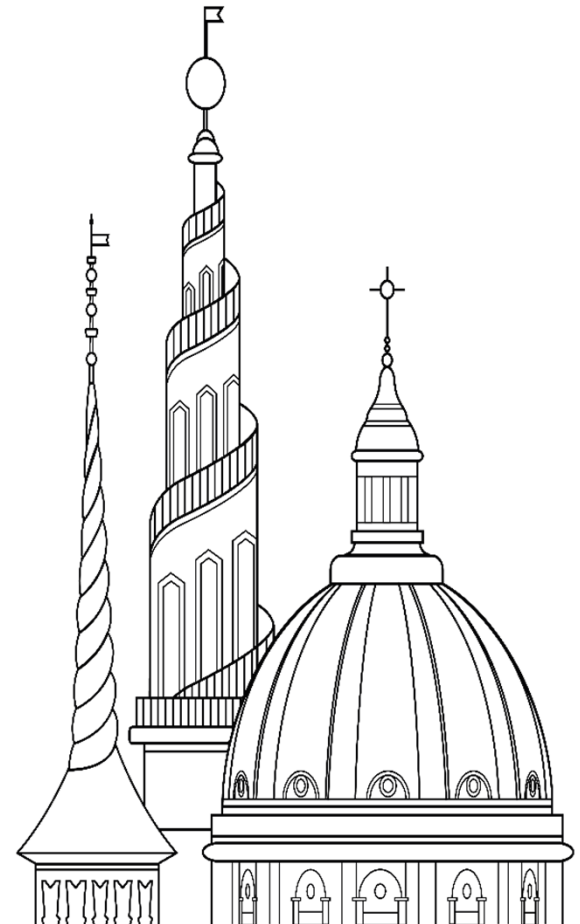


Supply Chain Strategies

Andreas Wieland



Decision Phases in a Supply Chain

Supply Chain Strategy, Design

- In this phase, the company decides how to structure the supply chain over the next several years.
- What will be the chain's configuration? How will resources be allocated? What processes will be performed at each stage?
- Outsourcing vs. in-house? Location/capacities of production/warehousing facilities? Type of information system? ...

Supply Chain Planning

- For decisions made during this phase, the time frame considered is a quarter to a year.
- The supply chain's configuration (determined before!) establishes constraints within which planning must be done.
- Forecast (demand, cost, ...) for the coming year? Which market will be supplied from which location? Inventory policies? ...

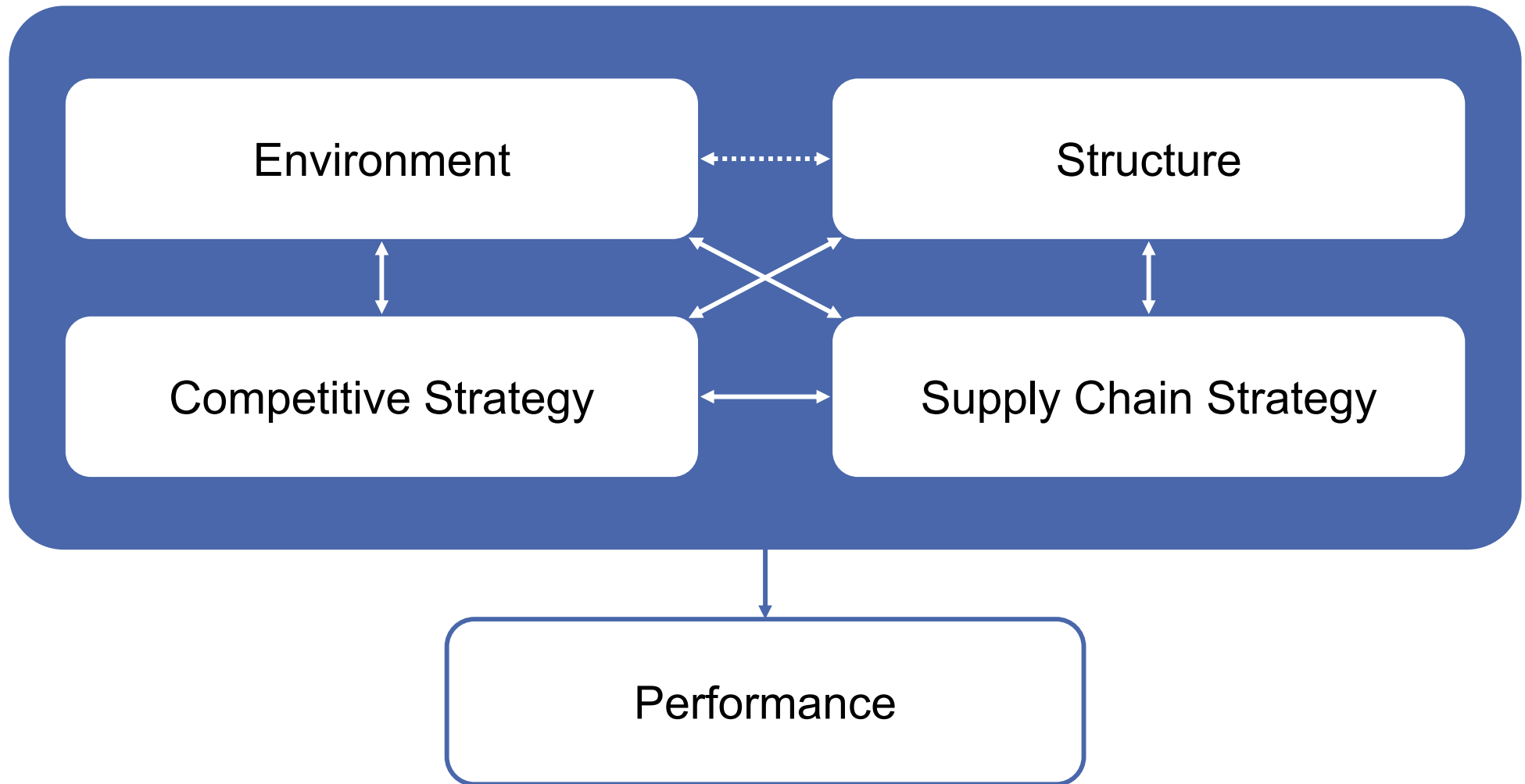
Supply Chain Operation

- For supply chain decisions made during the operational phase, the time horizon is weekly or daily.
- SC configuration is considered fixed and planning policies are already defined. Decision regarding Individual customer orders.
- Allocate inventory or production to individual orders. Set a date by which an order is to be filled. Generate pick list. ...

