PROCUREMENT MANAGEMENT

Supply Chain Management

BACKGROUND

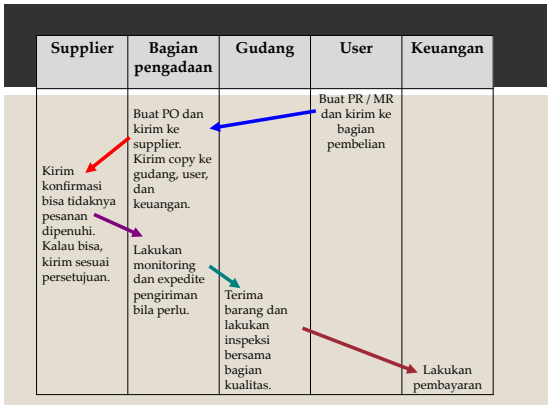
- About 40 – 70% of cost of goods sold are from material costs
- Non financial contributions of supply management are of high importance:
  - Quality of supplied materials
  - Delivery consistency from supplier
  - Supplier willingness to deliver more frequently with smaller delivery quantity
  - Supplier involvement in developing new products
  - Supplier production and delivery flexibility

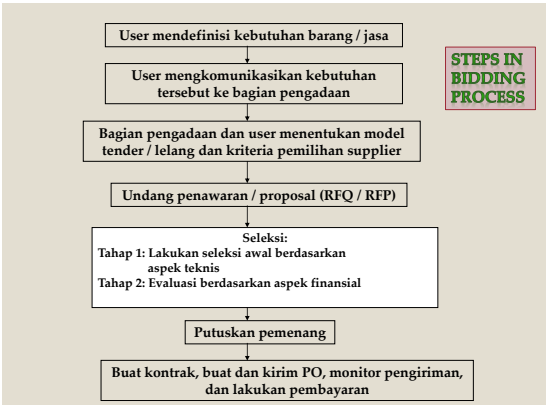
ACTIVITIES RELATED PROCUREMENT MANAGEMENT

- Managing purchasing activities
- Selecting appropriate suppliers
- Design strategic relationships with suppliers
- Chose and implement appropriate technology to support procurement activities
- Maintain procurement related data bases
- Evaluating supplier performance

PURCHASING PROCESS

1. **Recognition of needs**
   Need normally comes from a using department
2. **Description of the need**
   Cooperation is needed to avoid conflict in a later stage
3. **Identification and study of available suppliers**
   The number should be reduced to a workable group
4. **Supplier selection**
5. **Preparation and issuance of the purchase order**
6. **Follow up and expediting**
7. **Receipt, Inspection, Invoice, Order Close**





SELECTING SUPPLIERS

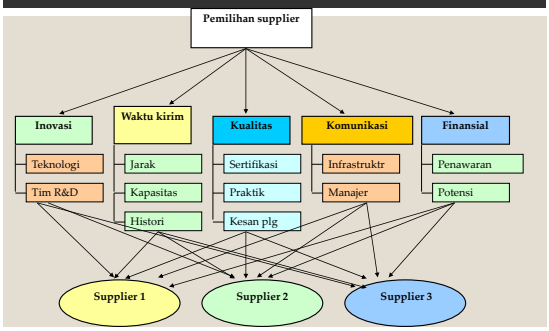
Kriteria	Skor
Kualitas	3.5
Delivery	3.4
Performance history	3.0
Warranties and claim policies	2.8
Price	2.8
Technical capability	2.8
Financial position	2.5
Prosedural compliance	2.5
Communication system	2.5
Reputation and position in industry	2.4
Desire for business	2.4
Management and organization	2.3
Operating controls	2.2
Repair service	2.2
Attitudes	2.1
Impression	2.1
Packaging ability	2.0
Labor relations records	2.0
Geographical location	1.9
Amount of past business	1.6
Training aids	1.5
Reciprocal arrangements	0.6

Criteria in Selecting Suppliers

CONTOH LAIN KRITERIA PEMILIHAN PARTNER
(DITERAPKAN OLEH KODAK CORPORATION)

- Amount of technical supports
- Number of innovative ideas
- Supplier's ability to communicate effectively on important issues
- Flexibility shown by suppliers
- Cycle time, responsiveness, and improvement shown
- Goals commonality with suppliers
- Level of trust that exists in dealings with the supplier
- Strength of the relationship at each point

SUPPLIER SELECTION PROBLEM: AHP STRUCTURE



CONTOH

Penting mana kualitas, harga, atau delivery?

