Lecture 05: Chapter 9

Supplier Management & Development

Strategic Sourcing and Procurement | OM 531

Monczka | Handfield | Giunipero | Patterson

Purchasing & Supply Chain Management, 4th Edition

Learning Objectives

1. Understand supplier performance measurement systems and when to use each
2. Apply weighted-point and cost-based evaluation methods with real data
3. Explain supply base rationalization and optimization strategies
4. Map the supplier development process and identify critical success factors
5. Diagnose and overcome barriers to supplier development
6. Analyze real-world supplier management decisions in Oil & Gas

OPENING CASE STUDY

Saudi Aramco's In-Kingdom Total Value Add (IKTVA)

- In December 2015, Saudi Aramco launched the IKTVA program to localize its supply chain.
- **The target:** grow local content from **23% to 70%** of total procurement spend by 2021.
- This required developing hundreds of local suppliers - many with no prior oil & gas experience- while maintaining world-class operational standards.
- By 2024, Aramco achieved a 67% IKTVA score and enabled 350+ new local manufacturing facilities with $9B+ in CAPEX, including 47 products manufactured in Saudi Arabia for the first time.

Source: Aramco.com/iktva; Aramco CEO Amin Nasser, IKTVA Forum 2025; Arab News, Jan 2025

CASE STUDY

The IKTVA Supplier Development Journey

MEASURE

IKTVA Score formula:

Local Value Added / Total Value Added x 100.

Applied to all contractors and suppliers as a compliance metric.

RATIONALIZE

In 2015, ~700 registered local manufacturers.

The program identifies 12 key sectors and 210+ localization opportunities worth $28B annual market (2025 data).

DEVELOP

350+ new manufacturing facilities enabled.

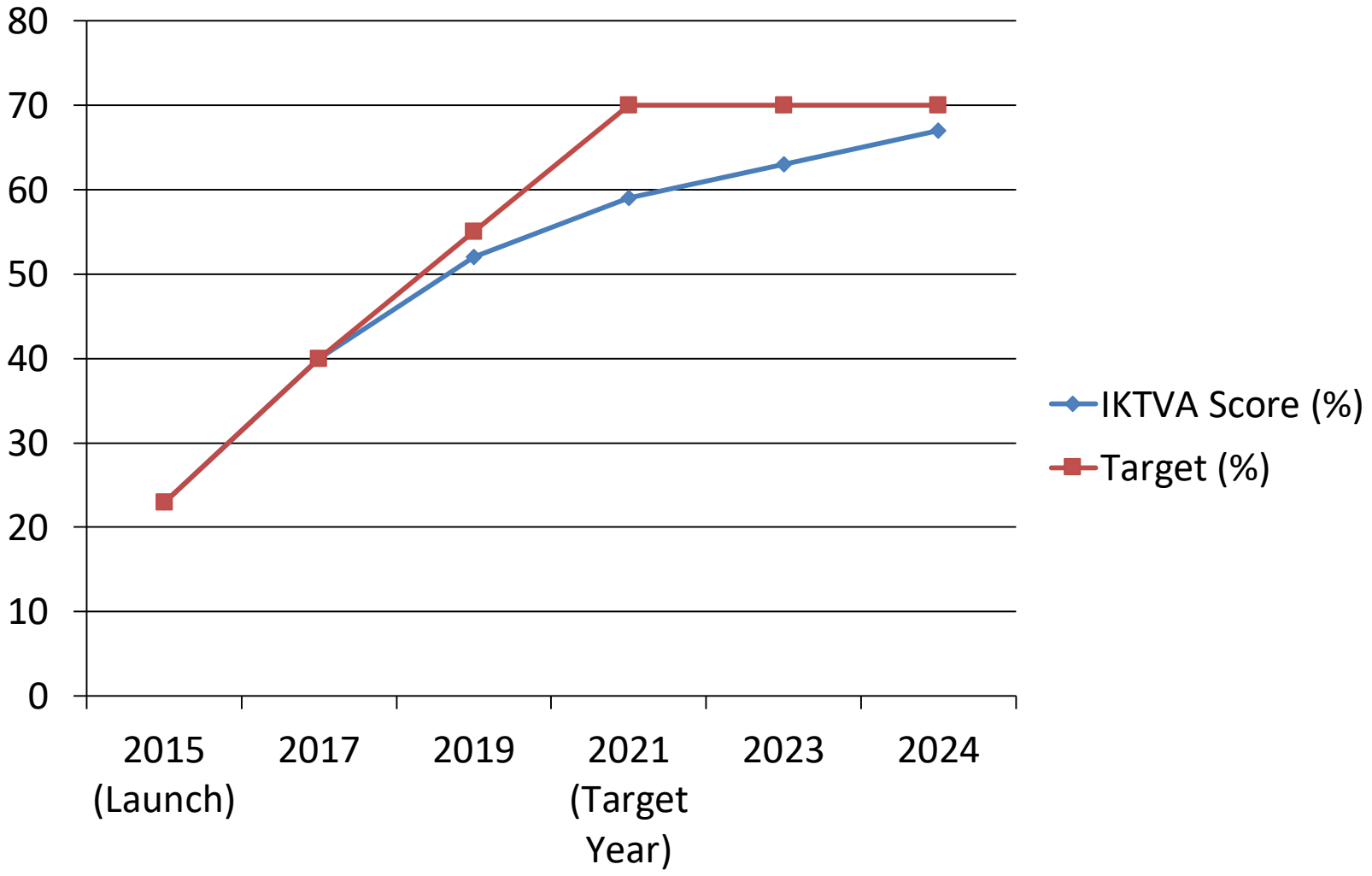
$9B+ invested in CAPEX.