Outline

1. Strategic Fit
2. Fisher's Model
3. Lee's Model
4. Leagility Models

Interdependencies among Supply Chain Strategy, Competitive Strategy, Structure, and Environment



Source: adapted from Ward, Bickford & Leong (1996)

Competitive Strategy vs. Supply Chain Strategy

Competitive Strategy

“A company’s competitive strategy defines, relative to its competitors, the set of customer needs that it seeks to satisfy through its products and services.”

Chopra & Meindl (2016), p. 31

Supply Chain Strategy

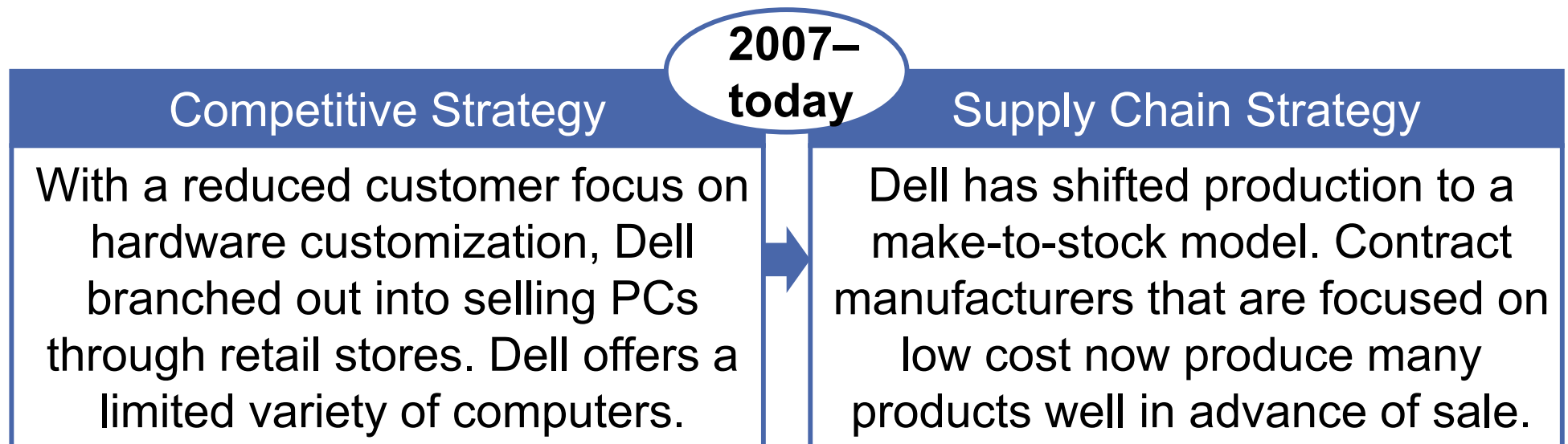
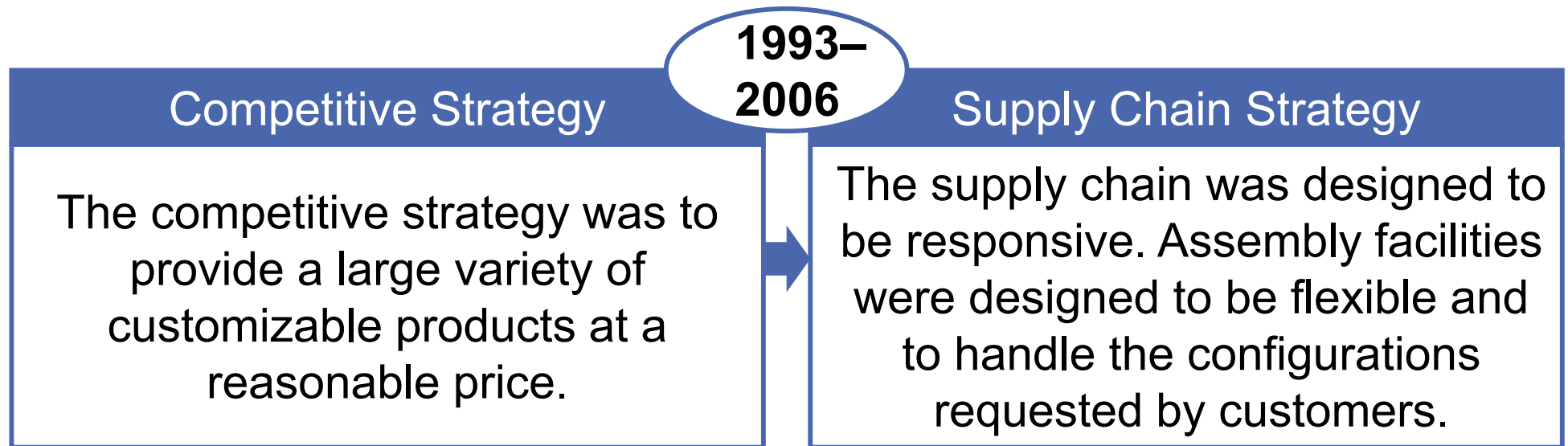
“A supply chain strategy determines the nature of procurement of raw materials, transportation of materials to and from the company, manufacture of the product or operation to provide the service, and distribution of the product to the customer, along with any follow-up service and a specification of whether these processes will be performed in-house or outsourced.”

