process
factors improving the procurement
logistics)**

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김 태 복

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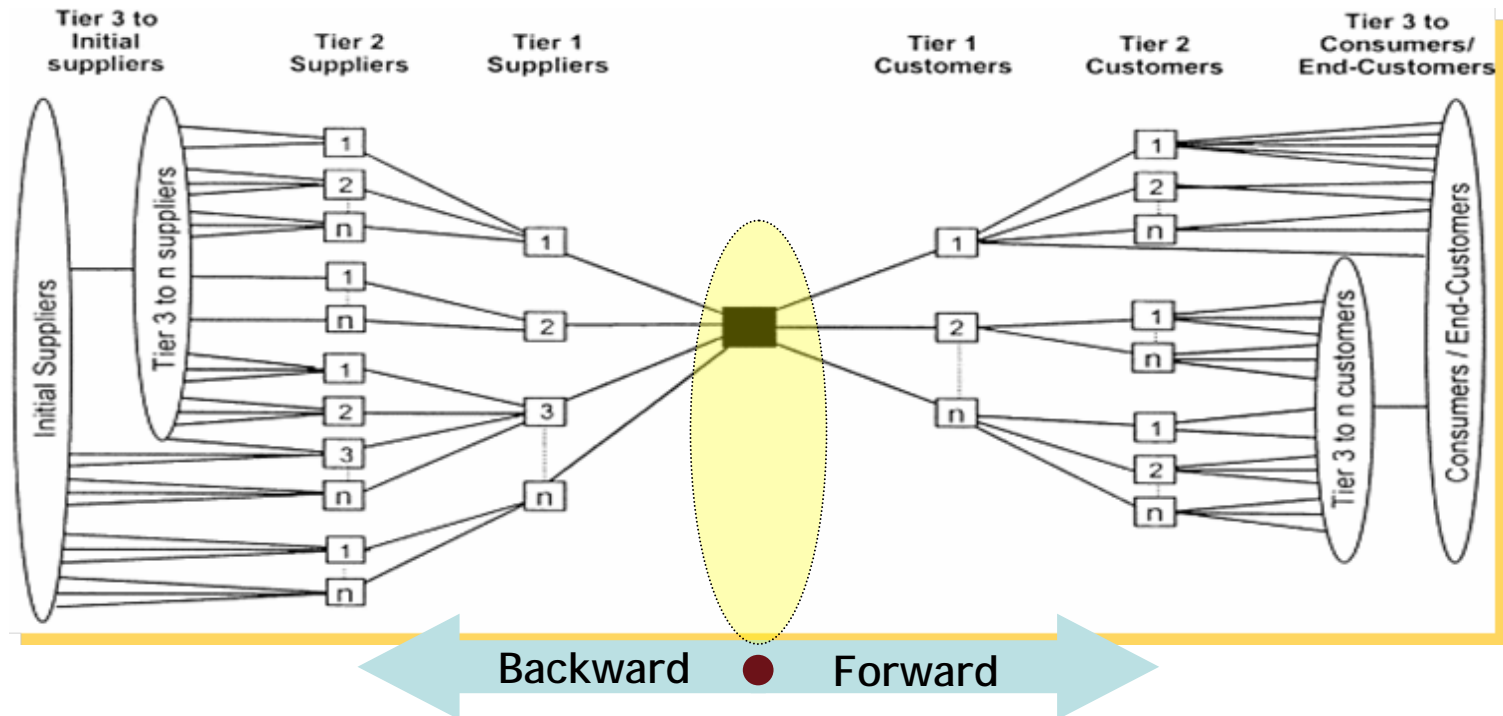
Agenda

- + Generic Procurement Process
- + Success Stories
 - ⊗ Supplier Diversity
 - ⊗ Eliminate the Bullwhip effect between buyer and supplier
- + Closed-loop Supply Chain Process
- + Supply Chain Integration
- + Framework for Procurement Strategy
- + Common Issues and Challenges
 - ⊗ Successful Supplier Partnership
 - ⊗ Supplier Selection Criteria
 - ⊗ Supplier Selection Procedure
 - ⊗ Supply Chain Quality
 - ⊗ Joint Replenishment
 - ⊗ Supply Chain Execution
- + Concluding Remarks



Generic Procurement Process

✚ The Structure of Supply Chain



- The cost of raw materials and component parts constitutes 70% of total product cost

[Source] A. Ghobadian, A. Stainer, T. Kiss, "A Computerized vendor rating system", Proceedings of the First International Symposium on Logistics, The University of Nottingham, Nottingham, UK, July 1993, pp.321-328.

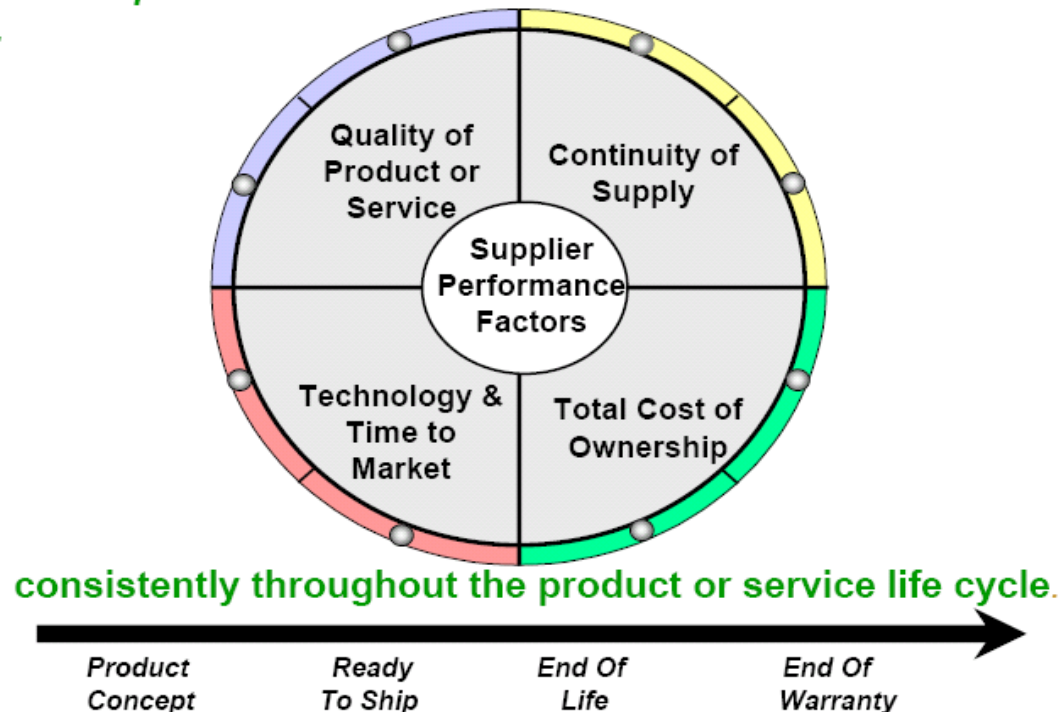


Success Story-1

✚ Global Procurement at Dell

● Total Value Assessment

Suppliers that provide best total value for Dell's customers in four key areas...



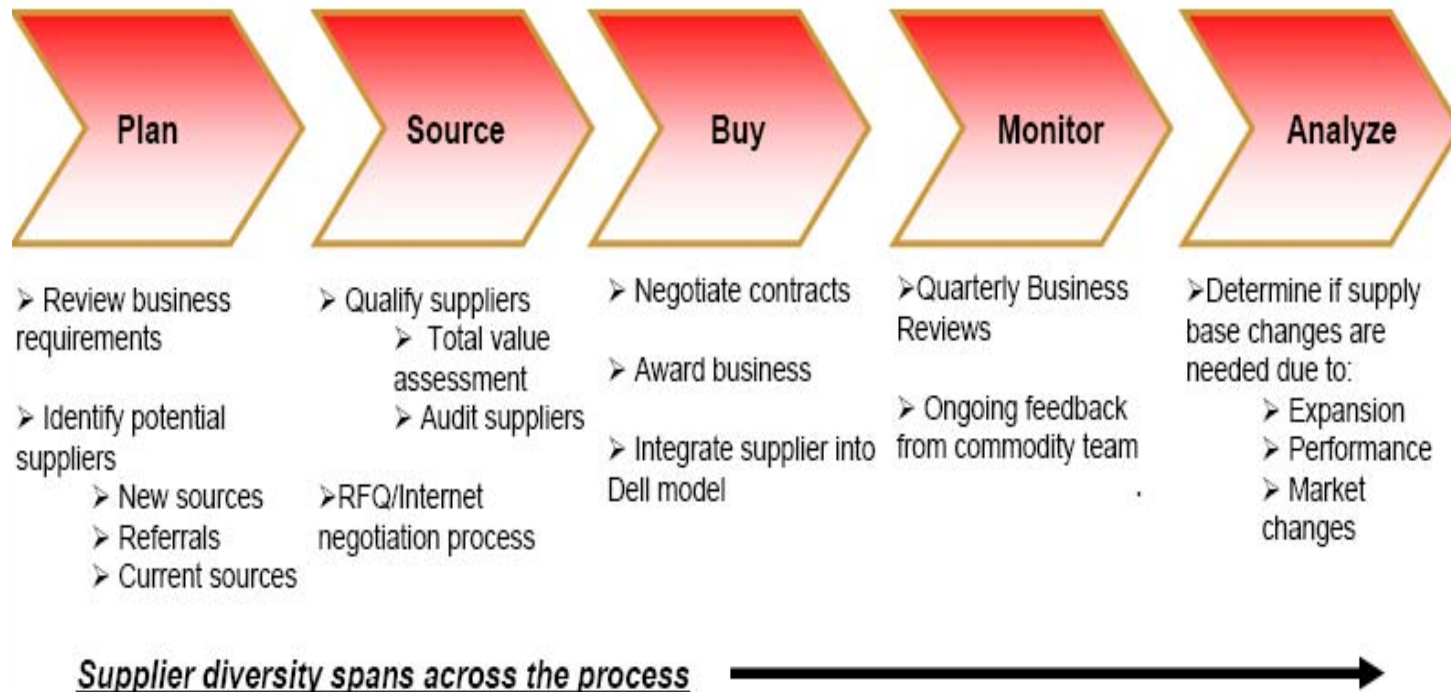
[Source] Leslie Campbell (Vice President, General Procurement),
Presentation made at Winston-Salem Supplier Information Session,
April 5, 2005