KRITERIA	Q	P	D
Quality (Q)	1	2	5
Price (P)	½	1	4
Delivery (D)	1/5	¼	1

KRITERIA	Q	P	D	Bobot
Quality (Q)	0.59	0.62	0.50	(0.59+0.62+0.50)/3 = 0.57
Price (P)	0.29	0.31	0.40	(0.29+0.31+0.40)/3 = 0.33
Delivery (D)	0.12	0.08	0.10	(0.12+0.08+0.10)/3 = 0.10

PENILAIAN

- Setelah bobot masing-masing kriteria diperoleh, perbandingan berpasangan dilakukan untuk memberikan penilaian terhadap masing-masing vendor pada tiap kriteria.
- Penilaian dilakukan dengan mengajukan pertanyaan, misalnya: *untuk aspek kualitas, seberapa bagus supplier 1 dibandingkan dengan supplier 2?*
- Penilaian dilakukan dengan menggunakan skala yang sama seperti yang dilakukan pada penentuan bobot

PENILAIAN

Mana yang paling berkualitas?

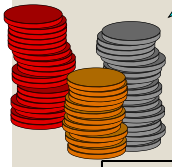
Kualitas

SUPPLIER	S1	S2	S3
S1	1	3	5
S2	1/3	1	3
S3	1/5	1/3	1

	S1	S2	S3	Nilai
S1	**0.652**	**0.692**	**0.636**	0.66
S2	**0.217**	**0.231**	**0.273**	0.24
S3	**0.130**	**0.077**	**0.091**	0.10

PRICE

Mana yang paling Murah?



	S1	S2	S3
S1	**1**	**1/2**	**1/4**
S2	**2**	**1**	**1/3**
S3	**4**	**3**	**1**

	S1	S2	S3	Nilai
S1	**0.143**	**0.111**	**0.158**	0.14
S2	**0.286**	**0.222**	**0.211**	0.24
S3	**0.571**	**0.667**	**0.632**	0.62

Delivery

Mana yang paling tepat waktu?

	S1	S2	S3
S1	**1**	**1/3**	**1/4**
S2		**1**	**1/2**
S3			**1**

	S1	S2	S3	Nilai
S1				
S2				
S3				

NILAI AGGREGAT

Nilai aggregat tiap supplier dihitung dengan menjumlahkan hasil perkalian antara bobot dengan nilai untuk masing-masing kriteria.

	Quality (0.57)	Price (0.33)	Delivery (0.10)	
S1	**0.66**	**0.14**	**0.12**	0.43
S2	**0.24**	**0.24**	**0.32**	0.25
S3	**0.10**	**0.62**	**0.56**	0.32

Artinya supplier 1 yang paling baik

Emerald

International Journal of Physical Distribution & Logistics Management
Vol. 35 No. 7, 2005, pp. 503-523, Emerald Group Publishing Limited

A MODEL FOR EVALUATION AND SELECTION OF SUPPLIERS IN GLOBAL TEXTILE AND APPAREL SUPPLY CHAINS

S. Gary Teng and Hector Jaramillo

Model evaluasi supplier yang umum digunakan

Beberapa penelitian terdahulu yang mendukung

- ***Simpson et al.,2002***
  Hampir 50% perusahaan dari industri yang berbeda memiliki proses evaluasi supplier yang formal
- ***Weber et al., 1991***
  Faktor utama pada metode evaluasi supplier adalah quality, supplier certification, facilities continuous improvement, physical distribution and channel relationship
- ***Humpreys et all., 1998***
  Terdapat 4 model evaluasi supplier yang digunakan untuk seleksi suplier, yaitu categorical model, weighted-point model, cost ratio model and dimensional analysis model

Model seleksi supplier untuk textile/apparel SC

Ada 2 metode seleksi supplier yang sering dijadikan literatur :

1. **Analytical Hierarchy Process (AHP)**

   (Saaty,1980;Hill&Nydick,1992;Barbarosoglu&Yazgac,1997)

2. **Analytical Network Process (ANP)**

   (Saaty,1996)

Model dalam penelitian ini diadopsi dari **AHP, multiple attribute approach, "what-if" scenarios and sensitivity analysis**.