Chopra & Meindl (2016), p. 32

Strategic Fit

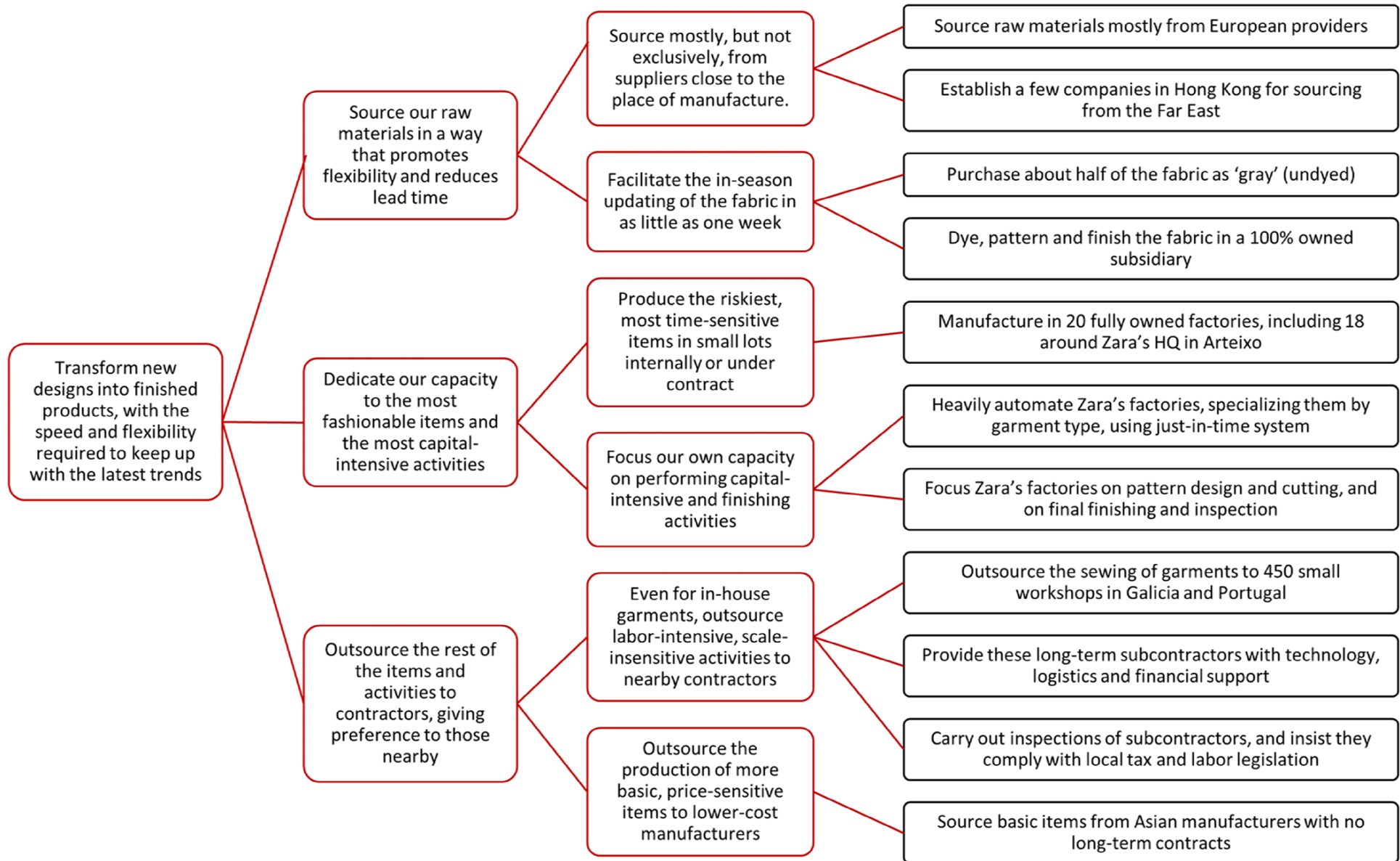


Example: Dell



Source: Chopra & Meindl (2016)

Fragment of Zara's Map, for the Area of "Suppliers & Manufacturing"



Source: Perez-Franco et al. (2016), <http://dx.doi.org/10.1016/j.jpe.2016.09.012>

Case Study: Strategic Fit



Please read the “Strategic Fit” case study and answer the following study questions:

1. In what ways did Blockbuster achieve better strategic fit than local stores?
 2. How did Netflix and Redbox achieve better strategic fit than Blockbuster?
- (45 min incl. break; prepare a PPT presentation.)