47 products was first-time-produced in-Kingdom.

145 deals worth $9B signed at IKTVA Forum 2025 alone.

Sources: aramco.com/iktva; SupplHi.com; Argaam.com; Arab News Jan 2025; Aramco IKTVA Forum 2025 speech

IKTVA Local Content Progress (2015-2024)



Key Milestones

2015: Program launched at 23%

2021: Reached 59% vs. 70% target

2024: Achieved 67% score

350+ new manufacturing facilities

47 products made in KSA for the first time

12 sectors with 210+ opportunities identified

Sources: Aramco.com/iktva; Argaam.com (CEO statement, 2024); IKTVA Forum 2025

THINK - PAIR - SHARE | 2 minutes

Aramco's IKTVA launched with 700 local manufacturers and a 23% score.

By 2024, they had reached 67%, with more than 350 new facilities. How did they decide? Which suppliers to invest in?

Consider:

- What criteria would you use to evaluate local vs. international suppliers?

- What risks come with developing suppliers who have no O&G experience?

Chapter Roadmap

SECTION 1

Supplier Performance Measurement

Supplier Measurement Decisions

Quantitative Measures

- On-time delivery rate (%)
- Defect rate (PPM)
- Cost reduction achieved ($)
- Lead time consistency
- Order fill rate (%)

Qualitative Measures

- Problem resolution ability
- Technical capability
- Corrective action responsiveness
- New product development support
- Buyer-supplier compatibility

Measurement Frequency & Uses of Data

Reporting Frequency

Daily: Troubleshooting & expediting

Monthly/Quarterly: Summarized to the supplier

Annually: Face-to-face performance review

Never delay reporting poor performance!

Uses of Measurement Data

Identify poor-performing suppliers

Allocate future purchase volumes

Spot improvement opportunities

Make sourcing decision (keep/drop/develop)

Industry Example: Aramco's IKTVA score = (Local Value Added / Total Value Added) x 100. This formula is applied as a compliance metric to every contractor and supplier.
Score below threshold = risk of losing Aramco contracts. (Source: Fragomen.com; Aramco.com/iktva)

SECTION 2

Supplier Evaluation Systems

Three Supplier Evaluation Systems - Comparison

	Categorical	Weighted-Point	Cost-Based (SPI)
Approach	Subjective ratings per category	Weighted scores across categories	Total cost of doing business (SPI index)
Objectivity	Low - Most subjective	Medium - Quantified	High - Most objective
Complexity	Simple, manual	Moderate, some IT	Complex, full cost accounting needed
Best For	Small firms, limited resources	Most firms, flexible system	Large firms, large supply base

Which Evaluation System Should You Use?

How large is your supply base?
How many resources do you have?

Small / Few

CATEGORICAL

Small firm
Few suppliers
Limited IT/resources
Just starting evaluation

Medium

WEIGHTED-POINT

Mid-size firm
Moderate supply base
Some IT support
Most common choice

Large / Many

COST-BASED (SPI)

Large firm (e.g. Aramco)
Hundreds of suppliers
Full cost accounting system
Highest accuracy needed

Many firms START with Categorical, GRADUATE to Weighted-Point, and ASPIRE to Cost-Based as they mature.

Weighted-Point System - Worked Example

Performance Category	Weight	Score (1-5)	Weighted Score
Delivery - On time	0.10	4	0.40
Delivery - Quantity	0.10	3	0.30
Quality - Inbound	0.25	4	1.00
Quality - Improvement	0.10	4	0.40
Cost - Competitiveness	0.15	2	0.30
Cost - Reduction ideas	0.10	3	0.30
Service - Problem resolution	0.05	4	0.20
Service - Technical ability	0.05	5	0.25
Service - Corrective action	0.05	3	0.15
Service - NPD support	0.05	5	0.25
TOTAL RATING	**1.00**		**3.55 / 5.0**

1 = Poor
2 = Below Average
3 = Average
4 = Good
5 = Excellent

Calculation:
Weight x Score = Weighted Score
Example: 0.25 x 4 = 1.00

Cost-Based System - Supplier Performance Index (SPI)

SPI Formula

SPI = (Total Purchases + Nonperformance Costs) / Total Purchases

SPI base = 1.0 | Higher SPI = Higher hidden costs | Goal: SPI as close to 1.0 as possible

Worked Example: Advanced Systems Inc.

