Performance Management, Supplier Partnership Development

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What is Performance Management ?

Why it is important?

"Managing a business organization without performance measures is like a captain of a ship navigating in the middle of the ocean without any instrumentation. The captain of would most likely end up travelling circle without a port of destination, as would a business organization."

Basic Concept of performance measures

- **Objectives:** Typical objectives are- establish baseline measures and trends, determining improvement areas, process gains and losses, compares goals with actual performance, provide information for decision making, etc
- **Typical measurements:** Some of the items to be measured are- human resource, customer, production, R&D, Suppliers, Marketing/sales, Administration
- **Criteria:** Measures should be simple and few in number. They should have relevance to the business and customer. Focus should be on improvement. Cost and time are also important criteria

Establishing strategic measurement system

The quality council has the overall responsibility for the performance measures. Often measures are integrated into a total system of measures. For this purpose, appropriate information is obtained from all of the stake-holders. They will utilize the core values, goals, mission, and vision statements as well as the objectives and criteria. With this information, the strategic measurement system is created**.**

Example of such a system that involves several functions is:

- **Quality:** Reduction in cost of poor quality, percent of certified suppliers, reduction in supplier base, reduction in corrective action cycle time
- **Cost:** increase in inventory turnover, reduction in data transactions, increase in output rupees per employee, reduction in floor space utilization
- **Flexibility:** reduction in cycle time, reduction in lot/batch size, increase in common materials used per product
- **Reliability:** Process capability, reduction in down time, reduction in warranty costs, reduction in design changes
- **Innovation:** reduction in new product introduction time, increase in new patents granted

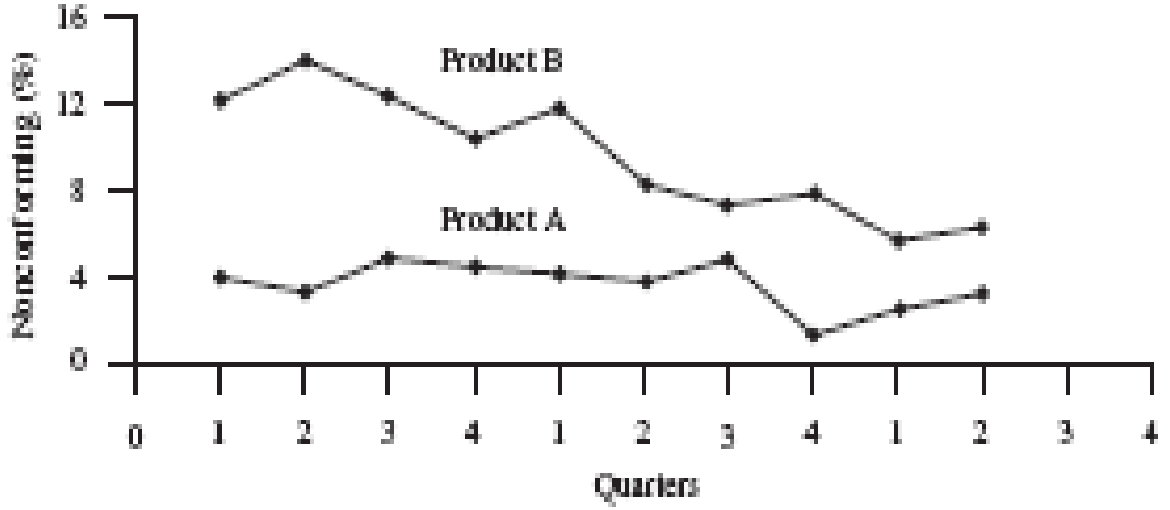
Performance Measure Presentation

There are few basic techniques for presenting performance measures:

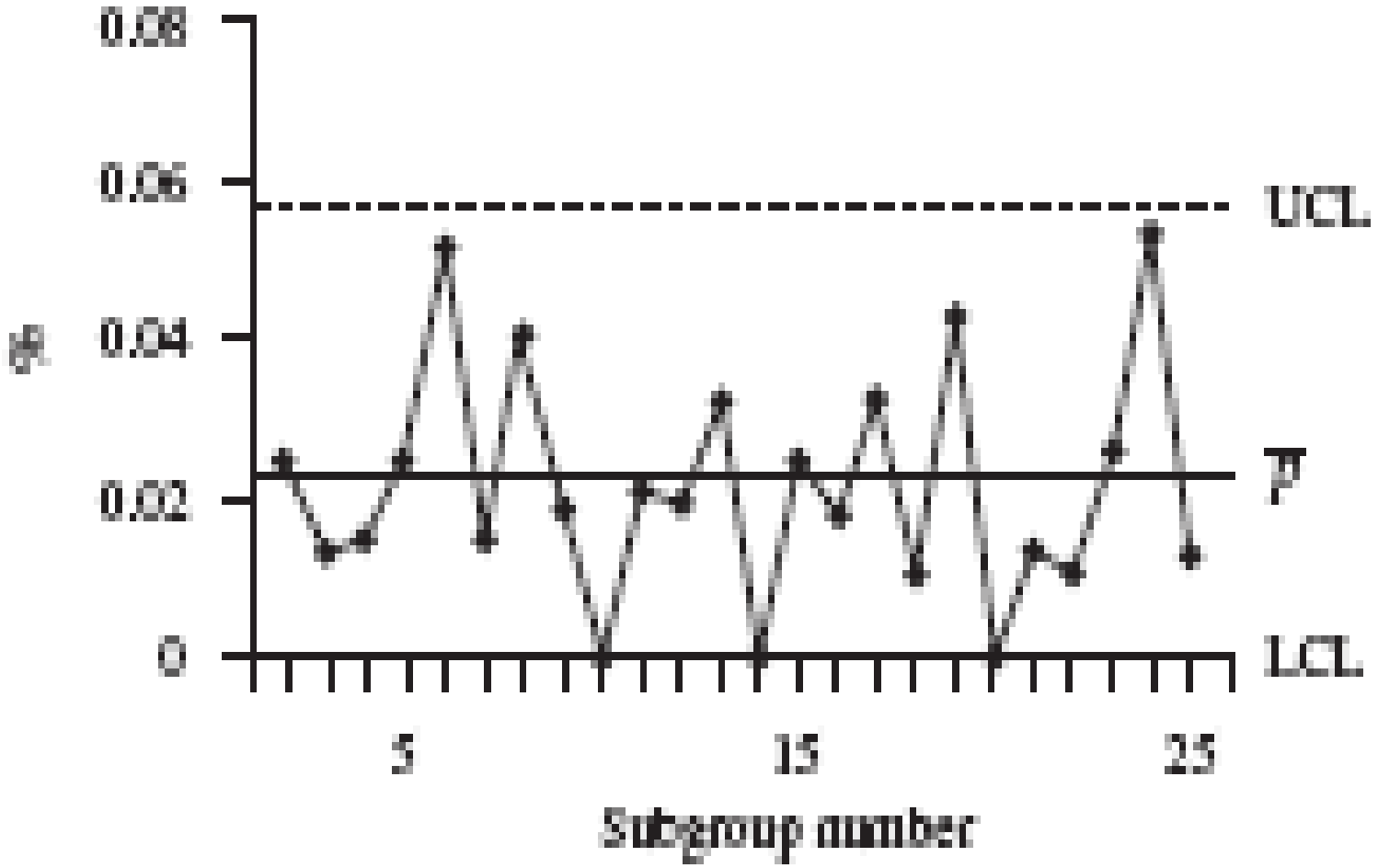
- Time series graph
- Control Charts
- Quality tools
- performance measurement based on the criteria of national/international
- Quality awards such as Malcolm Baldrige National Quality Award

Time Series Plot

- The simplest and most common technique is the time series graph
- Time as measured by days, weeks, months, and so forth, is shown on the horizontal axis, and the performance measure is shown on the vertical axis.
- This type of graph benchmarks the process and shows favorable and unfavorable trends in the measure.