Outline

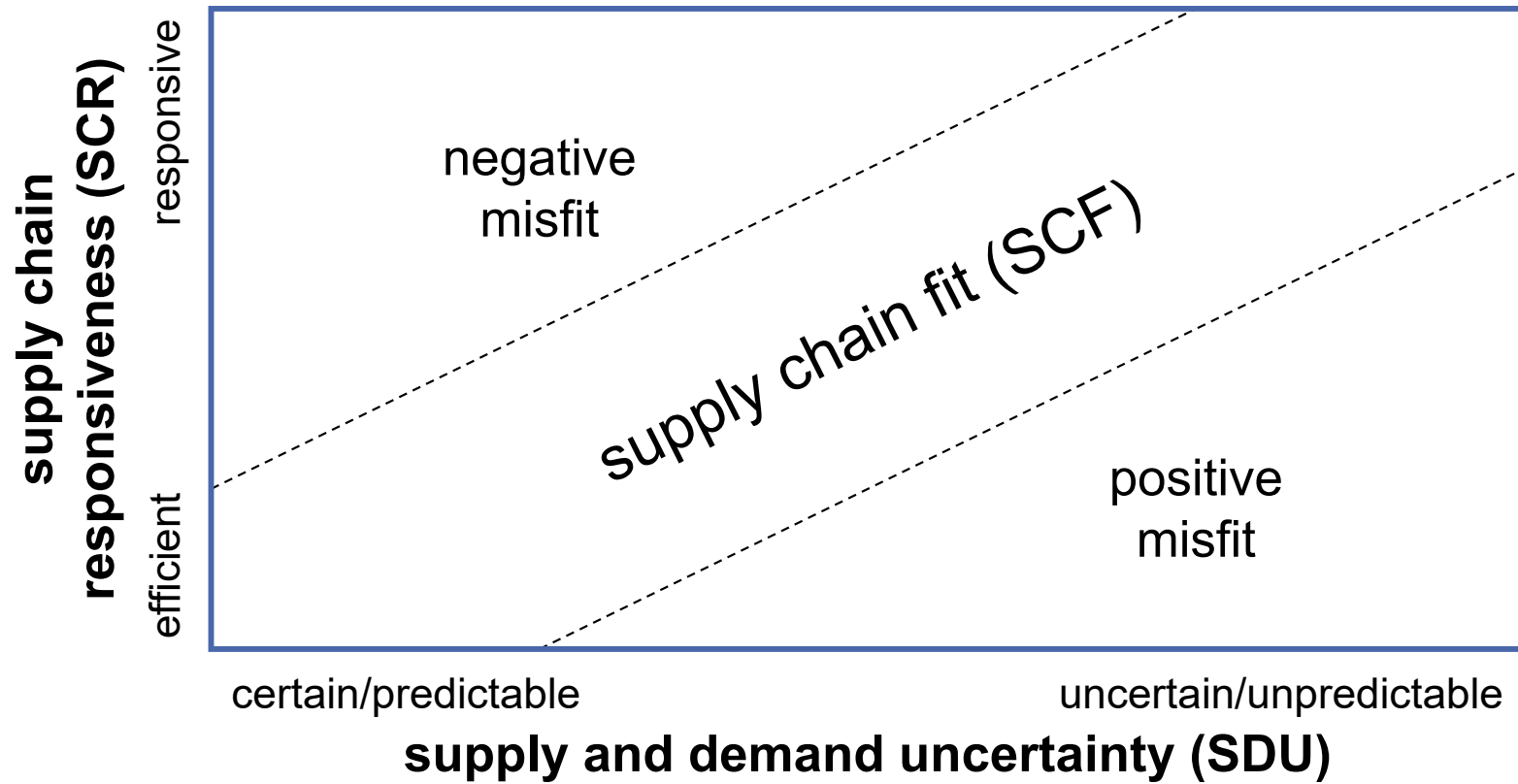
1. Strategic Fit
2. Fisher's Model
3. Lee's Model
4. Leagility Models

Supply Chain Fit



Source: Wagner, Grosse-Ruyken, Erhun (2012)

Fit and Misfit



1st Dimension of Fisher's Model: Functional vs. Innovative Products



Functional Products

- satisfy basic needs
- don't change much over time
- stable, predictable demand
- long life cycle



- pasta
 - tomato soup
- commodities



Innovative Products

- newness
- change much over time
- difficult to predict
- short life cycle



- smart phone
 - fashion apparel
- novelties



Source: Fisher (1997)

1st Dimension of Fisher's Model: Functional vs. Innovative Products

	Functional Products	Innovative Products
Product life cycle	more than 2 years	3 months to 1 year
Contribution margin	5–20%	20–60%
Product variety	low (10–20 variants per category)	high (often millions of variants per category)
Average margin of error in the forecast at the time production is committed	10%	40–100%
Average stockout rate	1–2%	10–40%
Average forced end-of-season markdown as percentage of full price	0%	10–25%
Lead time required for made-to-order products	6 months to 1 year	1 day to 2 weeks

Source: Fisher (1997); contribution margin = $100\% \times (\text{price} - \text{variable cost}) \div \text{price}$

2nd Dimension of Fisher's Model: Efficient vs. Responsive Strategy



Efficient Supply Chain

- Minimize physical costs!
- These costs include costs to convert raw materials into finished goods, transportation of goods, warehousing



tomato soup



underwear



cars



custom PC

Source: Fisher (1997)

Supply Chains Can Be Classified Based on Design Characteristics

Design Characteristics	Efficient Supply Chain	Responsive Supply Chain
SC cost minimization	High Importance	Low Importance
Inventory turnover		
Utilization rate		
Delivery reliability	Low Importance	High Importance
Buffer inventory		
Buffer capacity		
Customer service level		
Demand reaction capability		
Product launch frequency		