Success Story – 1

✚ Global Procurement at Dell

● End To End Procurement Process



[Source] Leslie Campbell (Vice President, General Procurement),
Presentation made at Winston-Salem Supplier Information Session,
April 5, 2005



Success Story –1

Global Procurement at Dell

Dell's Supplier Diversity Policy

Dell's Supplier Diversity Policy Summary:

- To facilitate the introduction use of diverse suppliers in the supplier selection process
- To consider Dell's large suppliers' commitment to supplier diversity in their supply base
- To conduct outreach activities to identify diverse suppliers
- To maintain procedures and initiatives which support Dell's commitment



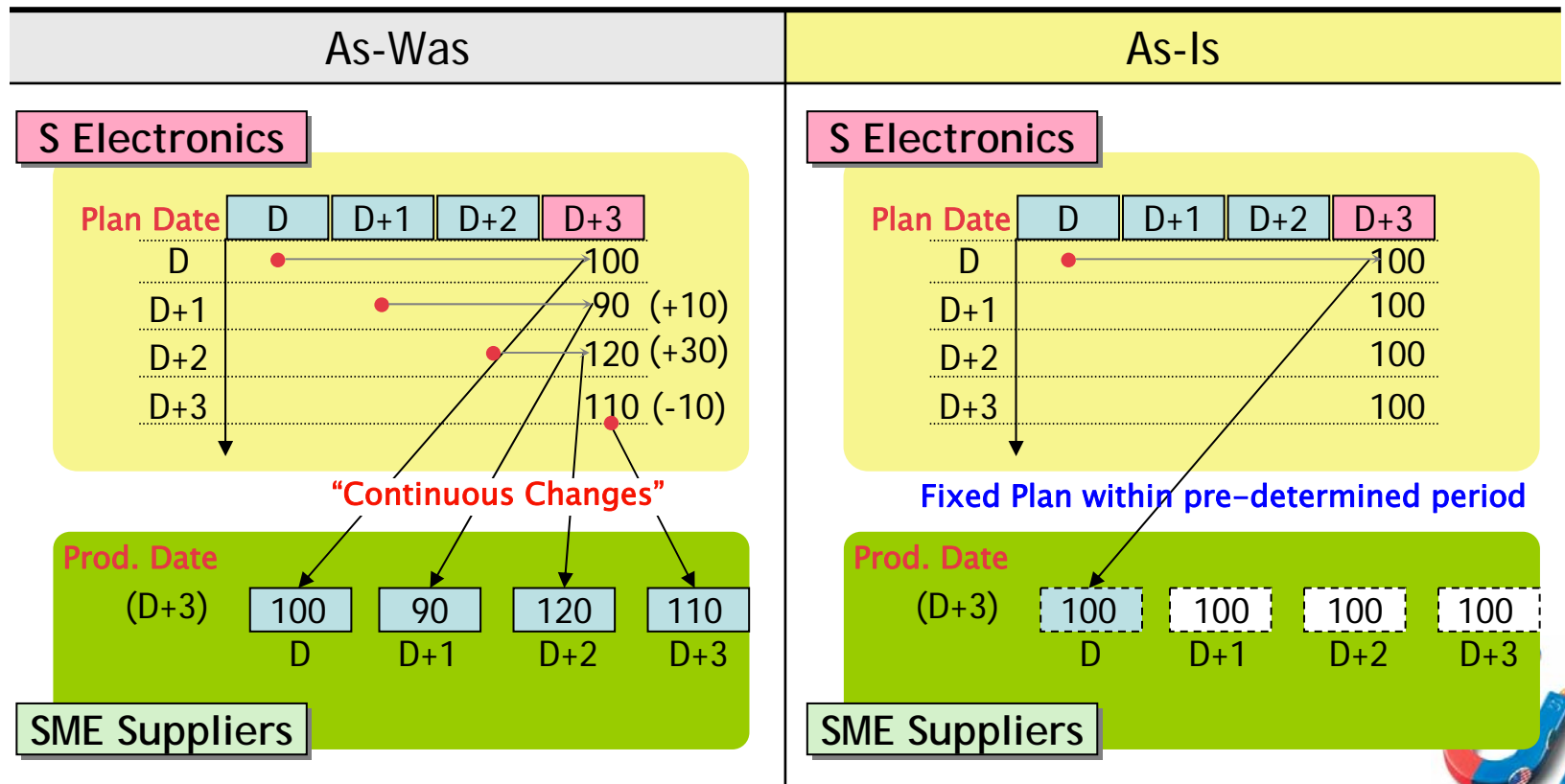
Dell manages Supplier Diversity in all aspects of procurement:

[Source] Leslie Campbell (Vice President, General Procurement),
Presentation made at Winston-Salem Supplier Information Session,
April 5, 2005



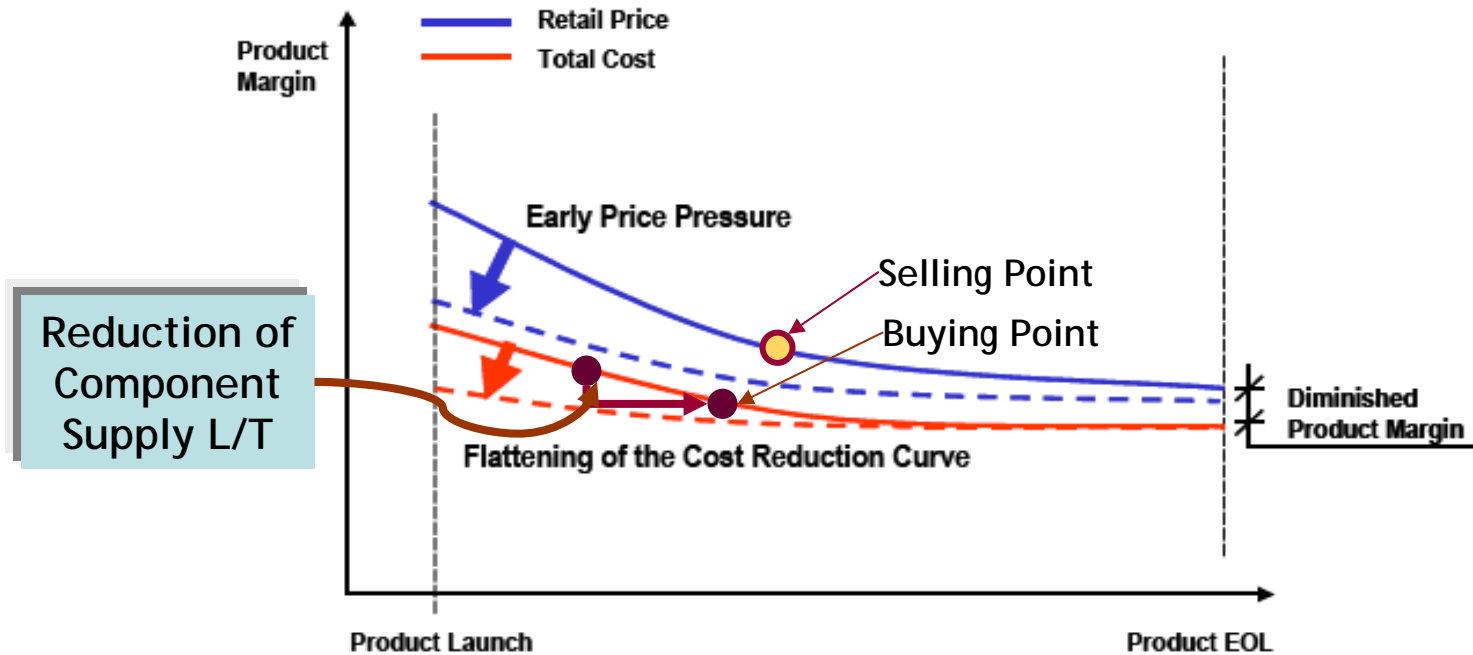
Success Story -2

- Confirmed Production Plan & Execution at "S" Electronics, Co.
 - To eliminate the bullwhip effect caused by S Electronics, co.
 - By the corporate level's rule, at least for 3 days, any change in production plan established at three days ago shouldn't be permitted.