Total purchases this quarter: $5,231.67

Late deliveries (5 x $150): $750.00
Returns to supplier (2 x $45): $90.00
Scrap labor costs (3 x $30): $90.00
Material rework (1 x $100): $100.00
Total nonperformance (sum of above): $1,030.00
SPI = $6,261.67 / $5,231.67 = 1.20

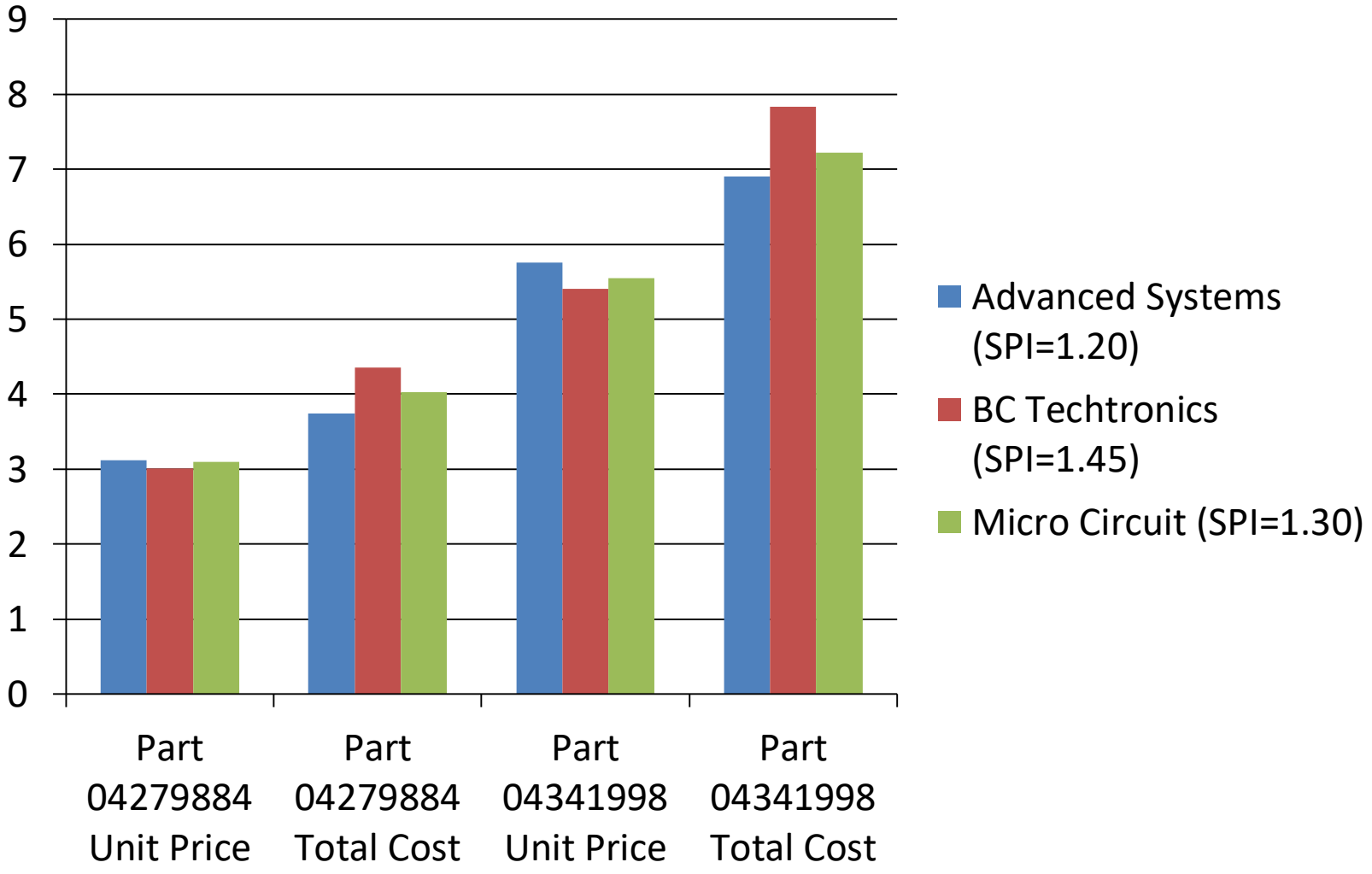
Interpretation

SPI of 1.20 means every $1 of purchases actually costs $1.20 due to poor performance.

That's a 20% hidden cost premium!

Total Cost = Unit Price x SPI

SPI Comparison - Which Supplier Wins on Total Cost?



Key Insight

BC Techtronics has the LOWEST unit price but the HIGHEST total cost!

SPI of 1.45 means 45% hidden cost premium.

Advanced Systems wins on total cost despite higher unit price.

Lesson: Never buy on price alone!