Pengembangan model untuk evaluasi supplier

Model dirancang berdasarkan struktur hirarki dengan beberapa layer :

1. *Level 1*
   - Terdiri atas 5 area (Saaty, 1966, menyebutnya sebagai *cluster*) yaitu ***delivery, flexibility, cost, quality dan reliability***.
   - Setiap cluster memiliki bobot yang diberikan oleh buyers berdasarkan kebutuhannya.
2. *Level 2*
   - Berisi ***faktor-faktor*** yang mempunyai pengaruh signifikan terhadap setiap cluster.
   - Buyers juga harus memberi bobot pada setiap faktor sesuai kebutuhannya.

Index yang menunjukkan performansi supplier adalah :

Total Supplier Score

Pengembangan model untuk evaluasi supplier

Total supplier score =

delivery score + flexibility score + quality score + reliability score – cost score

Cluster score juga membutuhkan data berikut :

C = cluster weights

K = factor weights

DV = desired value

V = value that is computed by dividing a buyer score by DV

Cluster untuk menjelaskan performansi supplier

1. **Delivery**, terdiri dari 4 faktor :

   a. **Geographic Location (K_{gl})**
   (4=very close, 3=close, 2=far, 1=very far)
   b. **Freight Terms (K_{ft})**
   (4=excellent, 3=good, 2=fair, 1=poor)
   c. **Trade Restriction (K_{tr})**
   (4=high, 3= moderate, 2=low, 1=free)
   d. **Total Order Lead Time (K_{lt})**
   (4=15-20 days, 3=21-25 days, 2=26-30 days, 1=more 30 days)

$$\text{Delivery score} = C_D\,[(K_{gl}*V_{gl})+(K_{ft}*V_{ft})-(K_{tr}*V_{tr})+(K_{lt}*V_{lt})]$$

C_D : weight of delivery cluster
V_{gl}, V_{ft}, V_{tr}, V_{lt} : value obtained for each factor dividing DV

Cluster untuk menjelaskan performansi supplier

2. **Flexibility**, terdiri dari 5 faktor :

   a. **Capacity (K_c)**
   (4=very high, 3=high, 2=acceptable, 1=low)
   b. **Inventory Availability (K_{iv})**
   (4=very high, 3=high, 2=acceptable, 1=low)
   c. **Information Sharing (K_{is})**
   (4=very high, 3=high, 2=acceptable, 1=low)
   d. **Negotiability (K_n)**
   (4=very high, 3=high, 2=acceptable, 1=low)
   e. **Customization (K_{cu})**
   (4=very high, 3=high, 2=acceptable, 1=low)

$$\text{Flexibility score} = C_F\,[(K_c*V_c)+(K_{iv}*V_{iv})+(K_{is}*V_{is})+(K_n*V_n)+(K_{cu}*V_{cu})]$$

C_F :weight of flexibility cluster
V_c, V_{iv}, V_{is}, V_n, V_{cu}: value obtained for each factor dividing DV

Cluster untuk menjelaskan performansi supplier

3. **Cost**, terdiri dari 3 faktor :

   a. **Suppliers' Selling Price (K_{sp})**
   (4=high, 3=acceptable, 2=low, 1=very low)
   b. **Internal Cost (K_{ic})**
   (4=high, 3=acceptable, 2=low, 1=very low)
   c. **Ordering and Invoicing (K_{oi})**
   (4=excellent, 3= good, 2=fair, 1=poor)

$$\text{Cost score} = C_C\,[(K_{sp}*V_{sp}) + (K_{ic}*V_{ic}) - (K_{oi}*V_{oi})]$$

C_C : weight of cost cluster
V_{sp}, V_{ic}, V_{oi} : value obtained for each factor dividing DV

Cluster untuk menjelaskan performansi supplier

4. **Quality**, terdiri dari 4 faktor :

   a. **Continuous Improvement Program (K_{ip})**
   (4=high, 3=moderate, 2=acceptable, 1=poor)
   b. **Customer Service (K_{cs})**
   (4=very high, 3=high, 2=acceptable, 1=poor)
   c. **Certifications (K_{ct})**
   (4=excellent, 3= good, 2=fair, 1=poor)
   d. **% of On-time Shipments (K_{ot})**
   (4=very high, 3=high, 2=moderate, 1=low)