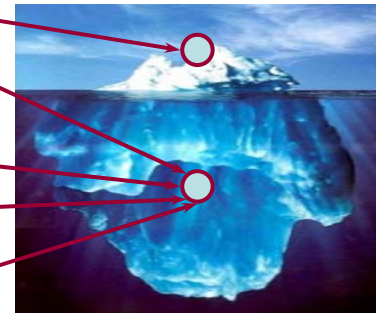
Supply Chain Lead-time

Supply Chain L/T vs. Inventory Driven Cost



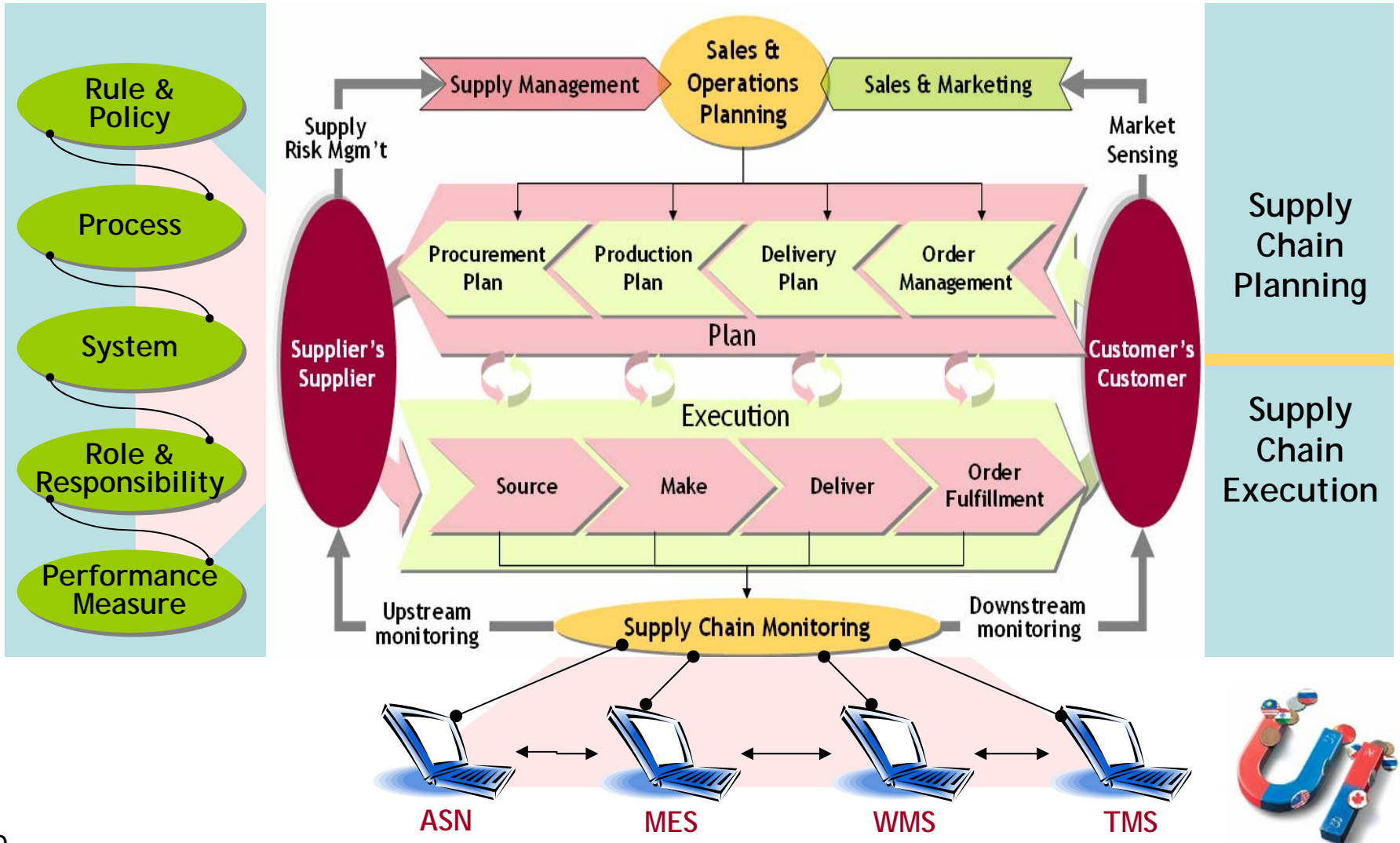
Inventory Driven Cost

- @ Inventory Holding Cost
- @ Component Devaluation
- @ Price Protection
- @ Product Return
- @ Product Obsolescence