Control Chart for Percent Non-conforming



Malcolm Baldrige National Quality Award

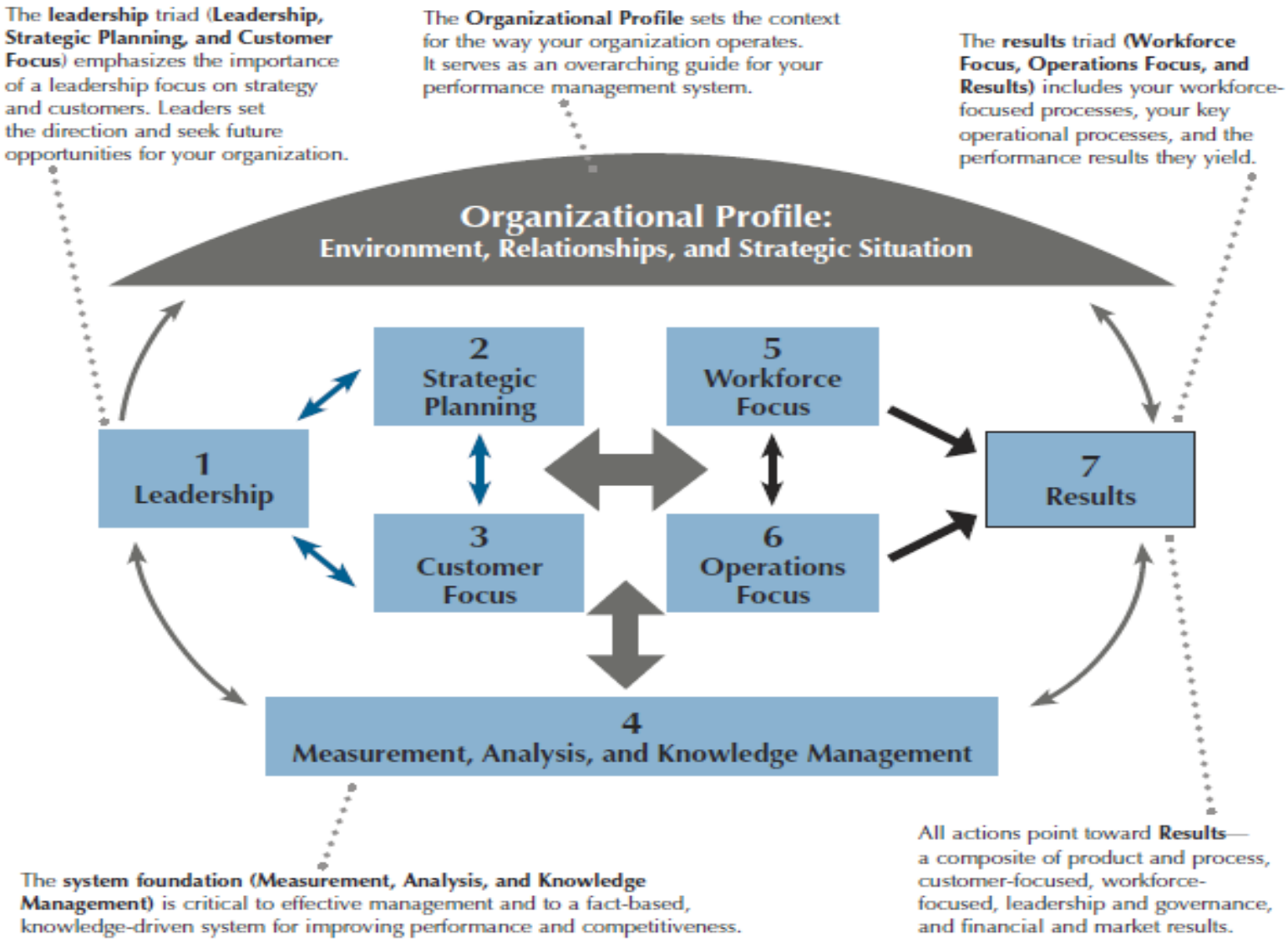
- The Malcolm Baldrige National Quality Award (MBNQA) is an annual award to recognize U.S. organizations for performance excellence.
- **Criteria for Performance Excellence Framework: A Systems Perspective**

  The **performance system** consists of the six categories in the center of the figure. These categories define your processes and the results you achieve.

  The **center horizontal arrow** shows the critical linkage between the leadership triad (categories 1, 2, and 3) and the results triad (categories 5, 6, and 7) and the central relationship between the Leadership and Results categories.

  The **two-headed arrows** show the importance of feedback in an effective performance management system.

Malcolm Baldrige National Quality Award



(Source MBNQA criteria 2013-14)

Key characteristics of MBNQA

- The criteria are directed toward results. They focus principally on following key areas of business performance. Results are a composite of
  - Products and processes
  - Customers
  - Market and financial
  - Workforce
  - Leadership
  - Governance
- Criteria are non-prescriptive and adaptable
- The criteria support a systems approach to maintaining organization-wide goal alignment.
- The criteria support goal-based diagnosis

Rajiv Gandhi National Quality Award

Rajiv Gandhi National Quality Award (RGNQA) was instituted by the Bureau of Indian Standards in 1991, with a view to encourage Indian manufacturing and service organizations to strive for excellence and giving special recognition to those who are considered to be the leaders of quality movement in India

The award has been designed in line with similar awards like **Malcolm Baldrige National Quality Award** in the U.S., **Deming Prize** in Japan and **European Quality Award**

Ramkrishna Bajaj National Quality Award

- Ramkrishna Bajaj National Quality Award (RBNQA) is an Indian equivalent of MBNQA. It was installed in year 1996 is named after Late Mr. Ramkrishna Bajaj, whose motto was “Trust in Quality and Business Ethics”. It is built around 11 interrelated core values and 14 business philosophy points lay foundation for Deming Prizes. Many of these 14 points relate to psychology and understanding of human behaviour. Thus involvement of people is the solid building block for the business excellence.