HANDS-ON EXERCISE | 2 minutes

Calculate SPI for Three Competing Valve Suppliers

Scenario: Your plant needs industrial valves. Three suppliers bid:

Supplier A (ValveTech): Unit Price = $450 | Quarterly purchases = $180,000
Nonperformance: 8 late deliveries ($200 each) + 3 returns ($500 each) = $3,100

Supplier B (FlowMaster): Unit Price = $420 | Quarterly purchases = $168,000
Nonperformance: 15 late deliveries ($200 each) + 8 quality rejects ($500 each) = $7,000

Supplier C (AramValve): Unit Price = $470 | Quarterly purchases = $188,000
Nonperformance: 2 late deliveries ($200 each) + 1 return ($500 each) = $900

Tasks: (1) Calculate SPI for each (2) Calculate total cost per unit (3) Rank suppliers (4) Recommend

SECTION 3

Supply Base Rationalization & Optimization

Rationalization & Optimization

Rationalization

How many and which suppliers to maintain?
Determining the optimal number and mix.

Optimization

Ensuring only the most capable suppliers are kept.
Should be a continuous process.

Five Phases of Supply Base Optimization

1. Develop supplier evaluation & measurement systems
2. Eliminate marginal and small-volume suppliers
3. Replace 'good' suppliers with better ones
4. Initiate supplier development activities
5. Global search for world-class suppliers

Key: The goal is the RIGHT number of suppliers, not just fewer suppliers.

Rationalization: Advantages vs. Risks

ADVANTAGES

Access to world-class suppliers

Full-service supplier capabilities

Reduced supply base risk & variability

Lower administrative costs

Lower total product cost (economies of scale)

Enables complex strategies (JIT, early involvement)

RISKS

Supplier dependency (unhealthy reliance)

Absence of competition (price hostage)

Supply disruption (single points of failure)

Overaggressive reduction (capacity gaps)

Higher switching costs if relationship fails

Loss of innovation from dropped suppliers

Real Case: Boeing 787 Dreamliner - When Outsourcing Goes Wrong

What Happened?

Boeing outsourced ~70% of design & manufacturing to 50+ global partners

Original budget: $5.5 billion over 5 years

Actual cost: Over $32 billion - 3 years late

First delivery promised 2008, actually delivered September 2011

Fuselage barrels arrived without wiring, brackets, or hydraulics

Shortage of fasteners - early 787s held with temporary bolts

Boeing had to buy out failing suppliers (Vought, Global Aeronautica)

Estimated $2.5B in penalties and supplier bailouts in 2008 alone

Root Causes (Ch. 9 Lens)

1. No supplier evaluation before outsourcing critical modules

2. Over-aggressive rationalization of in-house capabilities

3. No supplier development program

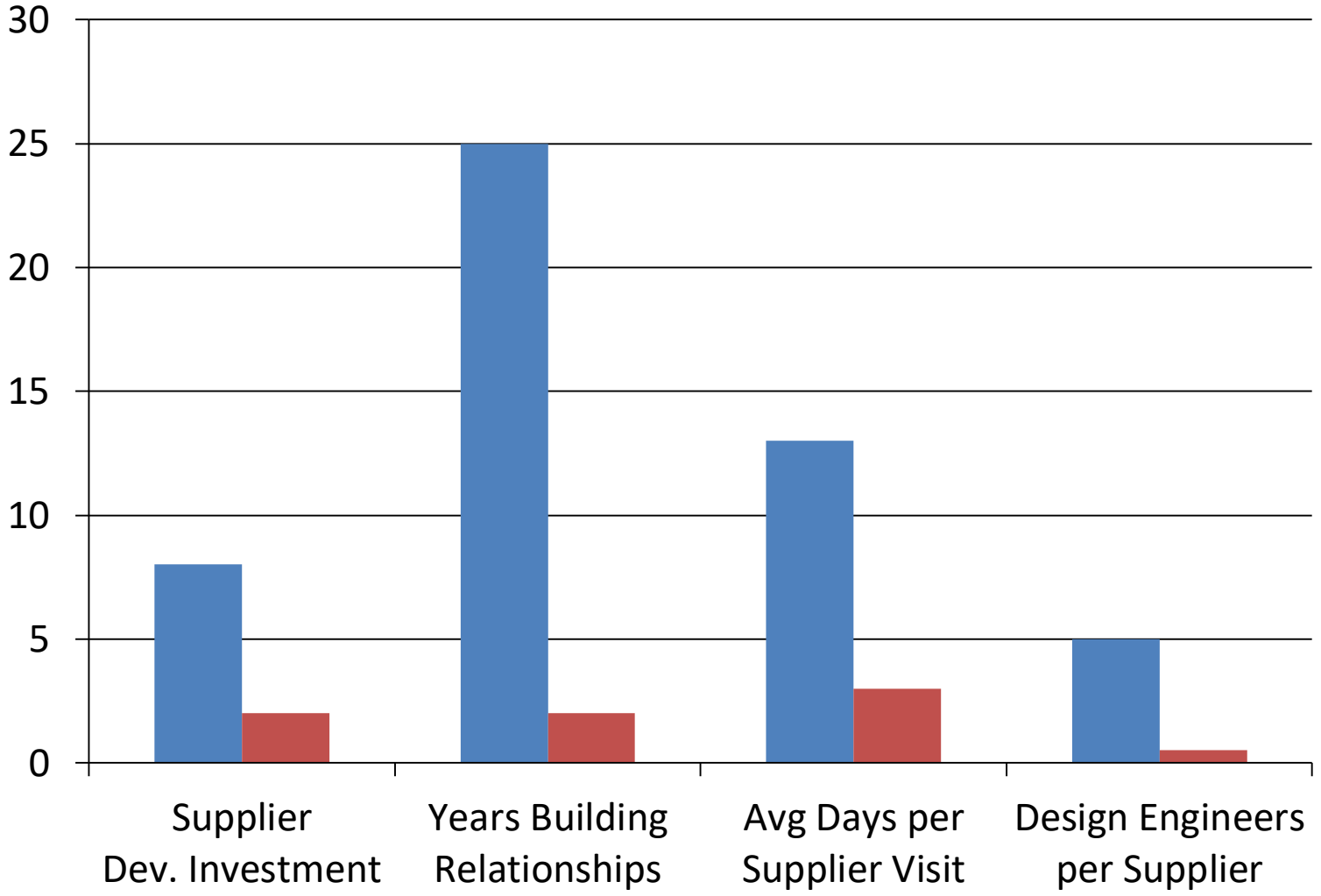
4. Monitoring failure - no visibility into tier-2 suppliers