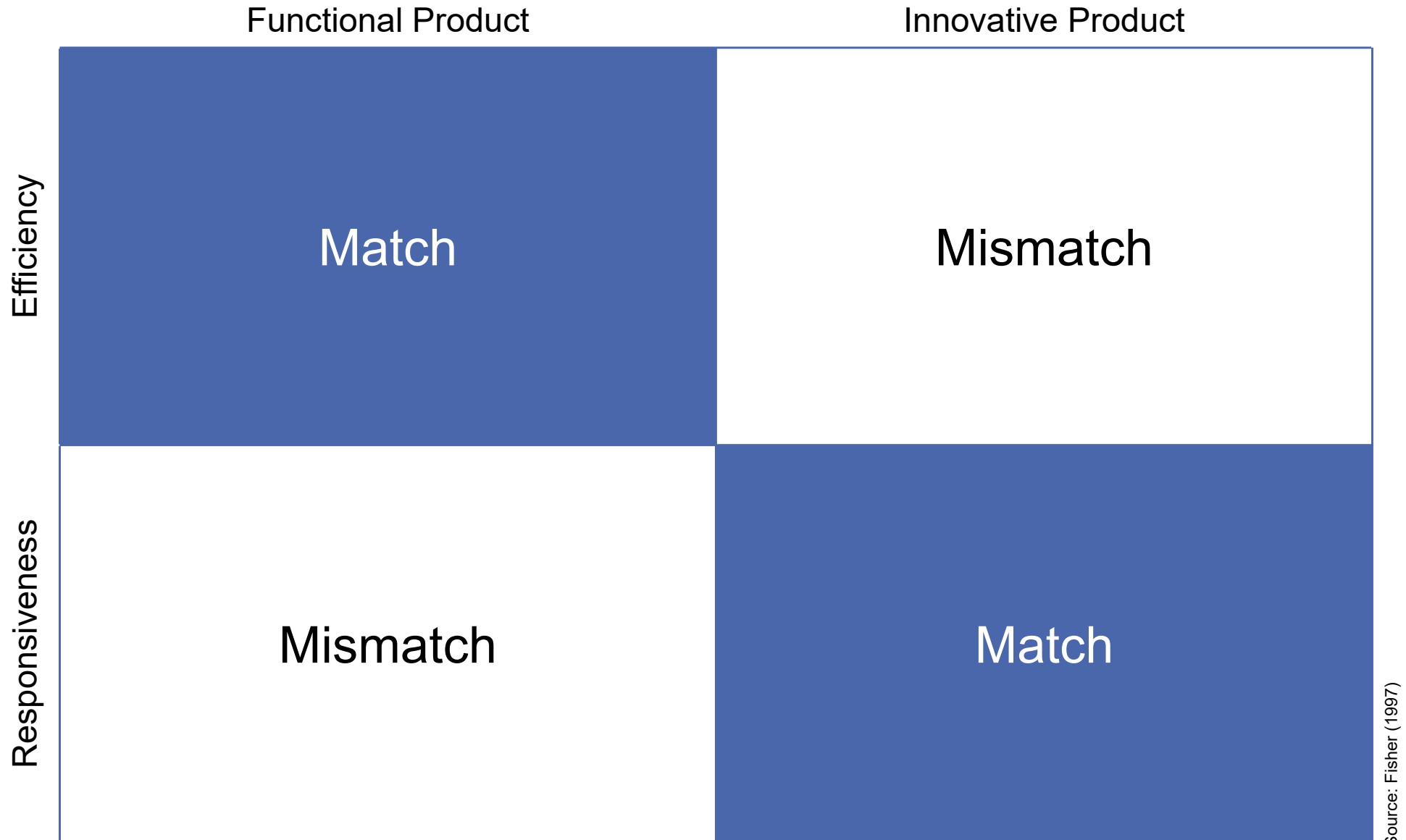
Source: Roland Berger (2008): Global SCM Excellence Study

2nd Dimension of Fisher's Model: Efficiency vs. Responsiveness

	Physical Efficiency	Market Responsiveness
Primary Purpose	supply predictable demand efficiently at the lowest possible cost	respond quickly to unpredictable demand in order to minimize stockouts, forced markdowns, and obsolete inventory
Manufacturing Focus	maintain high average utilization rate	deploy excess buffer capacity
Inventory Strategy	generate high turns and minimize inventory throughout the chain	deploy significant buffer stocks of parts of finished goods
Lead-Time Focus	shorten lead time as long as it doesn't increase cost	invest aggressively in ways to reduce lead time
Approach to Choosing Suppliers	select primarily for cost and quality	select primarily for speed, flexibility, and quality
Product-Design Strategy	maximize performance and minimize cost	use modular design in order to postpone product differentiation for as long as possible

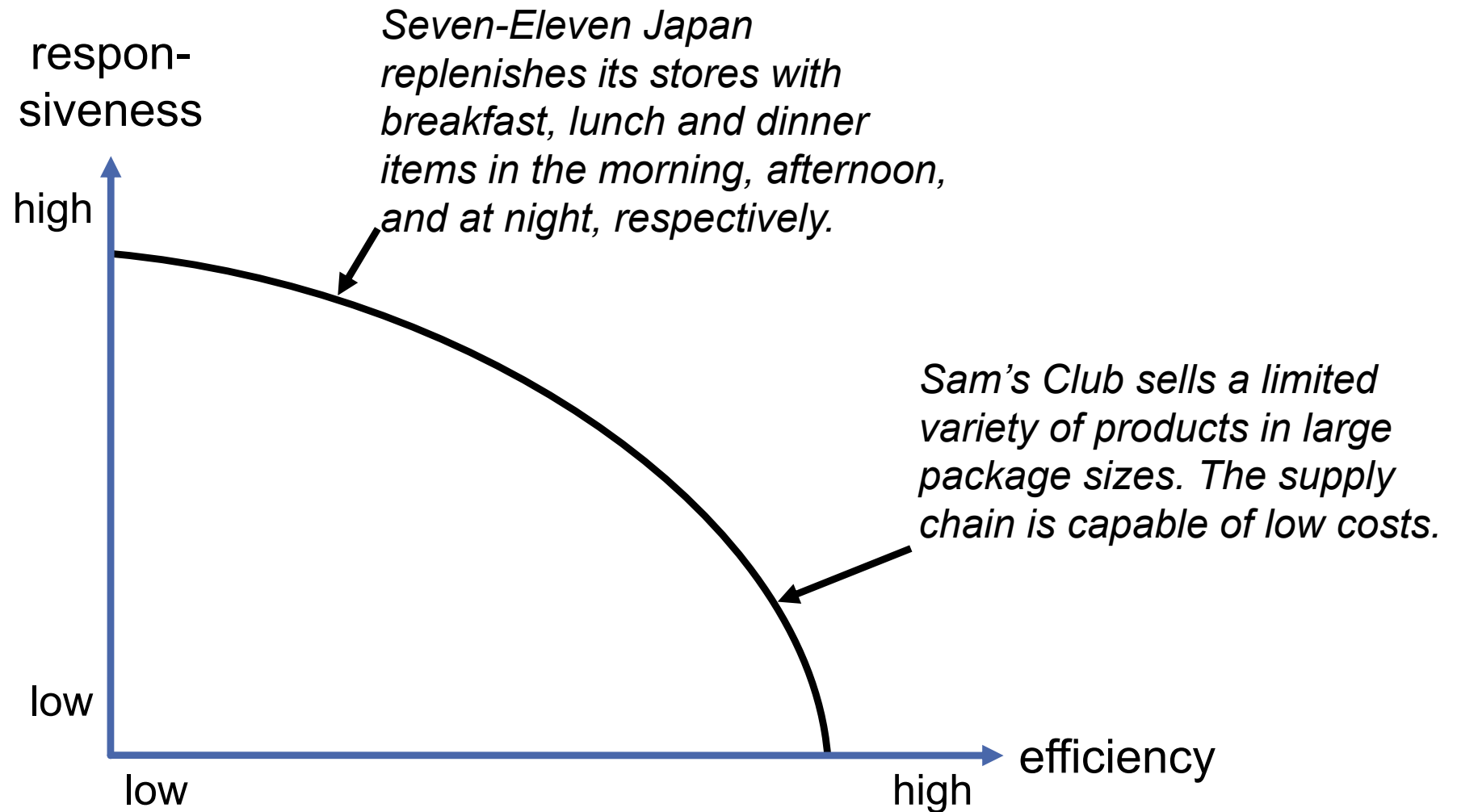
Source: Fisher (1997)