Deming Prize

- The Deming Prize is one of the highest awards in TQM
- Tt is presented to an organization that has implemented TQM suitable for its management philosophy, scope/ type/ scale of business and management environment.
- The Prize was established in year 1951 in commemoration of Dr. Deming’s great contribution to Japan’s proliferation of statistical process control post World War II.
- There is no limit to the number of potential recipients of the Prize each year.
  - This is consistent with Deming's philosophy of ‘Abolish quota system’

Deming Prize

- Assessment of the applicants is on the basis of criteria:
  - customer oriented business objectives and business strategies,
  - implementation of TQM to achieve these objectives and measurement/ achievements.
- The Deming Prize for individuals or group of individuals is given to those, who have made outstanding contribution to study of TQM or statistical methods used for TQM or dissemination of TQM.
- The Deming Prize for organizations is given to those organizations or their divisions that have achieved distinctive performance improvement through application of TQM in a designated year.
- The Deming Grand Prize is given to operations business units of organization that has achieved distinctive performance improvement through application of quality control and management in pursuit of TQM in designated year.

Supplier Partnership

Introduction

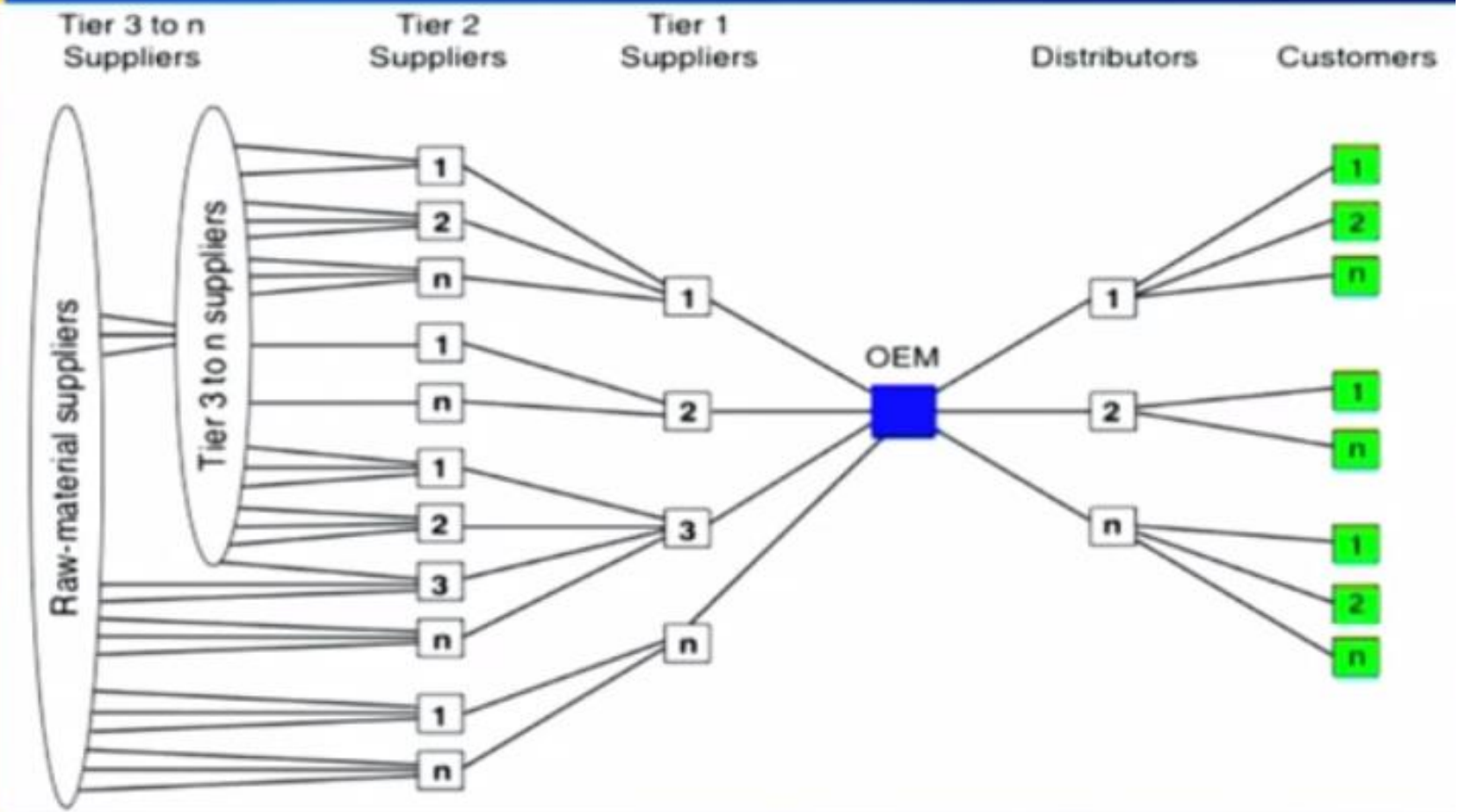
- 60-70% of the cost of goods sold in 2017 consisted of purchased goods
- Therefore, supplier quality can substantially affect the overall cost of a product or service
- Dr. Deming stated that customers must stop awarding business based on the low bidder because price has no basis without quality
- He also advocated single suppliers for each item to help develop a long-term relationship of loyalty and trust
- Introduction of JIT changed the relationship
- To meet the requirements of ISO9000, first tier and tiers subsequent to the OEMs must maintain supply chain development through three key factors:
  - zero defects, 100% on-time delivery, and a process for continuous improvement.