5. Trusted price over capability

Contrast with Toyota: deep relationships built over decades

Sources: SimpleFlying.com; SupplyChainDigital.com; Zhao (2013) Rutgers; IndustryWeek.com; ResearchGate (2024)

Boeing vs. Toyota: Two Approaches to Supplier Management



Key Lesson

Toyota spends 13 days/year visiting each supplier vs. Boeing's minimal oversight

Toyota assigns 5 design engineers per supplier; GM assigned 0.2

Toyota suppliers show:
- 84% defect reduction
- 35% inventory reduction
- 36% productivity gain

(Liker, The Toyota Way, 2004)

Result: Toyota designed cars in 12-18 months vs. competitors' 2-3 years

Sources: Liker (2004) The Toyota Way, McGraw-Hill; Liker & Choi (2004) HBR; Dyer (2000) Collaborative Advantage, Oxford UP

Formal Approaches to Supply Base Rationalization

20/80 Rule (Pareto)

20% of suppliers typically account for 80% of spend. Focus on the vital few.

Improve or Else

Set clear performance thresholds. Suppliers must improve quickly or lose business.

Triage Approach

Categorize into: Keep, Develop, or Eliminate. Based on strategic fit & performance.

Competency Staircase

Series of performance milestones. Suppliers must climb each step to remain.

Supplier Triage Matrix

Supplier Performance

WORLD-CLASS - Strategic Partners (Keep & Grow)

Top-tier suppliers: deepen relationships, co-develop, long-term contracts

CANDIDATES FOR DEVELOPMENT - Invest to Improve

Potential but underperforming: training, shared resources, joint improvement plans

ELIMINATE - Phase Out

Below minimum threshold: transition volumes to better suppliers

CLASS DISCUSSION | 2 minutes

Boeing outsourced 70% of the 787 to 50+ suppliers. Budget: $5.5B.
Actual cost: $32B+, 3 years late. What went wrong through the lens of Ch. 9?

Discuss in your groups (2 min):

1. Was this a failure of supplier evaluation, rationalization, or development?
2. How would applying the triage approach have changed the outcome?
3. Compare Boeing's approach with Toyota's OMCD model.
4. What lessons apply to Saudi Arabia's Vision 2030 localization push?

SECTION 4

Supplier Development Process

Supplier Development Process Map - 8 Steps

1

Identify Critical Commodities

2

Identify Critical Suppliers

3

Form Cross-Functional Team

4

Meet Supplier Top Mgmt

5

Identify Key Opportunities

6

Define Metrics & Cost-Sharing

7

Reach Agreement

8

Monitor Status & Modify

Steps 1-4: Foundation Building

1. Identify Critical Commodities

Does external purchasing > 50% of value?
Is supplier a source of competitive advantage?
Is purchasing based on total cost?
Can current suppliers meet needs in 5 years?