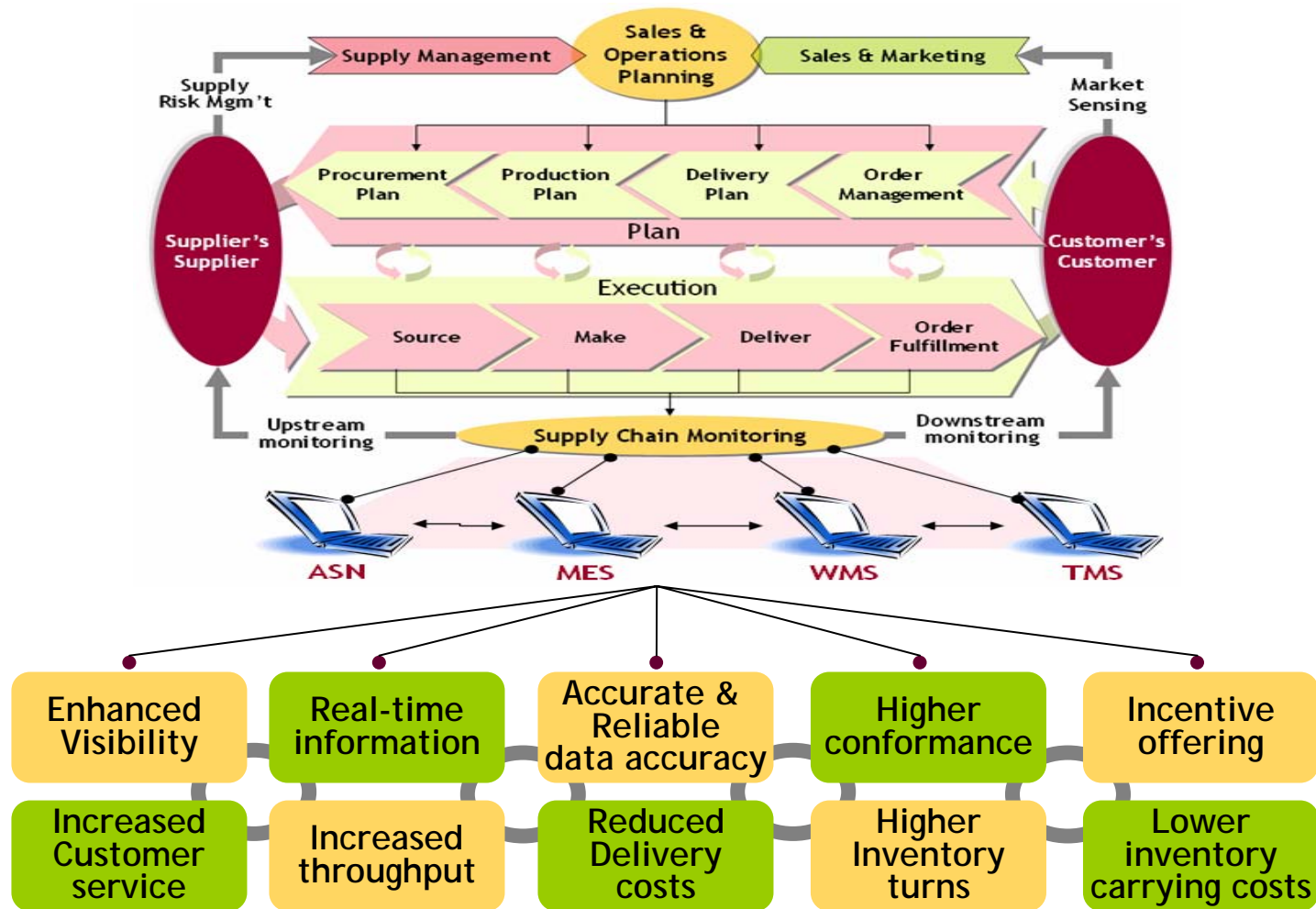
Closed-loop Supply Chain Process

✚ Continuous alignment between planning and execution



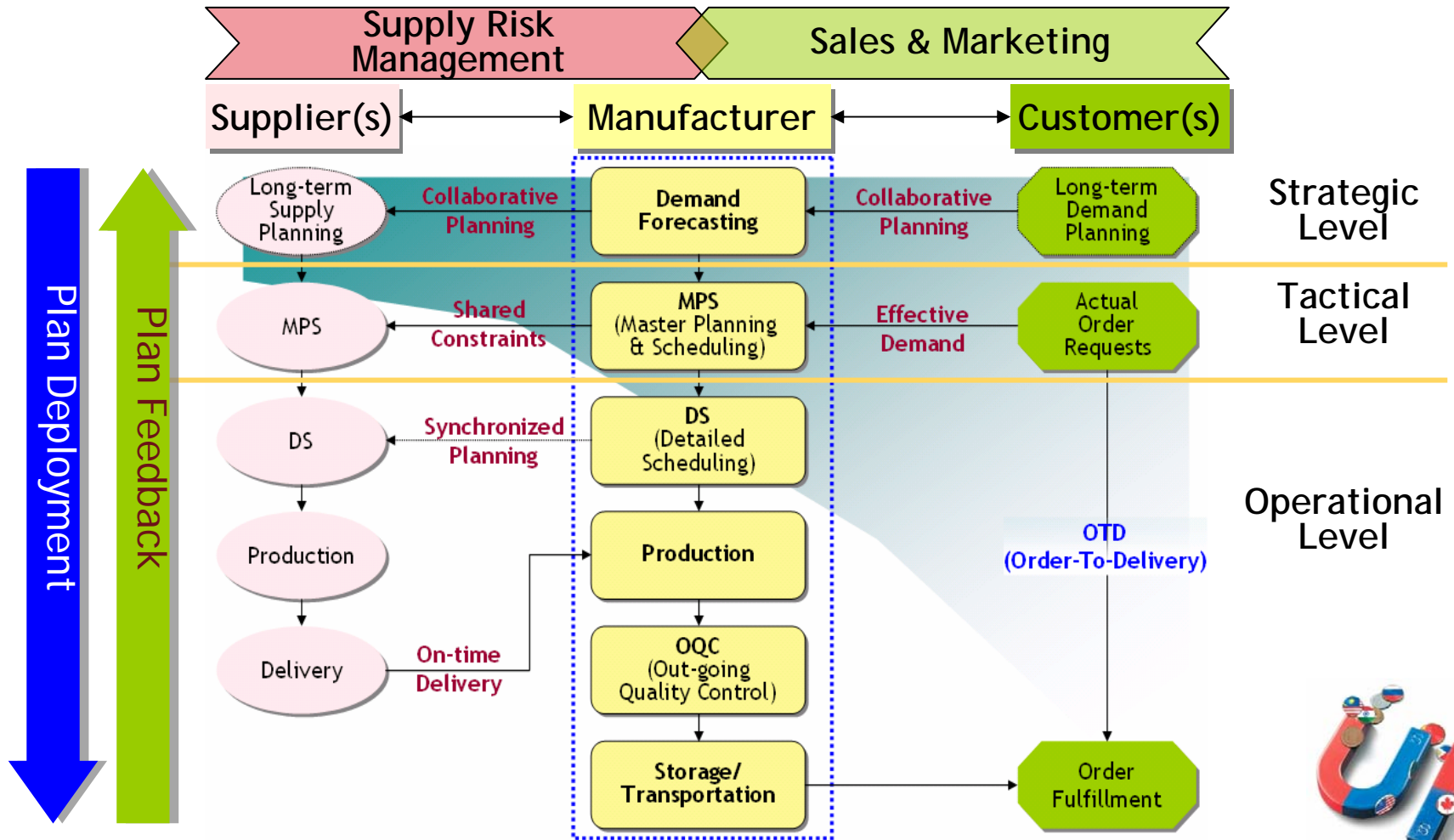
Benefits of Supply Chain Execution

✚ Continuous alignment between planning and execution



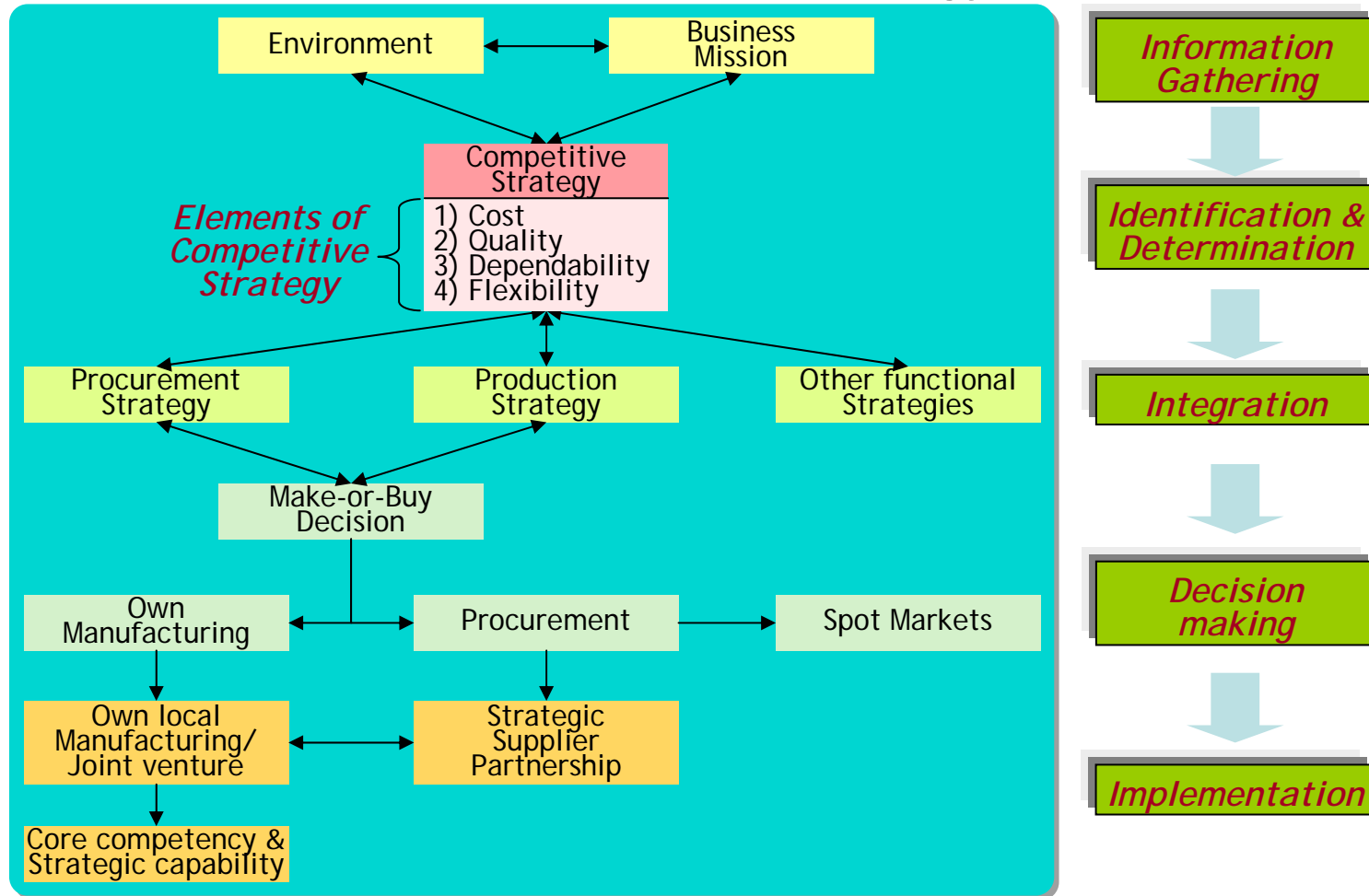
Supply Chain Integration

Vertical vs. Horizontal Integration



Framework for Procurement Strategy

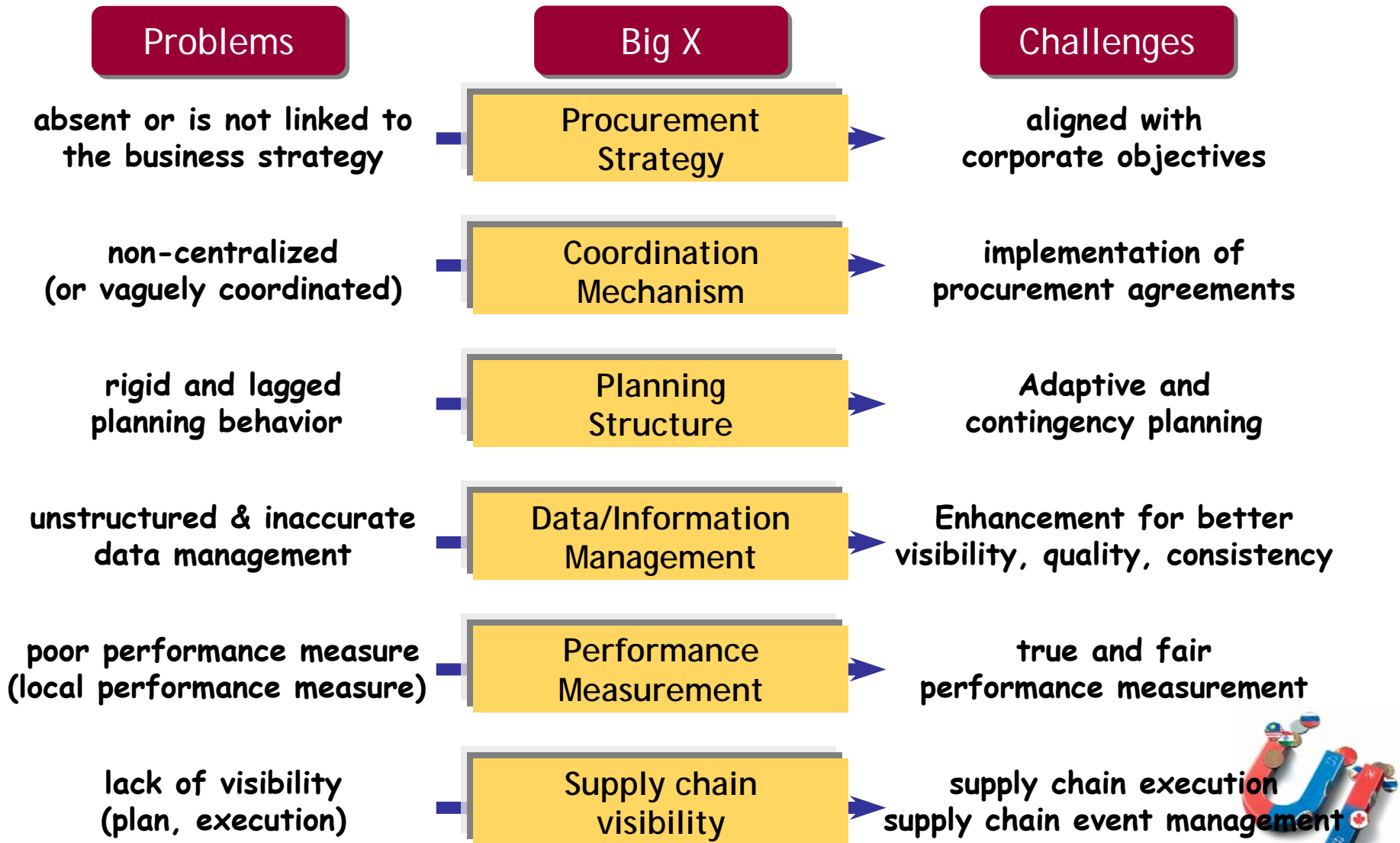
Framework for Procurement Strategy Formulation