Benefits of Effective Sourcing Decisions

- Better economies of scale can be achieved if orders are aggregated
- More efficient procurement transactions can significantly reduce the overall cost of purchasing
- Design collaboration can result in products that are easier to manufacture and distribute, resulting in lower overall costs
- Good procurement processes can facilitate coordination with suppliers
- Appropriate supplier contracts can allow for the sharing of risk
- Firms can achieve a lower purchase price by increasing competition through the use of auctions

Global Supply Chain Management

Multi Tier Supply Chain Network



Source: National Research Council Staff (2000). *Surviving supply chain integration: strategies for small manufacturers*. Washington, DC: National Academies Press. Adapted from Lambert et al., 1998.

SCM Issues

- Multiple partners in an extended supply chain
- Global nature of the business operations
- Increased need for coordination
- Increased need for collaboration
- Increased need for cost reduction
- Increased need for speed
- Coordination and Integration is key to success

Underpinning theory- ***Resource dependency theory*** **–** ***Firm depends on the other firms or actors in the supply chain.*** It is based on the principle that an organization, such as a business firm, **must engage in transactions with other actors and organizations** in its environment in order to acquire resources.

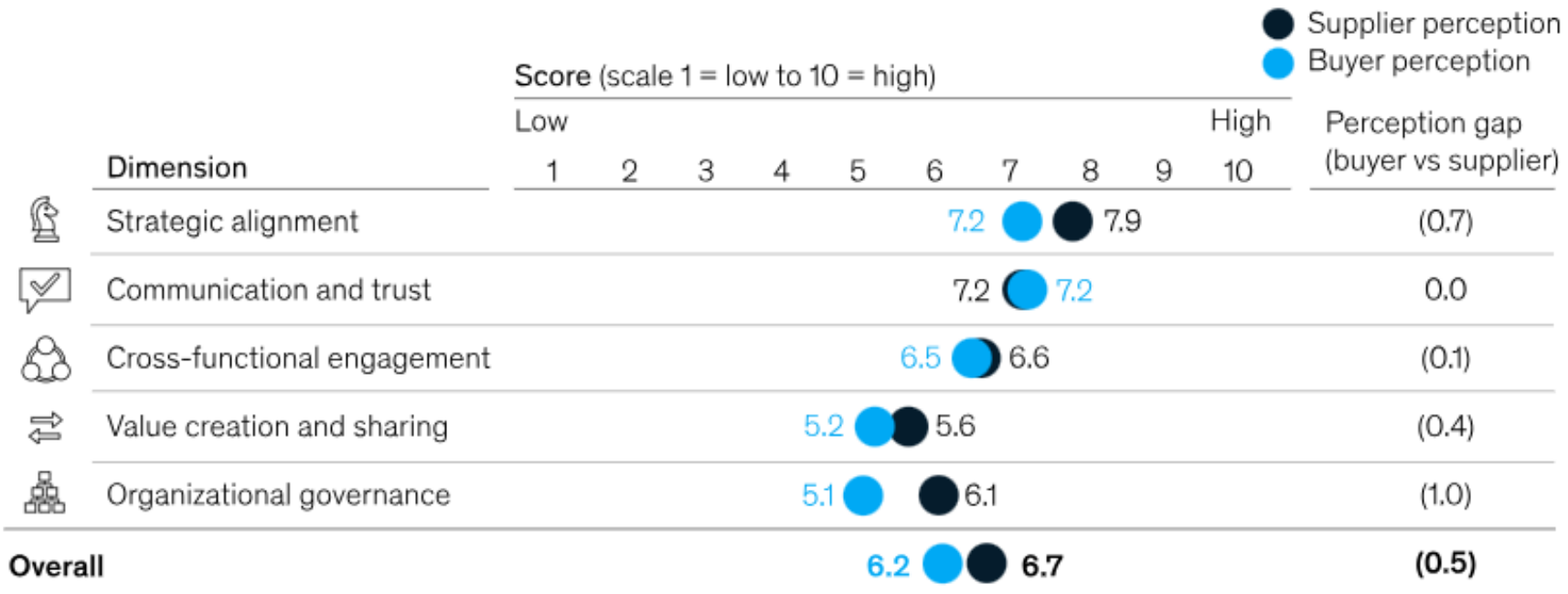
- Outsourcing components have increased progressively over the years
- Some industries have been outsourcing for an extended time
  - Fashion Industry (Nike) (all manufacturing outsourced)
  - Electronics Industry
    - Cisco (major suppliers across the world)
    - Apple (over 70% of components outsourced)

Closer relationships between buyers and suppliers could create significant value and help supply chains become more resilient.

Buyers and suppliers can work together to develop innovative new products, for example, boosting revenues and profits for both parties. They can take an integrated approach to supply-chain optimization, redesigning their processes together to reduce waste and redundant effort, or jointly purchasing raw materials. Or they can collaborate in forecasting, planning, and capacity management—thereby improving service levels, mitigating risks, and strengthening the combined supply chain.

The study conducted by McKinsey in 2022 shows that: average buyer and supplier perceptions of their own collaboration programs rated from one (low) to ten (high) in each of the five dimensions.