2. Identify Critical Suppliers

Use supply base assessment system
Rank suppliers from best to worst
Poor performers = eliminate candidates
Mid-range = development candidates

3. Form Cross-Functional Team

Build internal consensus first
Improve YOUR processes before asking supplier
Members: Supply mgmt, Engineering,
Operations, Quality

4. Meet Supplier Top Management

Establish strategic alignment
Set positive, collaborative tone
Foster 2-way communication
Develop mutual trust from the start

Steps 5-8: Execution & Monitoring

5. Identify Opportunities

Driven by customer requirements
Determine probability of improvement
Jointly agree on improvement areas

6. Define Metrics & Cost-Sharing

Evaluate project feasibility & ROI
Establish agreed-upon measures
Equitable cost/benefit sharing

7. Reach Agreement

Identify necessary resources
Commit to deploying resources
Develop milestones & timelines

8. Monitor & Modify

Routine 2-way information exchange
Analyze progress vs. milestones
Modify plan to maintain momentum

Real Case: Toyota's Supplier Development Model

Toyota's Verified Practices

OMCD (Operations Management Consulting Division) - est. 1970 under Taiichi Ohno

Toyota Supplier Support Center (TSSC) - est. 1992, Plano TX, 15 full-time advisors

TSSC runs up to 50 projects/year with 500+ organizations helped since 1992

Jishuken (self-study) groups: 55-60 key suppliers in teams of 4-7 companies

Jishuken started 1977 in Japan; 3-4 month projects per company

Suppliers rated Toyota as 'most preferred company to work with' (Liker & Choi, 2004)

TSSC results (31 projects): avg 124% productivity gain, 75% inventory reduction

Liker & Choi's 6 Steps

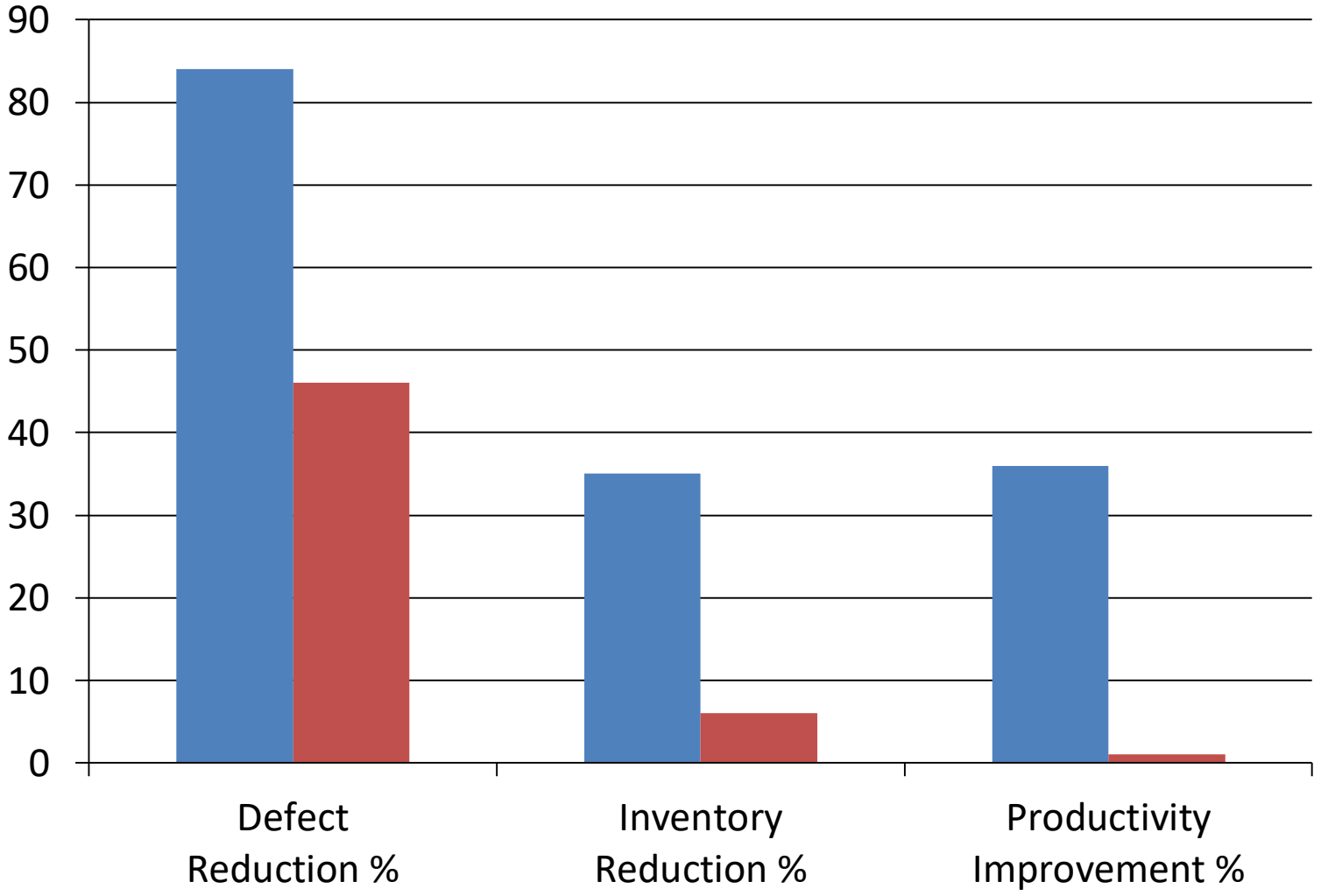
From HBR Dec 2004:

1. Understand how suppliers work
2. Turn rivalry into opportunity
3. Supervise vendors closely
4. Develop technical capabilities
5. Share info intensively
6. Conduct joint improvement

Based on interviews with 50+ Toyota/Honda managers & 40+ suppliers

Sources: Liker & Choi (2004) HBR; TSSC.com; Dyer & Nobeoka (2000) Strategic Mgmt Journal; Liker (2004) The Toyota Way

Toyota vs. Competitors: Supplier Development Results



Additional Data (Dyer 2000)

Plants supplying Toyota vs. same plants supplying rivals:

14% higher output per worker

25% lower inventories

50% fewer defects

1965-1992: Toyota + suppliers achieved 700% labor productivity gain vs. 250% for US automakers

CCC21 program saved $10B over 5 years (2000-2005)

Sources: Liker (2004) The Toyota Way; Dyer (2000) Collaborative Advantage, Oxford UP; Dyer & Nobeoka (2000) Strategic Mgmt Journal, 21(3), pp.345-367

SECTION 5

Overcoming Barriers to Supplier Development

Three Categories of Barriers

Buyer-Specific Barriers

- Purchase volume doesn't justify investment
- No immediate benefit evident
- Item not important enough
- Lack of executive support

Buyer-Supplier Interface Barriers

- Supplier reluctant to share cost data
- Confidentiality concerns
- Lack of trust
- Misaligned organizational cultures
- Insufficient inducements

Supplier-Specific Barriers

- Lack of supplier mgmt commitment
- Agrees but fails to implement
- Lacks engineering resources
- Lacks IT/information systems
- Not convinced of benefits
- Lacks skilled employees

Solutions Toolkit: The Carrot & The Stick

THE CARROT (Incentives)

Share personnel and engineering resources
Provide direct technical support on-site
Offer training programs & skill development
Increase future order volumes
Financial incentives for hitting targets
Awards and public recognition programs
Co-invest in technology upgrades
Create ombudsman for dispute resolution

THE STICK (Consequences)

Withhold future business if no improvement
Reduce order volumes progressively
Share competitive benchmarking data
Set clear deadlines for improvement
Phase-out plans for non-compliant suppliers
Let suppliers know exactly where they stand
Make improvement a contract requirement

Barrier-Solution Quick Reference

BARRIER	SOLUTION	Type
Volume too low to justify investment	Standardize parts & single-source	
No immediate benefit evident	Pursue quick wins first	
Supplier won't share cost data	Create ombudsman, confidentiality agreements	
Supplier doesn't trust buyer	Spell out commitments in writing	
Cultural misalignment	Adapt approach to local conditions	
Supplier lacks engineering resources	Provide direct engineering support	
Supplier lacks IT systems	Provide EDI support directly	
Supplier lacks skilled workers	Establish training centers, HR support	

Real Case: SABIC's Nusaned Supplier Development Initiative

SABIC Nusaned (Launched 2018)

SABIC's Integrated Localization Engine for supplier development

Four pillars: Entema (opportunities), Da'aem (support packages), Muahal (workforce development), Numou (SME manufacturing)

Numou reaches Saudi SMEs to locally manufacture goods SABIC imports

GDP contribution: SAR 16.7 billion (2018-2023)

Jobs created: 30,756 citizen jobs (2018-2023)

13 strategic sectors: automotive, construction, O&G, pharma, etc.

Nusaned Investment: 100% SABIC-owned entity for SME equity investment

Ch. 9 Connection

All 8 steps visible:

Step 1-2: Identified import-heavy commodities & SMEs

Step 3: Cross-functional with SABIC plants

Step 4-5: Entema portal for opportunity matching

Step 6: Da'aem support packages

Step 7: Nusaned Investment equity

Step 8: Ongoing monitoring & Muahal training

Overcomes barriers via direct support (carrot approach)

Sources: sabic.com/en/nusaned; SABIC Nusaned Annual Report 2022 (nusanedannualreport.com); sabic.com stories

SIMULATION EXERCISE | 20 minutes

Supplier Portfolio Optimization Game

You are the CPO of a Saudi petrochemical company with 12 suppliers across 4 commodity groups. Annual spend: SAR 500 Million. Budget for supplier development: SAR 15 Million.