[Source] Veli-Matti Virolainen, "A survey of procurement strategy development in industrial companies", Int. J. Production Economics 56-57 (1998) 677-688

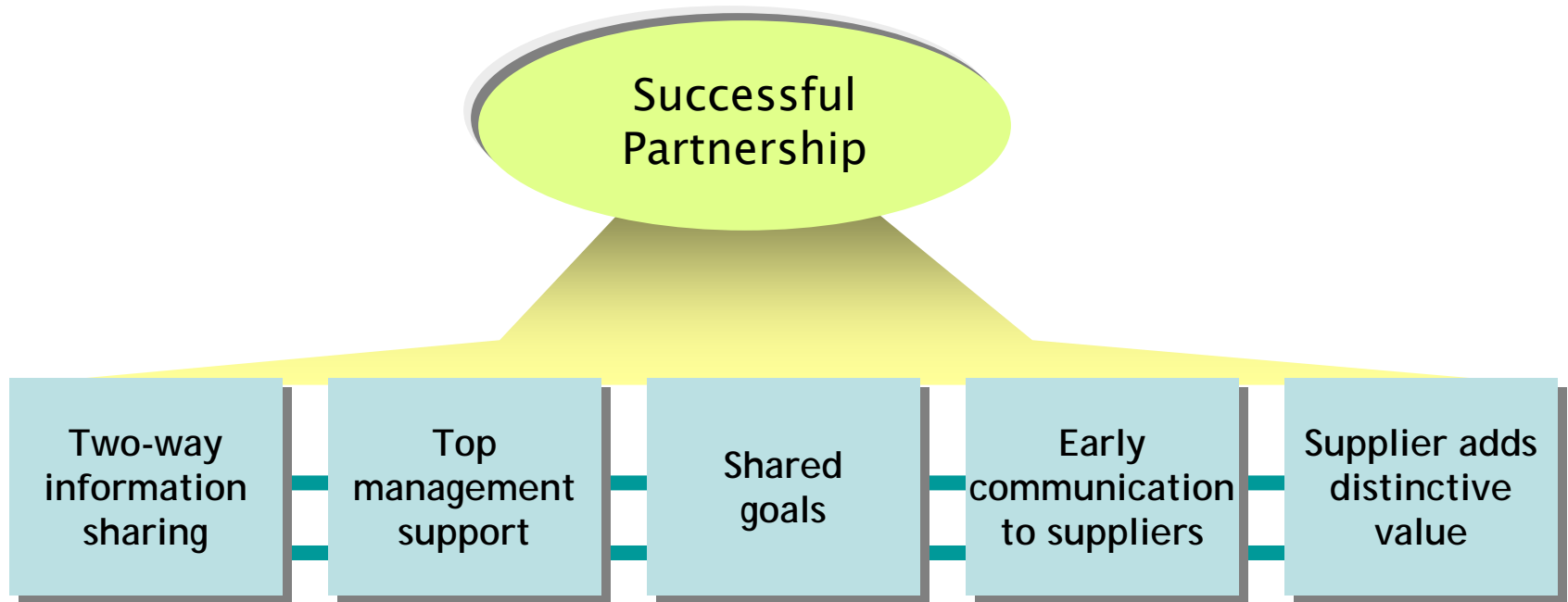


Common Issues and Challenges



Successful Supplier Partnership

Key factors for successful partnership

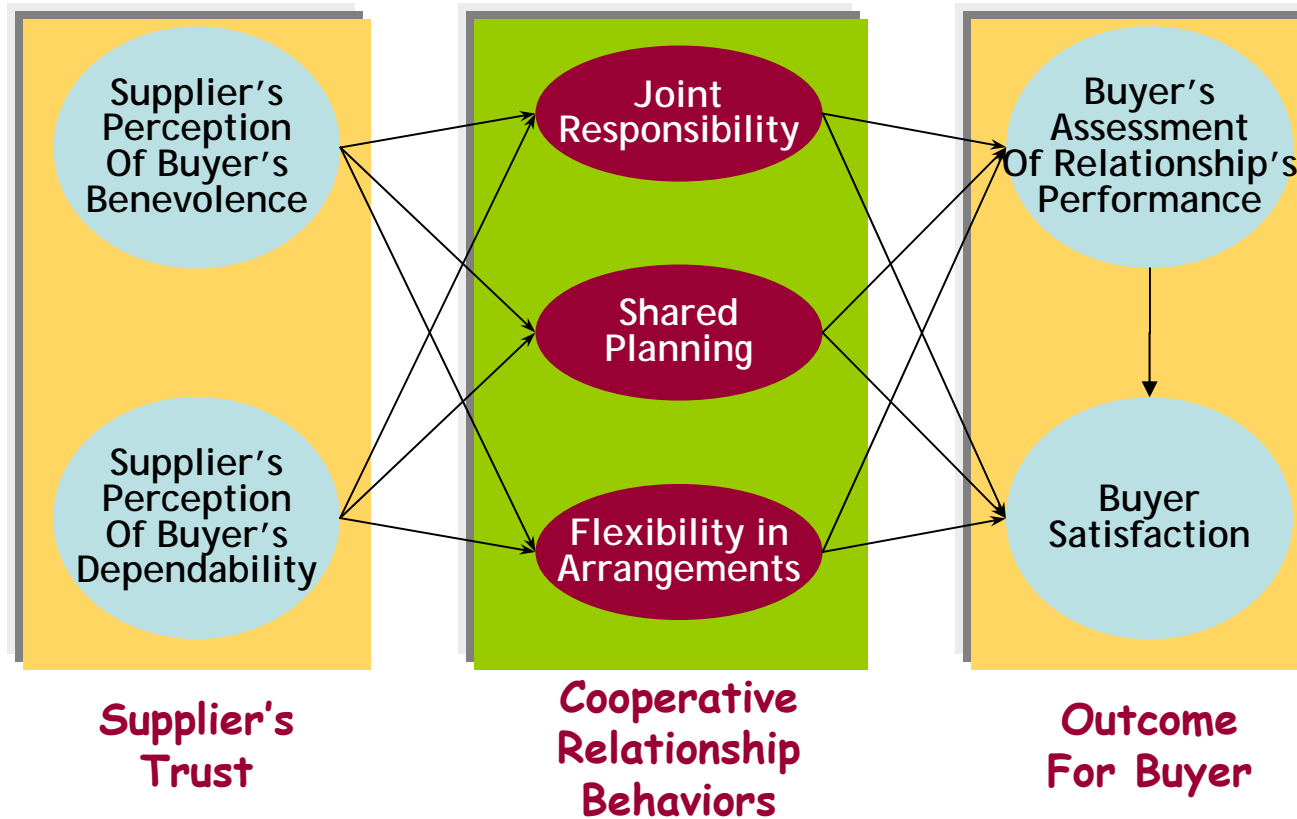


[Source] L.M. Ellram, "Partnering pitfalls and success factors", International Journal of Purchasing and Materials Management(1995) 36.



Successful Supplier Partnership

Conceptual model of trust effects



[Source] David A. Johnston*, David M. McCutcheon, F. Ian Stuart, Hazel Kerwood , " *Effects of supplier trust on performance of cooperative supplier relationships*" , Journal of Operations Management 22 (2004) 23-38



Focused Topic: Supplier Selection

Major vendor selection criteria

[Dickson(1966)]

Rank	Factor	Mean rating	Evaluation
1	Quality	3.508	Extreme importance
2	Delivery	3.417	
3	Performance history	2.998	Considerable importance
4	Warranties and claim policies	2.849	
5	Production facilities and capacity	2.775	
6	Price	2.758	
7	Technical capability	2.545	
8	Financial position	2.514	
9	Procedural compliance	2.488	Average importance
10	Communication system	2.426	
11	Reputation and position in industry	2.412	
12	Desire for business	2.256	
13	Management and organization	2.216	
14	Operating controls	2.211	
15	Repair service	2.187	
16	Attitude	2.120	
17	Impression	2.054	
18	Packaging ability	2.009	
19	Labor relations record	2.003	Slight importance
20	Geographical location	1.872	
21	Amount of past business	1.597	
22	Training aids	1.537	
23	Reciprocal arrangements	0.610	

- 
1. Quality
 2. Delivery
 3. Performance history
 4. Warranties & claim policies
 5. Price
 6. Technical capability

[Source] Charles A. Weber, John R. Current and W.C. Benton, "Vendor selection criteria and methods", *European Journal of Operational Research*, Vol. 50, 2-18, 1991.