Quality score = $C_Q [(K_{ip}*V_{ip})+(K_{cs}*V_{cs})+(K_{ct}*V_{ct})+(K_{ot}*V_{ot})]$

C_Q : weight of quality cluster
V_{ip}, V_{cs}, V_{ct}, V_{ot} : value obtained for each factor dividing DV

Cluster untuk menjelaskan performansi supplier

5. **Reliability**, terdiri dari 4 faktor :

   a. **Feeling of Trust (K_t)**
   (4=very high, 3=high, 2=moderate, 1=low)
   b. **Countrys' Political Situation (K_{ps})**
   (4=excellent, 3=good, 2=fair, 1=poor)
   c. **Currency Exchange Situation (K_{ce})**
   (4=very favorable, 3=favorable, 2=neutral, 1=non favorable)
   d. **Warranty Policies (K_{wp})**
   (4=very favorable, 3=favorable, 2=neutral, 1=non favorable)

Reliability score = $C_R [(K_t*V_t)+(K_{ps}*V_{ps})+(K_{ce}*V_{ce})+(K_{wp}*V_{wp})]$

C_R : weight of reliability cluster
V_t, V_{ps}, V_{ce}, V_{wp} : value obtained for each factor dividing DV

THE SUPPLIER PERFORMANCE EVALUATION MATRIX

Cluster	Weight	Factors	Weight	DV	Supplier A	Supplier B	Supplier C
Delivery	C_D	Geographic location	K_{gl}				
		Freight terms	K_{ft}				
		Trade restrictions	K_{tr}				
		Total order lead time	K_{lt}				
Flexibility	C_F	Capacity	K_c				
		Inventory availability	K_{iv}				
		Information sharing	K_{is}				
		Negotiability	K_n				
		Customization	K_{cu}				
Cost	C_C	Supplier's selling price	K_{sp}				
		Internal cost	K_{ic}				
		Ordering and invoicing	K_{oi}				
Quality	C_Q	Continuous improv. programs	K_{ip}				
		Customer service	K_{cs}				
		Certifications	K_{ct}				
		Percent of on-time shipments	K_{ot}				
Reliability	C_R	Feeling of trust	K_t				
		Country's political situation	K_{ps}				
		Currency exchange situation	K_{ce}				
		Warranty policies	K_{wp}				
SCORE							

Notes: DV = desired value

Table I.
Proposed decision matrix for supplier selection

A CASE STUDY FOR SUPPLIER EVALUATION

Three suppliers located in different geographical regions. They are :

- Supplier A (Mexico),
- Supplier B (South America), and
- Supplier C (China).

Supplier A (Mexico)

Cluster	Factors	Explanation	Score
Delivery	*Geographic location*	Close to USA, possible to have frequent shipments of small quantities	4
	Freight terms	Exceeds the buyer's expectations regarding possible freight terms	4
	Trade restrictions	Supplier and buyer belong to NAFTA, so no trade restrictions	1
	Total order lead time	Total order lead time is shorter than its competitors	4
Flexibility	*Capacity*	It has reached its production limits	3
	Inventory availability	It's trying to implement JIT	2
	Information sharing	Supplier and buyer's communication channel are very good	3
	Negotiability	Based on buyer's perception, acceptable	2
	Customization	High level of specialization, difficult to changes	1
Cost	*Supplier's selling price*	The increase of labor cost and a revaluation of Mexican currency	2
	Internal cost		2
	Ordering and invoicing	Its ordering and invoicing processes are within customer's expectations	4
Quality	*Continuous improv. programs*		3
	Customer service		3
	Certifications		3
	Percent of on-time shipments	Generally arrive on time	4
Reliability	*Feeling of trust*		3
	Country's political situation		4
	Currency exchange situation	Mexican currency exchange situation is not favorable to the US buyers	2
	Warranty policies		2

SUPPLIER B (SOUTH AMERICA)