Matching Products with Supply Chain Strategies

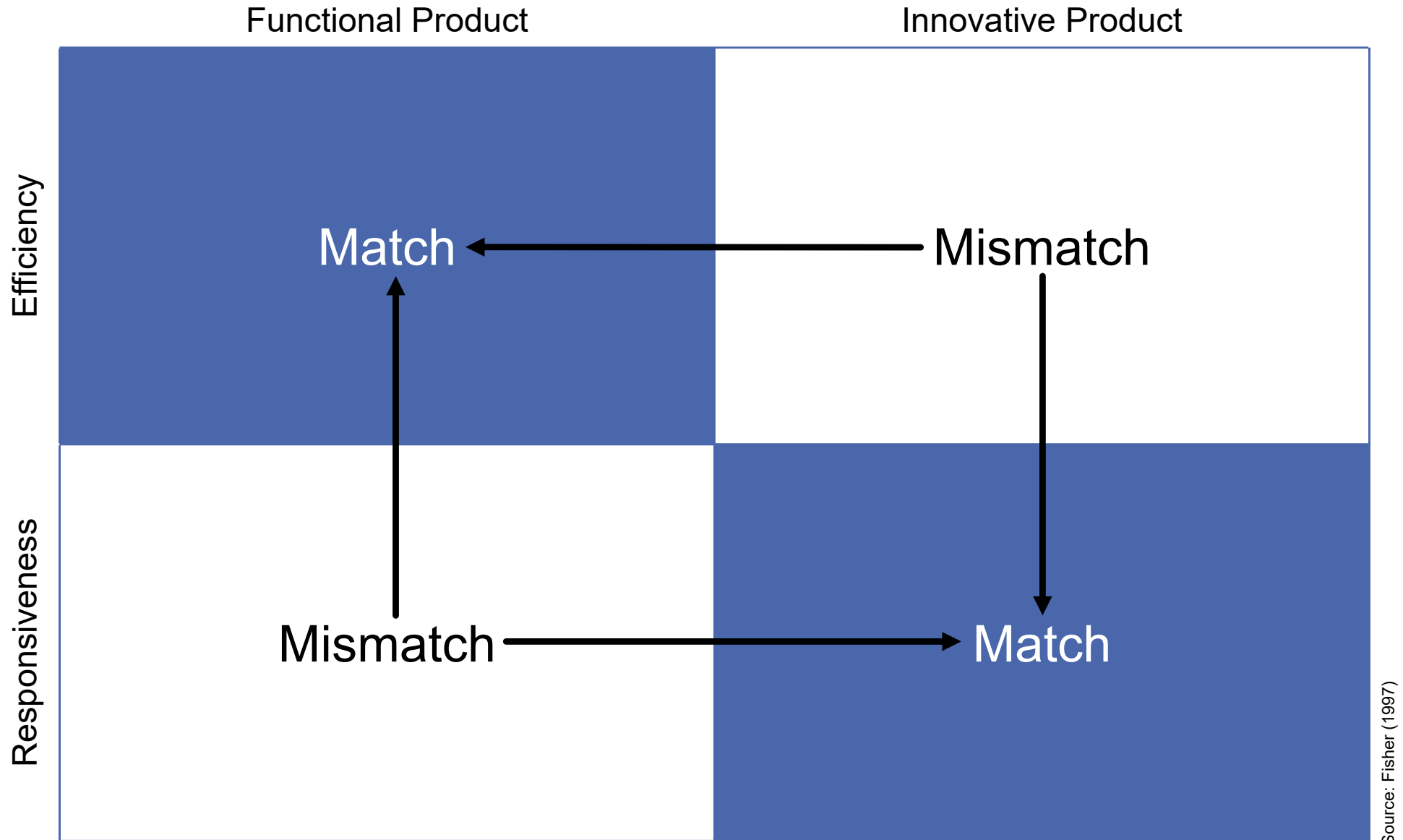


Source: Fisher (1997)