Focused Topic: Supplier Selection

Supplier selection criteria

Reviewed articles: 74 articles

Vendor selection criteria

Article	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Ansari and Modarress	1986	X	X				X										X			X				
Ansari and Modarress	1988	X	X				X										X		X		X			
Anthony and Buffa	1987		X				X																	
Banerjee	1986		X				X																	
Banerjee	1986						X																	
Bender et al.	1985	X	X			X	X																	
Benton	1983						X																	
Benton	1985						X																	
Benton	1985						X																	
Benton and Krajewski	1990	X	X													X								
Benton and Whybark	1982						X																	
Bernard	1989	X	X											X		X								
Bragg and Hahn	1982		X			X																		
Browning et al.	1983		X			X	X	X																
Buffa and Jackson	1983	X	X	X			X																	
Burton	1988	X	X			X	X	X						X	X									
Cardozo and Cagley	1972	X	X				X																	
Chapman	1989	X	X			X						X												
Chapman and Carter	1990	X	X																					
Chakravarty and Martin	1988						X																	
Cooper	1977		X																					
Croell	1980	X	X																					
Dada and Srikanth	1987						X																	
Dempsey	1978	X	X	X		X	X	X	X	X	X	X		X	X	X	X		X	X	X		X	
Edwards	1967																							
Frazier et al.	1988	X	X				X	X						X										
Gaballa	1974					X	X																	
Goyal	1987					X	X																	
Gregory	1986	X	X			X	X	X														X		
Hahn et al.	1986	X	X			X	X	X														X		
Hahn et al.	1983	X	X			X	X																	
Håkansson and Wootz	1975	X				X	X																	
Hinkle et al.	1969	X	X				X	X																
Ho and Carter	1988					X																		
Hwang et al.	1990						X																	
Jacobson and Aaker	1987	X																						
Jackson	1983	X	X														X				X			
Jordan	1987						X																	
Kingsman	1986						X																	
Kraljic	1983	X	X			X		X																
LaForge	1985						X																	

1. Quality
2. Delivery
3. Performance history
4. Warranties & claim policies
5. Price
6. Technical capability

[Source] Charles A. Weber, John R. Current and W.C. Benton, "Vendor selection criteria and methods", *European Journal of Operational Research*, Vol. 50, 2-18, 1991.



Focused Topic: Supplier Selection

✚ List of major performance measure studied

Dickson's study		Criteria	Number of articles
Rank	Rating ^a		
6	1	Net price	61
2	1	Delivery	44
1	1A	Quality	40
5	1	Production facilities and capacity	23
20	2	Geographic location	16
7	1	Technical capability	15
13	2	Management and organization	10
11	2	Reputation and position in industry	8
8	1	Financial position	7
3	1	Performance history	7
15	2	Repair service	7
16	2	Attitude	6
18	2	Packaging ability	3
14	2	Operational controls	3
22	2	Training aids	2
9	2	Bidding procedural compliance	2
19	2	Labor relations record	2
10	2	Communication system	2
23	3	Reciprocal arrangements	2
17	2	Impression	2
12	2	Desire for business	1
21	2	Amount of past business	1
4	1	Warranties and claims	0

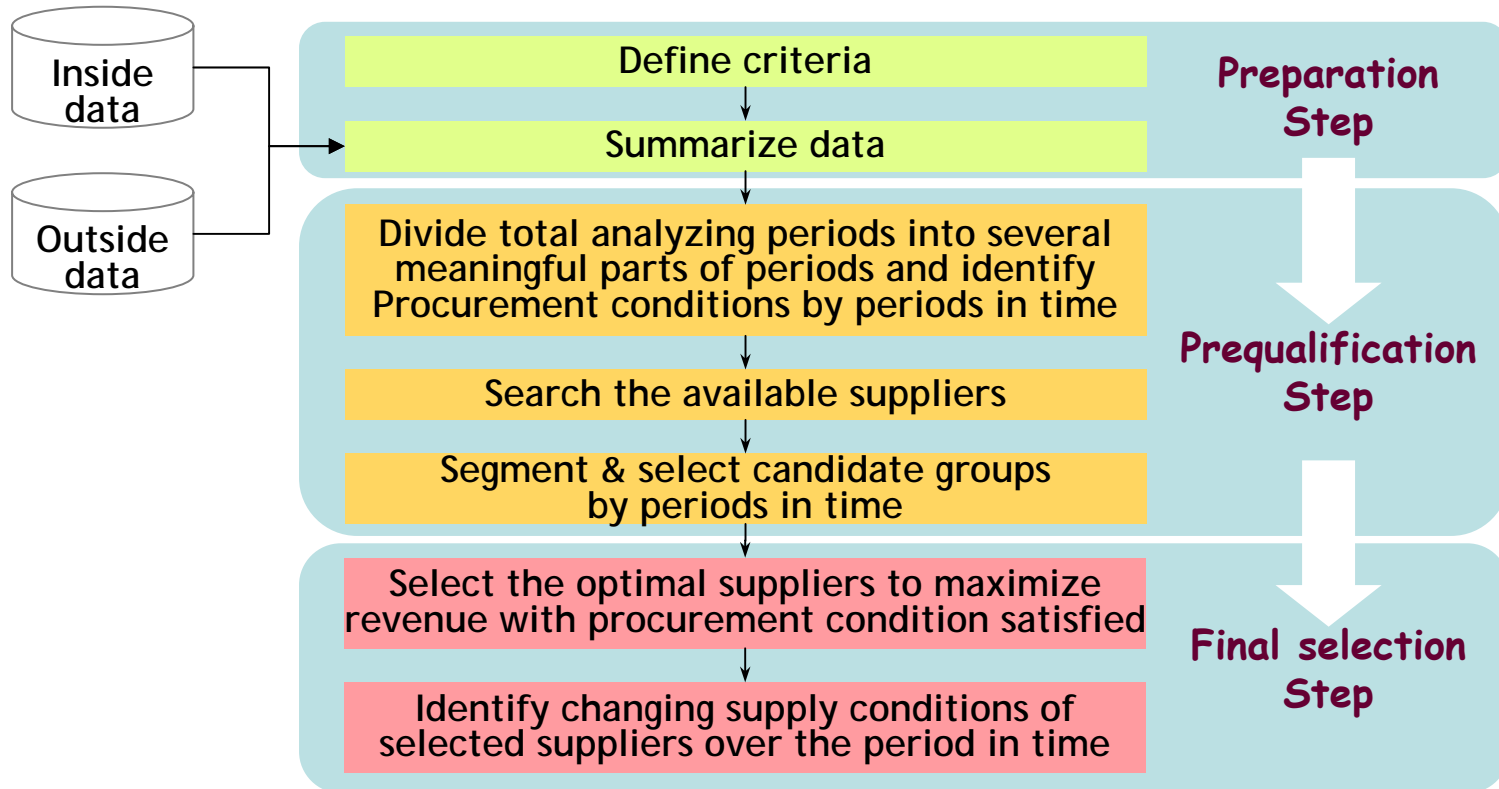
^a Ratings: 1A = Extreme importance. 2 = Average importance.
 1 = Considerable importance. 3 = Slight importance.

[Source] Charles A. Weber, John R. Current and W.C. Benton, "Vendor selection criteria and methods", *European Journal of Operational Research*, Vol. 50, 2-18, 1991.



Focused Topic: Supplier Selection

Supplier Selection Procedure



[Source] Gye Hang Hong, Sang Chan Park, Dong Sik Janga, Hyung Min Rho
, "An effective supplier selection method for constructing a competitive supply-relationship", Expert Systems with Applications 28 (2005) 629-639



Focused Topic: Supply Chain Quality

✚ Buyer-Supplier Relationship for integrated TQM

TQM factor	Factor
1	Importance of the purchasing function
2	Interaction with suppliers
3	Level of interaction with other functional areas
4	Human resource management
5	Influence over suppliers
6	Competitive focus
7	Purchasing organization and structure

[Source] Joseph R. Carter, Larry Smeltzer, Ram Narasimhan, "The role of buyer and Supplier relationship in integrating TQM through the supply chain", European Journal of Purchasing & Supply Management 4(1998) 223-234



Focused Topic: Supply Chain Quality

✚ Buyer-Supplier Relationship for integrated TQM

TQM factor	Factor	Sub-factors
1	Importance of the purchasing function	<ol style="list-style-type: none"> 1. Degree of top management emphasis on the purchasing function 2. The existence and the importance of the planning process in the procurement function 3. The purchasing function's emphasis on the total quality management/customer satisfaction in defining its mission 4. The purchasing function's role in the corporate business planning processes
2	Interaction with suppliers	<ol style="list-style-type: none"> 1. Whether or not the company employs formal reward/recognition programs for its suppliers 2. The number, or lack, of organizational layers in the purchasing function 3. The level and quality of purchasing interaction with suppliers 4. The degree of supplier training 5. The degree of formal evaluation of purchasing personnel (based on their involvement with suppliers)