Buyer and supplier perceptions were surprisingly close—but scores weakened between alignment and execution.



Source: McKinsey/MSU Supplier Collaboration Index Team

Not Just Manufacturing but Product Design, Too…

- Taiwanese companies now design and manufacture most laptop sold around the world
- Brands such as Hewlett-Packard and PalmOne collaborate with Asian suppliers on the design.

- The complexity of global industrial supply chains exponentially increases their risk.
- On average, an auto manufacturer has around 250 tier-one suppliers, but the number proliferates to 18,000 across the full value chain.
- Aerospace manufacturers have an average of 200 tier-one suppliers and 12,000 across all tiers.
- Finally, technology companies have an average of 125 suppliers in their tier-one group and more than 7,000 across all tiers.

Ishikawa's Principles of Customer/Supplier Relations

1. Both the customer and the supplier are fully responsible for the control of quality.
2. Both the customer and the supplier should be independent of each other and respect each other's independence.
3. The customer is responsible for providing the supplier with clear and sufficient requirements so that the supplier can know precisely what to produce.
4. Both the customer and the supplier should enter into a nonadversarial contract with respect to quality, quantity, price, delivery method, and terms of payments.
5. The supplier is responsible for providing the quality that will satisfy the customer and submitting necessary data upon the customer's request.

Ishikawa's Principles of Customer/Supplier Relations

6. Both the customer and the supplier should decide the method to evaluate the quality of the product or service to the satisfaction of both parties.
7. Both the customer and the supplier should establish in the contract the method by which they can reach an amicable settlement of any disputes that may arise.
8. Both the customer and the supplier should continually exchange information, sometimes using multifunctional teams, in order to improve the product or service quality.
9. Both the customer and the supplier should perform business activities such as procurement, production and inventory planning, clerical work, and systems so that an amicable and satisfactory relationship is maintained.
10. When dealing with business transactions, both the customer and the supplier should always have the best interest of the end user in mind.