Each team receives a Supplier Profile Card with:

- Supplier name, commodity, annual spend, quality score, delivery score, SPI
- Current capacity utilization and financial health rating

Your tasks:

1. Classify each supplier: Keep (Strategic) / Develop / Eliminate
2. Allocate your SAR 15M development budget across 'Develop' suppliers
3. Create a transition plan for 'Eliminate' suppliers (who takes their volume?)
4. Present your rationalization strategy to the class (3 min per team)

Constraint: You MUST maintain at least 2 suppliers per commodity group for risk mitigation

Simulation: Supplier Portfolio Data

Supplier	Commodity	Spend (M)	Quality	Delivery	SPI
Al-Faris Steel	Steel Pipes	85	92%	88%	1.08
Gulf Metals	Steel Pipes	45	78%	72%	1.25
National Steel	Steel Pipes	30	85%	90%	1.12
ChemFlow	Chemicals	70	95%	94%	1.04
Petrochem Arabia	Chemicals	55	82%	80%	1.18
Saudi Chemicals	Chemicals	25	70%	65%	1.35
ValveTech Int'l	Valves	50	90%	92%	1.06
Eastern Valves	Valves	35	75%	70%	1.28
Precision Valve Co	Valves	20	88%	85%	1.10
ElectroPower	Electrical	40	93%	91%	1.05
Spark Systems	Electrical	30	80%	77%	1.20
Cable Arabia	Electrical	15	68%	60%	1.40

Decision Guide

KEEP if:
SPI < 1.10
Quality > 90%

DEVELOP if:
SPI 1.10-1.30
Quality 75-90%

ELIMINATE if:
SPI > 1.30
Quality < 75%

Budget: SAR 15M
Min 2 per commodity

GROUP DEBATE | 8 minutes

"We should eliminate all suppliers with SPI > 1.30 and invest only in our top 3 suppliers per category."

Side A (Agree): Defend this aggressive rationalization approach.
Side B (Disagree): Argue for a more moderate, development-first approach.

Each side gets 3 minutes. Then open floor for 2 minutes.

Consider: What if the supplier with SPI 1.35 is the ONLY local supplier for that commodity and Vision 2030 requires 70% local content?

HANDS-ON EXERCISE 2 | 05 minutes

Design a Weighted-Point Scorecard for Your Industry

In pairs, design a weighted-point supplier evaluation scorecard for ONE of these:

A) A drilling equipment supplier for an offshore oil rig
B) A catering/food services supplier for a petrochemical plant
C) An IT services supplier for a logistics company

Your scorecard must include:

1. At least 6 performance categories with assigned weights (must sum to 1.0)
2. Justification for why you weighted certain categories higher
3. A scoring scale (1-5 or 1-10)
4. One unique category not found in the textbook example

Be prepared to explain: How would your weights change if the supplier was providing safety-critical vs. non-critical items?

CASE STUDY REVISITED

Saudi Aramco IKTVA: 10 Years of Results (2015-2025)

IKTVA Score	New Facilities	CAPEX Invested	First-in-KSA
23% --> 67%	**350+**	**$9 Billion+**	**47 Products**
(2015 to 2024)	manufacturing plants	in local capacity	made locally for 1st time

Chapter 9 in Action: IKTVA used weighted evaluation for all suppliers | Triage approach to rationalization | 8-step development process with on-site support | Barriers overcome through training, shared engineers, and long-term volume commitments | 12 sectors, 210+ opportunities worth $28B annual market

Sources: Aramco.com/iktva; Aramco CEO speech IKTVA Forum 2025; Arab News Jan 2025; Argaam.com 2024

Key Takeaways

MEASURE	Use the right evaluation system for your context. Cost-based (SPI) reveals hidden costs that unit price hides.
RATIONALIZE	Pursue the RIGHT number of suppliers, not just fewer. Balance efficiency gains against concentration risks.
DEVELOP	Follow the 8-step process systematically. Invest in suppliers as you would in your own capabilities.
OVERCOME	Address barriers from all 3 categories. Combine carrots (incentives) with sticks (consequences).

References

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Dyer, J.H. (2000). Collaborative Advantage: Winning through Extended Enterprise Supplier Networks. Oxford University Press.

Liker, J.K. (2004). The Toyota Way: 14 Management Principles. McGraw-Hill.

Industry Cases & Reports:

Saudi Aramco IKTVA Program: aramco.com/en/what-we-do/commercial-ecosystems/iktva

Aramco IKTVA Forum 2025 - CEO Amin Nasser speech: aramco.com/en/news-media/speeches/2024

SABIC Nusaned Initiative: sabic.com/en/nusaned; Annual Report: nusanedannualreport.com

Toyota Supplier Support Center (TSSC): tssc.com; Toyota USA Newsroom - 30 Years of TSSC

Boeing 787 Supply Chain: SimpleFlying.com; Zhao (2013) Rutgers; IndustryWeek.com

Arab News (Jan 2025): 'Saudi Aramco secures $9bn in deals at IKTVA forum'

Argaam.com (2024): 'Aramco's local content up to 67% of total purchases: CEO'

Thank You

Questions & Discussion

Further Reading

Monczka et al., Ch. 9: Supplier Management and Development

Liker & Choi (2004) - 'Building Deep Supplier Relationships' - HBR

Dyer & Nobeoka (2000) - 'The Toyota Case' - Strategic Mgmt Journal

Saudi Aramco IKTVA Reports: aramco.com/iktva