Focused Topic: Supply Chain Quality

✚ Buyer-Supplier Relationship for integrated TQM

TQM factor	Factor	Sub-factors
3	Level of interaction with other functional areas	<ol style="list-style-type: none"> 1. The degree of implementation of quality improvement programs 2. Years of experience with of such programs 3. The overall relationships of the purchasing function with the other functional areas within the firm 4. The degree of active interaction with other functions
4	Human resource management	<ol style="list-style-type: none"> 1. The degree of empowerment provided to purchasing personnel 2. The extent to which purchasing personnel are recognized and rewarded 3. The degree of emphasis on training purchasing personnel 4. The level of job security perceived by purchasing personnel 5. The degree to which purchasing personnel are encouraged to take risks without dear of punishment



Focused Topic: Supply Chain Quality

✚ Buyer-Supplier Relationship for integrated TQM

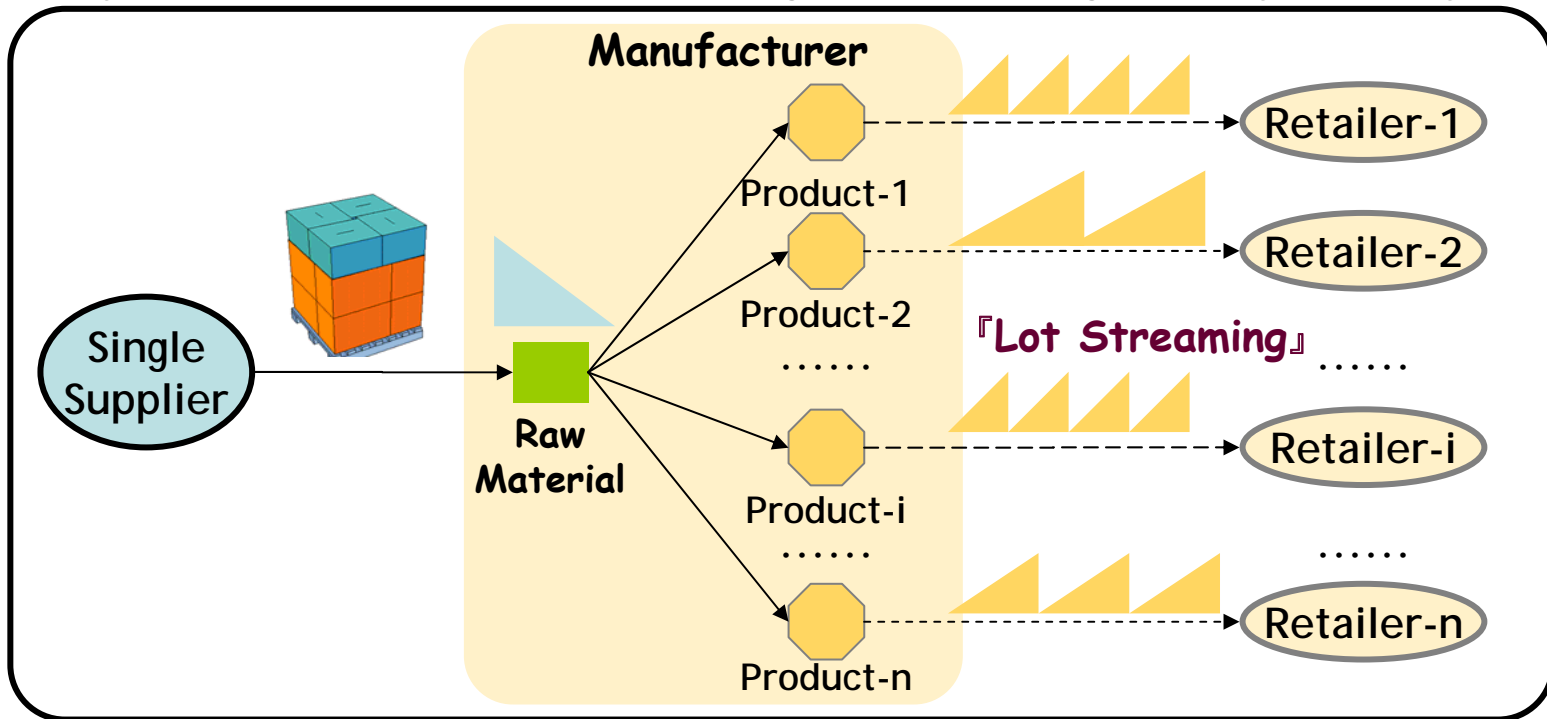
TQM factor	Factor	Sub-factors
5	Influence over suppliers	<ol style="list-style-type: none"> 1. The ability of purchasing to exert power and influence over suppliers 2. The degree of supplier involvement 3, The degree to which purchasing can access internal and external supplier information
6	Competitive focus	<ol style="list-style-type: none"> 1. The degree of single sourcing as a percentage of total purchases 2. The use of Just-In-Time purchasing concepts 3. The degree of understanding of internal and external customer needs
7	Purchasing organization and structure	<ol style="list-style-type: none"> 1. The degree of decentralization of the purchasing function 2. The degree of purchasing involvement in and interaction with the manufacturing function 3. The degree of assigned responsibility for total quality management and customer satisfaction to purchasing 4. The degree of risk sharing (cost, info, etc.) with suppliers



Focused Topic: Joint Replenishment

✚ Joint Replenishment

- Lot Streaming Issues through supply chain pipelines
- Synchronized Production Planning on multi-stage supply chain system



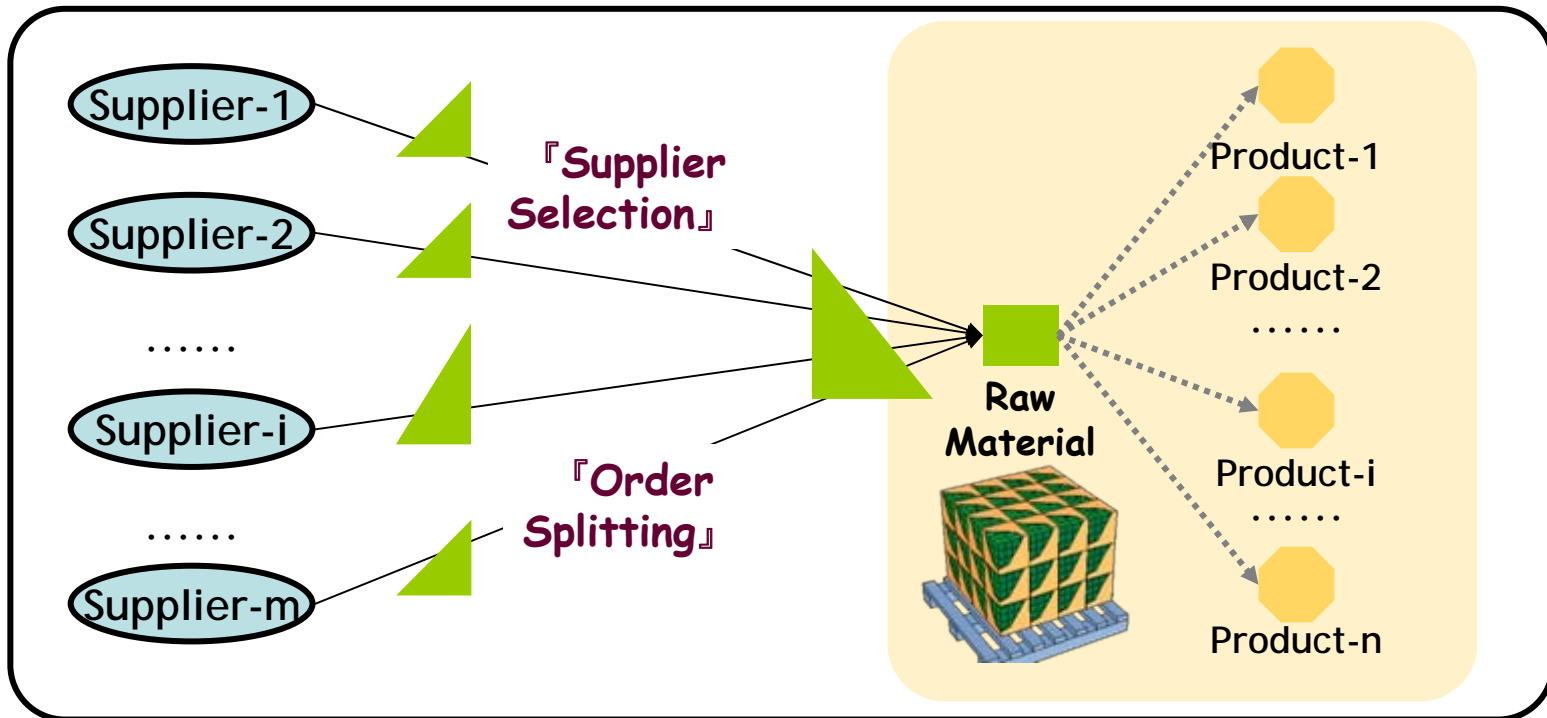
[Source] T. Kim, Y. Hong and S. Y. Chang, "Joint economic procurement-production-delivery policy for multiple items in a single-manufacturer, multiple-retailer system", *International Journal of Production Economics*, Vol. 103, 2006, 198-208.