Supplier Selection

- This decision is a strategic one that must be made during the design stage. The following three questions need to be answered:
  1. How critical is the item to the design of the product or service?
  2. Does the organization have the technical knowledge to produce the items internally? If not, should that knowledge be developed?
  3. Are there suppliers who specialize in producing the item? If not, is the organization willing to develop such a specialized supplier?

Conditions for selection and evaluation of suppliers

1. The supplier understands and appreciates the management philosophy of the organization.
2. The supplier has a stable management system.
3. The supplier maintains high technical standards and has the capability of dealing with future technological innovations.
4. The supplier can provide those raw materials and parts required by the purchaser, and those supplied meet the quality specifications.
5. The supplier has the capability to produce the amount of production needed or can attain that capability.
6. There is no danger of the supplier breaching corporate secrets.
7. The price is right and the delivery dates can be met. In addition, the supplier is easily accessible in terms of transportation and communication.
8. The supplier is sincere in implementing the contract provisions.
9. The supplier has an effective quality system and improvement program such as ISO 9000 or ISO/TS-16949.
10. The supplier has a track record of customer satisfaction and organization credibility

Requirements of Supplier Certification

1. The customer and supplier shall have agreed upon specifications that are mutually developed, justifiable, and not ambiguous
2. The supplier shall have no product-related lot rejection for a significant period of time
3. The supplier shall have no nonproduct-related rejections for a stated period of time
4. The supplier shall have no negative nonproduct-related incidents for a stated period
5. The supplier shall have a fully-documented quality system, typically ISO 9000
6. The supplier shall have successfully passed an on-site system evaluation
7. The supplier must conduct inspections and tests
8. The suppliers shall have the ability to provide timely inspection and test data

Supplier Rating

A successful supplier rating system requires three key factors:

1. An internal structure to implement and sustain the rating program,
2. A regular and formal review process, and
3. A standard measurement system for all the suppliers

Simplified scoring model (weighted)

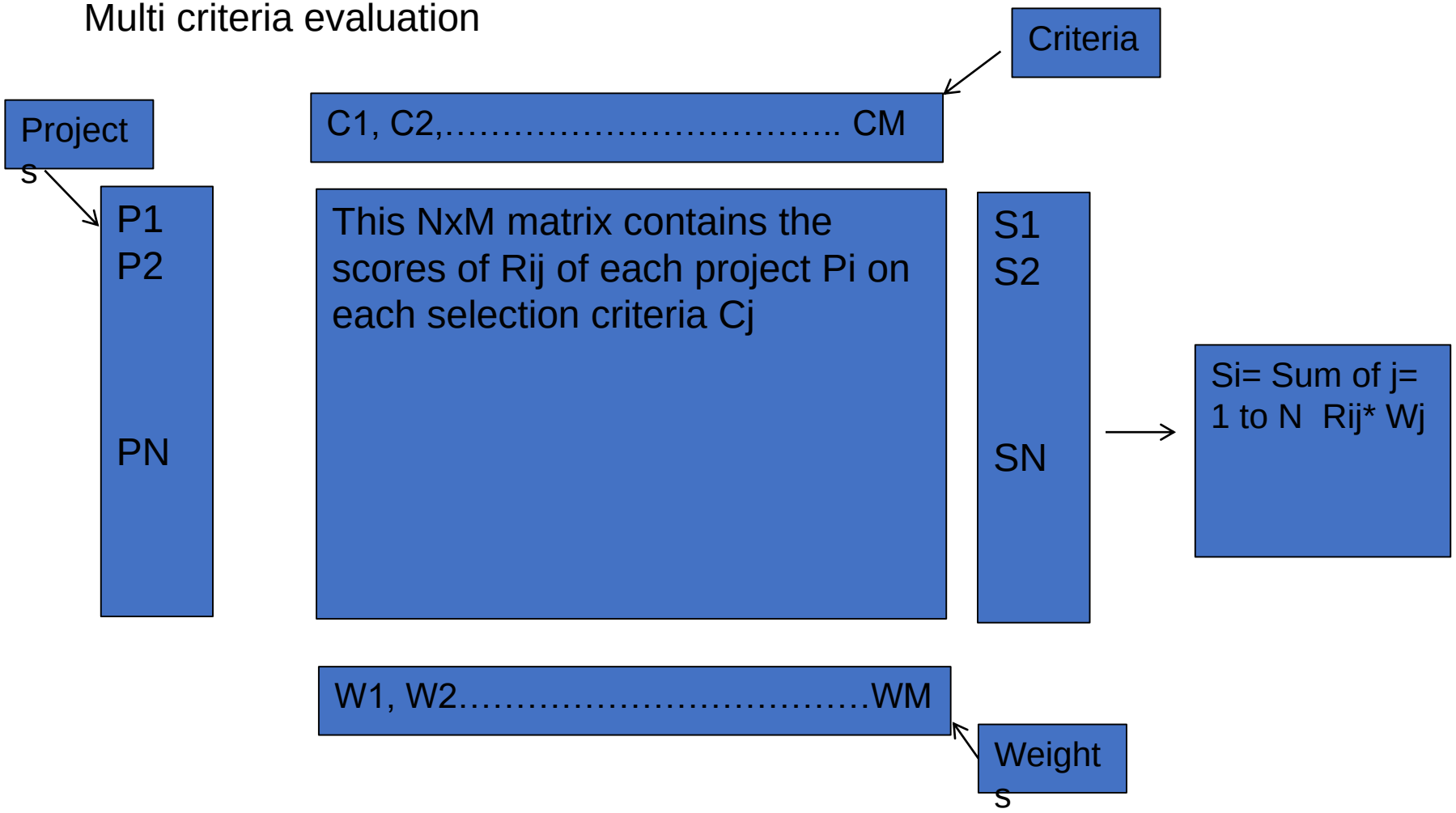
Supplier	Criteria	Performance on criteria		
		High	Medium	Low
Alpha	Cost	x		
	Time			x
	Flexibility		x	
	risk			x
Beta	Cost		x	
	Time		x	
	Flexibility	x		
	risk		x	
Gamma	Cost	x		
	Time	x		
	Flexibility			
	risk	x		
Delta	Cost			x
	Time			x
	Flexibility	x		
	risk		x	