Cost-Responsiveness Efficient Frontier

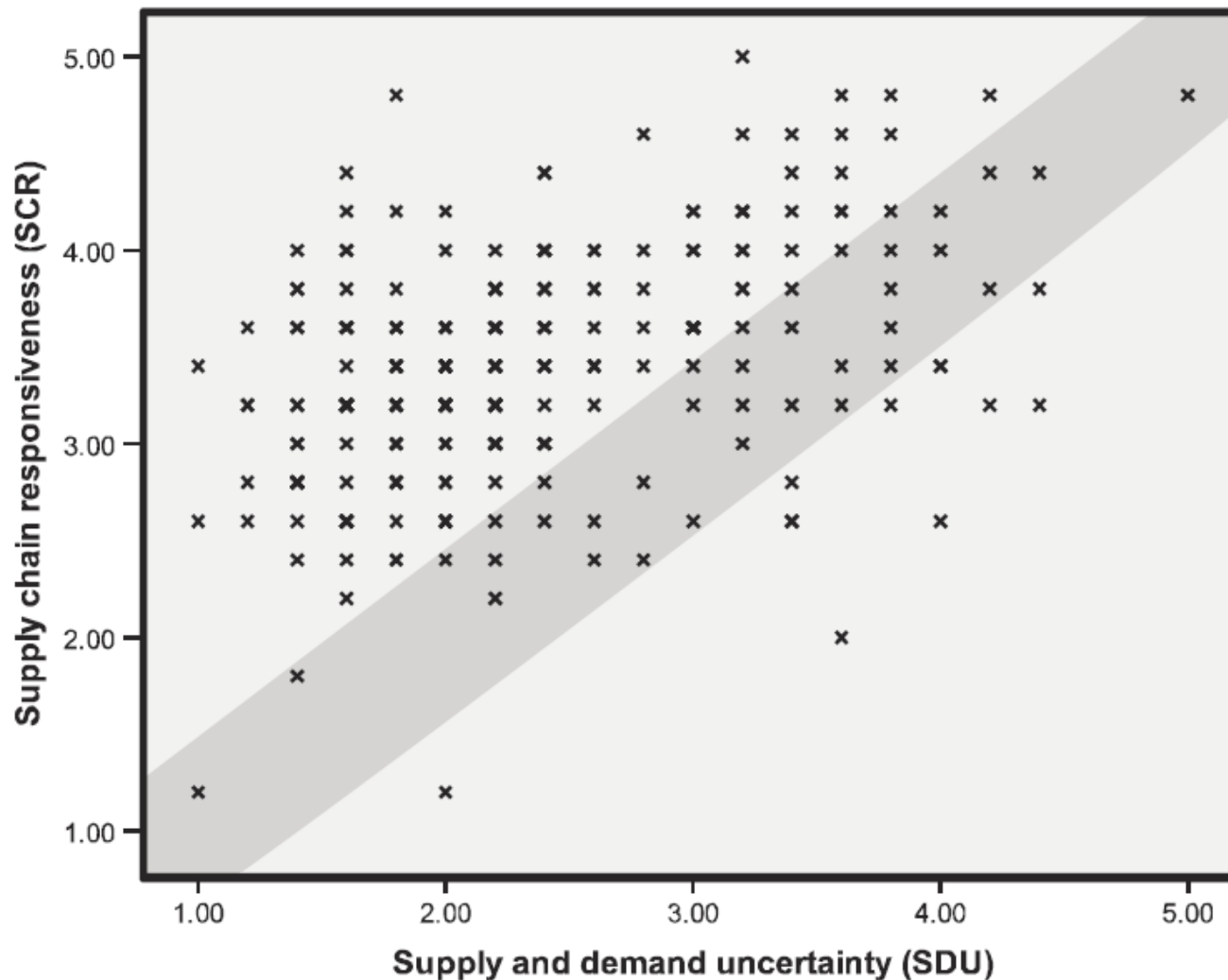


Either Change Product or Strategy to Move from “Mismatch” to “Match”



Source: Fisher (1997)

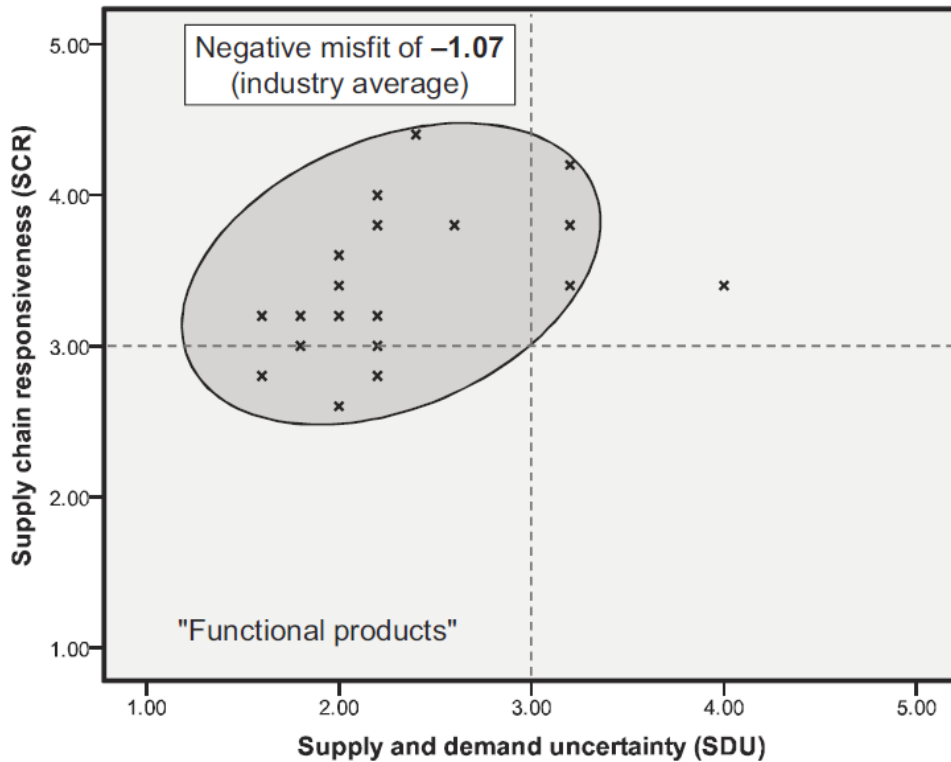
Scatter Plot of SDU vs. SCR for an International Sample of Firms