Cluster	Factors	Explanation	Score
Delivery	*Geographic location*	Relatively close to the USA	3
	Freight terms		4
	Trade restrictions	It can ship products into USA duty-free	1
	Total order lead time	Total lead time has been reduced just slightly above the Mexican supplier	3
Flexibility	*Capacity*	There are expansion projects for the near future, and it has limited capacity currently	2
	Inventory availability	Willing to maintain high inventory	4
	Information sharing	Obsolete information systems	1
	Negotiability	Very high negotiability	4
	Customization		4
Cost	*Supplier's selling price*	Lower than Mexican, but higher than Chinese	2
	Internal cost	It's reducing their internal cost	2
	Ordering and invoicing	Below buyer's expectation	2
Quality	*Continuous improv. programs*	It only has occasional continuous improvement activities	2
	Customer service	Buyer's perception recently	3
	Certifications	It doesn't have an ISO 9000 certification	2
	Percent of on-time shipments	90% on time delivery	3
Reliability	*Feeling of trust*		2
	Country's political situation	Political stability	1
	Currency exchange situation	Favorable to the buyer	3
	Warranty policies	It offers to take full responsibility for non-conformities at this time	4

SUPPLIER C (CHINA)

Cluster	Factors	Explanation	Score
Delivery	Geographic location	Far from US	1
	Freight terms	Insufficient control of its shipping process	1
	Trade restrictions	Moderate	2
	Total order lead time	Less competitive than supplier A and B	2
Flexibility	Capacity		3
	Inventory availability	Willing to maintain buyer desired inventory levels	4
	Information sharing	Deficient use of EDI	2
	Negotiability		4
	Customization	Has capacity above buyer's expectations and flexibility to manufacture products with special characteristics	4
Cost	Supplier's selling price	Cheap, exceeds buyer's expectation	1
	Internal cost	Very low	1
	Ordering and invoicing	Fair, but is expected to improve after China's access to the WTO	3
Quality	Continuous improv. programs	Continuous improvement has been enhanced by large investment in machinery and information systems	4
	Customer service	Still low	2
	Certifications	It's not ISO 9000 certified, but has certification from a US retail chain	2
	Percent of on-time shipments	Below expectations	2
Reliability	Feeling of trust	It often had in-transit delays in shipping process that represents its reliability	2
	Country's political situation	It's backed by a well established government	4
	Currency exchange situation	Very favorable to the buyer	4
	Warranty policies		2

THE BUYER'S NEEDS

- The buyer located in USA.
- It's looking for a supplier that can assume the entire manufacturing processes and provide **competitive prices**.
- It wants to reduce its current inventory level, so it prefers suppliers that can **provide frequent small quantity shipments** or vendor managed inventory service.
- It wants to make sure that the selected supplier has safety stocks at the levels that can **guarantee products' availability** whenever the company needs them.
- It emphasizes the importance of **fast** and **reliable deliveries** that can serve its **just-in-time system**.
- It's also looking for suppliers that can obtain a long-term and **stable partnership** with effective communication channels. So the suppliers must have a **good EDI system**.

THE EVALUATION AND ANALYSIS OF RESULTS

Cluster	Weight	Factors	Weight	DV	Supplier A	Score	Supplier B	Score	Supplier C	Score
Delivery	0.22	Geographic location	0.3	3	4	1.333	3	1.000	1	0.333
		Freight terms	0.15	3	4	1.333	4	1.333	1	0.333
		Trade restrictions	0.2	2	1	0.500	1	0.500	2	1.000
		Total order lead time	0.35	4	3	0.750	3	0.750	2	0.500
						0.168		***0.146***		***0.028***
Flexibility	0.17	Capacity	0.2	2	3	1.500	2	1.000	3	1.500
		Inventory availability	0.25	4	2	0.500	4	1.000	4	1.000
		Information sharing	0.25	3	3	1.000	1	0.333	2	0.667
		Negotiability	0.18	3	1	0.333	4	1.333	4	1.333
		Customization	0.12	2	1	0.500	4	2.000	4	2.000
						0.135		***0.172***		***0.203***
Cost	0.25	Supplier's selling price	0.4	2	4	2.000	2	1.000	1	0.500
		Internal cost	0.4	2	3	1.500	2	1.000	1	0.500
		Ordering and invoicing	0.2	4	4	1.000	2	0.500	3	0.750
						0.300		***0.175***		***0.063***

Cluster's Weight * [∑ (Factors' Weight * Score)]