	Weight
Cost	1
Time	2
Flexibility	3
risk	2

Low-1 Medium-2 High-3

Supplier selection: no of criteria????????

Multi criteria evaluation



Methodology

Analytic Hierarchy Process (AHP)

- Analytic Hierarchy Process is a multi-criteria decision making (MCDM) technique was developed by Saaty in 2000 year.
- The analytic hierarchy process (AHP) is also a structured technique for helping people deal with organizing and analyzing complex decisions.
- AHP is also a measurement theory that priorities the hierarchy and consistency of judgmental data provided by a group of decision makers.
- The AHP provides a comprehensive and rational framework for structuring a problem, for representing and quantifying its elements, for relating those elements to overall goals, and for evaluating alternative solutions

i. Establish the hierarchy structure

ii. Various hierarchies' elements weight computation

✓ Establishment of pair-wise comparison matrix

✓ The relative importance of two elements is rated using a scale with the values 1, 3, 5, 7, and 9.

Equally Preferred	Moderately Preferred	Strongly Preferred	Extremely Preferred	Absolutely Preferred
1	3	5	7	9

✓ 2, 4, 6, and 8 indicate intermediate value.

$$A = [a_{ij}] = \begin{array}{c} \\ C_1 \\ C_2 \\ \vdots \\ C_n \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & & C_n \end{array} \\ \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ 1/a_{12} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & & \vdots \\ 1/a_{1n} & 1/a_{2n} & \cdots & 1 \end{bmatrix} \end{array}$$

Where $a_{ij} = 1$ and $a_{ij} = 1/a_{ji} = 1, 2, ...n.$

$$A = [a_{ij}] = \begin{array}{c} \\ C_1 \\ C_2 \\ \vdots \\ C_n \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & & C_n \end{array} \\ \begin{bmatrix} w_1/w_1 & w_1/w_2 & \cdots & w_1/w_n \\ w_2/w_1 & w_2/w_2 & \cdots & w_2/w_1 \\ \vdots & \vdots & & \vdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{bmatrix} \end{array}$$

Where $W_i / W_j = a_{ij}$

- Eigen value and eigen vector calculation

$$\lambda_{max} = \sum_{j=1}^{n} a_{ij} \frac{W_j}{W_i}$$

- Consistency test

CI (Consistency Index) = $\frac{\lambda \max - n}{n - 1}$

CR (Consistency Ratio) = $\frac{CI}{RI}$

✓Random index values were already given by Saaty where

n=1	n=2	n=3	n=4	n=5	n=6	n=7	n=8
RI=0	RI=0	RI=0.52	RI=0.89	RI=1.11	RI=1.25	RI=1.35	RI=1.4

iii. Overall hierarchy weight computation

Case Study- Sourcing decision: Choosing the right supplier