Focused Topic: Joint Replenishment

Joint Replenishment

- Vendor selection and Order splitting policy

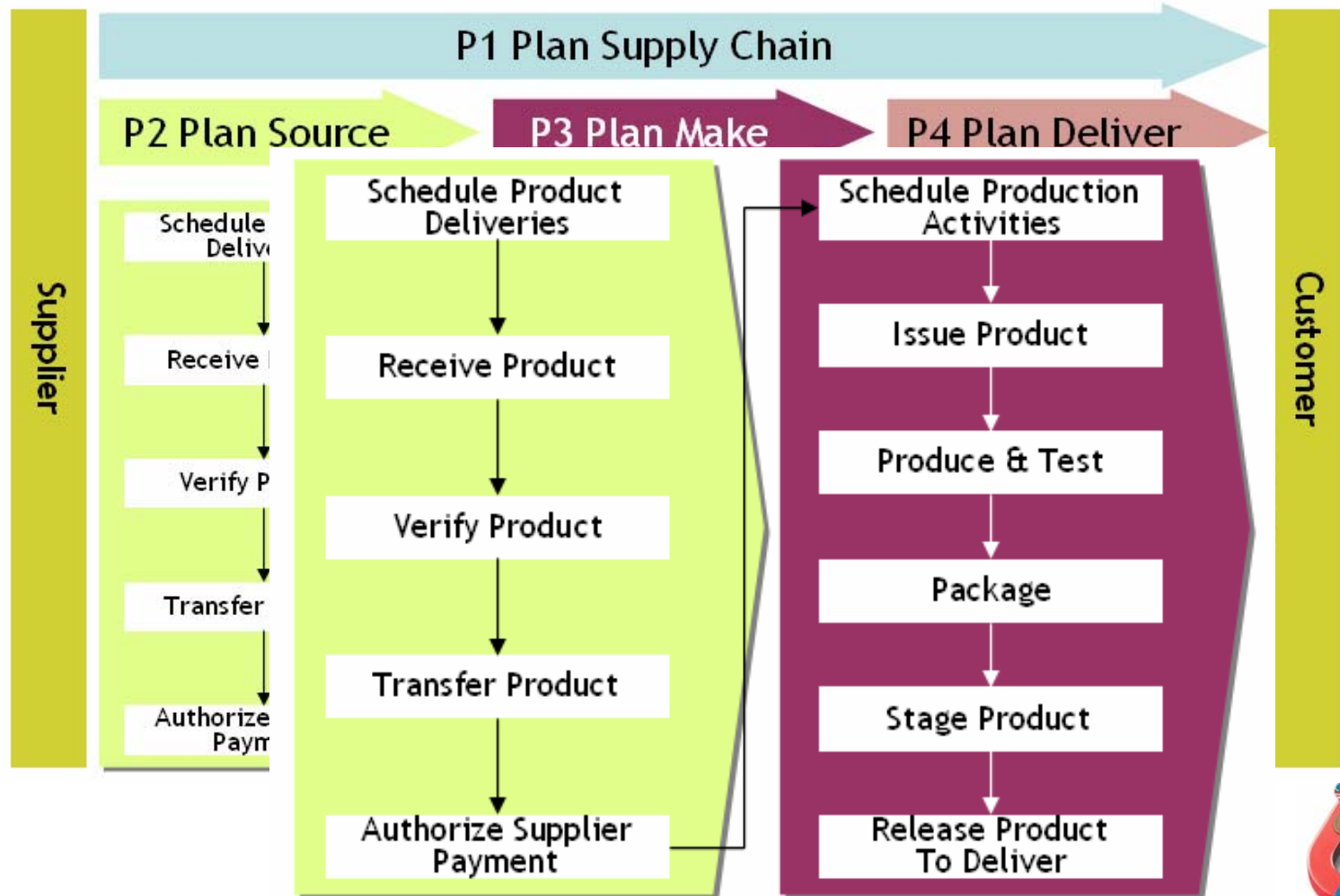


[Source] S. S. Park, T. Kim and Y. Hong, "Production allocation and shipment policies in a multiple-manufacturer-single-retailer supply chain", *International Journal of Systems Science*, Vol. 37, No.3, Feb. 2006, 163-171



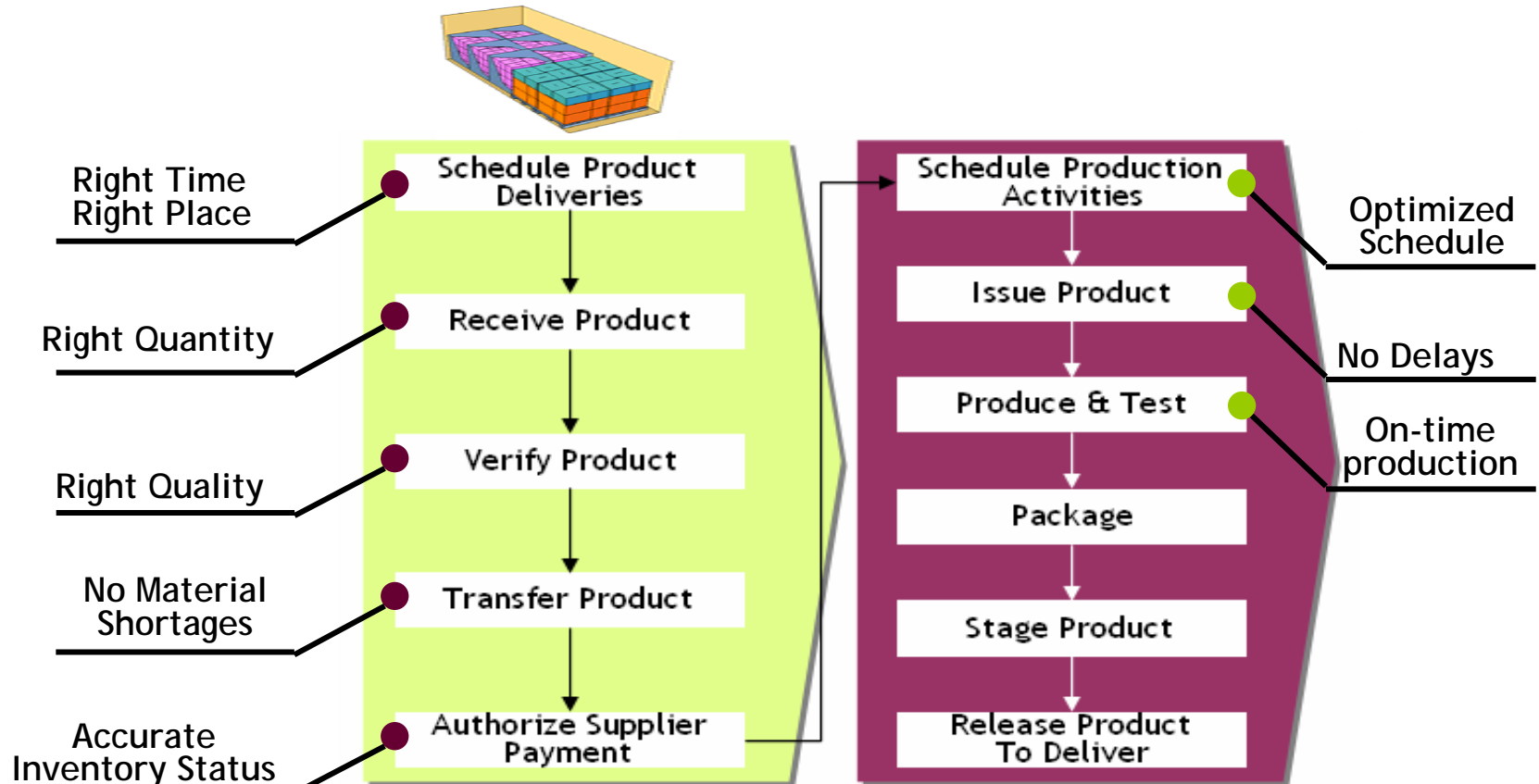
Focused Topic: Supply Chain Execution

✚ SCOR Model (for Make-To-Order environment)



Focused Topic: Supply Chain Execution

Operational issues in SCE



Concluding Remarks

✚ Structure of Collaboration Factors

Collaboration Viewpoints	Planning	Execution
Rule & Policy	<ul style="list-style-type: none"> • Procurement Strategy <ul style="list-style-type: none"> - Sourcing strategy - Supplier finding • Supplier Partnership <ul style="list-style-type: none"> - Supplier selection criteria • Trust Management 	<ul style="list-style-type: none"> • Rule & Policy Dissemination <ul style="list-style-type: none"> - Employee Training • Design for X <ul style="list-style-type: none"> - SCM, Quality, Manufacturability • Execution by System
Process	<ul style="list-style-type: none"> • Collaborative decision-making • Interchangeability between process elements • Process Optimization <ul style="list-style-type: none"> - Consolidated Transportation 	<ul style="list-style-type: none"> • Knowledge sharing with suppliers <ul style="list-style-type: none"> - "Know-how", Technology, Skill - Managerial decision • Sync. Prod.-Delivery Operations
System	<ul style="list-style-type: none"> • Data/Information sharing • Automated Data Transfer • Material Handling System • Validity of Master Data 	<ul style="list-style-type: none"> • Transaction Data Visibility <ul style="list-style-type: none"> -Accessibility, Accuracy, Reliability • Automated Data Acquisition • Standardized M/H Devices
Role & Responsibility	<ul style="list-style-type: none"> • Quality Assurance Program • Continuous Training Program 	<ul style="list-style-type: none"> • Incentive Offering
Performance Measure	<ul style="list-style-type: none"> • Value Sharing Scheme • Mutually Recognized KPIs 	<ul style="list-style-type: none"> • Periodic KPI Evaluation & Feedback