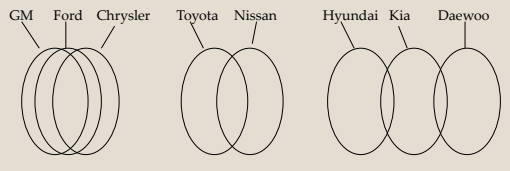
Supplier A / DV = 4/2 = 2

Cluster	Weight	Factors	Weight	DV	Supplier A	Score	Supplier B	Score	Supplier C	Score
						(0.300)		***(0.175)***		***(0.063)***
Quality	0.22	Continuous improv. programs	0.1	3	3	1.000	2	0.667	4	1.333
		Customer service	0.25	3	3	1.000	3	1.000	2	0.667
		Certifications	0.3	3	3	1.000	2	0.667	2	0.667
		Percent of on-time shipments	0.35	4	4	1.000	3	0.750	2	0.500
						0.220		***0.171***		***0.149***
Reliability	0.14	Feeling of trust	0.3	3	3	1.000	2	0.667	2	0.667
		Country's political situation	0.25	3	4	1.333	1	0.333	4	1.333
		Currency exchange situation	0.3	4	2	0.500	3	0.750	4	1.000
		Warranty policies	0.15	3	2	0.667	4	1.333	2	0.667
						0.124		***0.099***		***0.131***
						0.347		**0.414**		**0.448**

So, choose supplier C

MANAGING RELATIONSHIPS WITH SUPPLIERS

PRACTICES ACROSS NATIONS



Suppliers supply multiple automakers

Big, but not loyal
Able to learn from other customers

Most effective at strategically segmenting suppliers

Suppliers tend to supply only one automaker

Loyal, but small
Unable to learn from other customers

Classifying Items for Relationship Design

Tingkat kesulitan \ Tingkat kepentingan	Rendah	Tinggi
Tinggi	**Bottleneck suppliers** Sulit mencari substitusi Pasar monopoli Supplier baru sulit masuk	**Critical strategic suppliers** ❑Penting / strategis ❑Substitusi sulit
Rendah	**Non-critical suppliers** Ketersediaan cukup Item-item cukup standar Substitusi dimungkinkan Nilainya relatif rendah	**Leverage suppliers** ❑Ketersediaan cukup ❑Substitusi dimungkinkan ❑Spesifikasi standar ❑Nilainya relatif tinggi

Supplier Relationship Portfolio

Tingkat kesuitan \ Tingkat kepentingan	Rendah	Tinggi
Tinggi	**Bottleneck suppliers** Penyederhanaan / standarisasi item	**Critical strategic suppliers** ❑Strategic partnership, focus ke keunggulan strategis
Rendah	**Non-critical suppliers Rendah** Simplifikasi proses, focus ke harga per unit	**Leverage suppliers** ❑Pelihara bargaining power terhadap supplier

E-PROCUREMENT

E-PROCUREMENT

- Allow you to select a supplier in an open environment or an exclusive supplier in a closed environment.
- Allow you to make a sole purchase of your required products/materials, or make a joint-purchase with other buyer members.
- Allow you to set up a reorder point in relation with a level of inventory. The system can then automatically issue a purchase order for you.
- Allow you to purchase a product or material by way of bargaining, biding or fixed-pricing.

EXAMPLES

The Volkswagen Group developed a website in 2000 in which includes applications on:

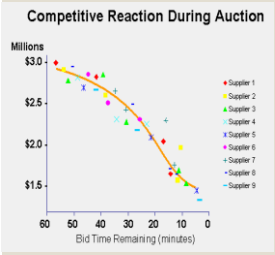
1. **Online enquiries**
2. **Online negotiation**
3. **Online catalogue**
4. **Capacity management**

The group manages almost all of their annual spending, which is more than 50 billion Euros, via the Internet.

Garuda Indonesia
http://www.garuda-indonesia.com/eauction/index.php

Thai Government Purchasing
http://www.gprocurement.go.th/

E-PROCUREMENT CASE 1



AIRLINE EXAMPLE

- Number of supplier: 9
- Number of bids:46
- Materials Sourced: Mixed consumables
- Negotiation format: Reverse Auction
- Duration:30 minutes with two 5-minute extensions