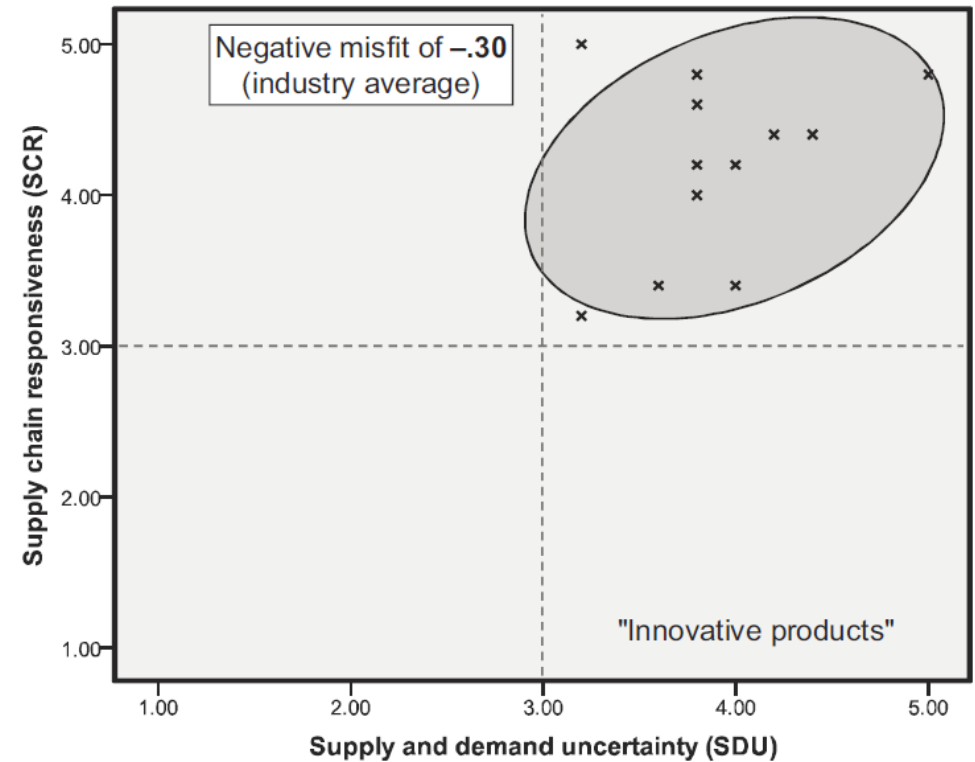
- Negative misfit
→ ROA = 5.80%
- Positive misfit
→ ROA = 7.73%
- Zero misfit
→ ROA = 10.57%
- Many companies overinvest into responsiveness (e.g. postponement), rather than into efficiency (e.g. inventory reduction)

Scatter Plot of SDU vs. SCR Scores for Two Industries

Food & beverages



Textiles & apparel

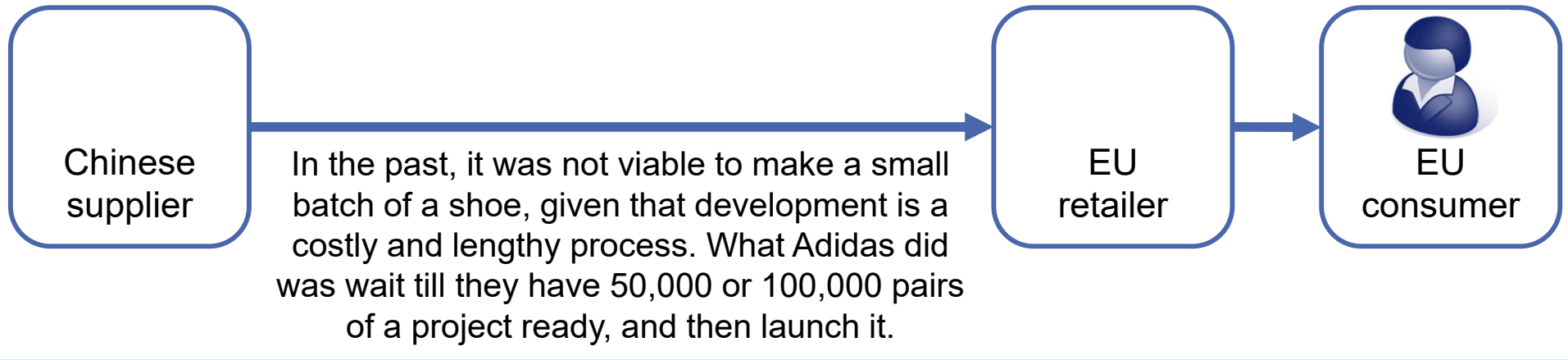


- SDU = 2.34 (on average)
 - SCR = 3.41
 - SCF = SDU - SCR = -1.07
- relatively bad fit!

- SDU = 3.90
 - SCR = 4.20
 - SCF = SDU - SCR = -0.30
- relatively good fit!

Adidas's "Speedfactory"

Traditional Supply Chain



Thanks to years of work digitizing its supply chain and rethinking the way it makes footwear, Adidas says it can now create small runs of unique shoes tailored to the needs of individuals. Ultimately, this aims to upend the economics that have defined the sneaker industry for decades.



"Speedfactory" Supply Chain

Discussion



What is missing in Fisher's model?

Outline

1. Strategic Fit
2. Fisher's Model
3. Lee's Model
4. Leagility Models

Lee's Model Extends the Demand Dimension of Fisher's Model by Including a Supply Dimension

	Stable Supply	Evolving Supply
Breakdowns	less	vulnerable
Yields	stable, higher	variable, lower
Quality Problems	less	potential
Supply Sources	more	limited
Suppliers' Reliability	higher	lower
Process Changes	less	more
Capacity Constraint	less	potential
Changeover	easier	difficult
Flexibility	high	low
Lead Time	dependable	variable

Source: Lee (2002), <https://doi.org/10.2307/41166135>

Matching Supply and Demand in Lee's Model

		Demand Uncertainty	
		Low (Functional Product)	High (Innovative Product)
Supply Uncertainty	Low (Stable Process)	grocery, basic apparel, food, oil and gas	fashion apparel, computers, pop music
	High (Evolving Process)	hydro-electric power, some food products	telecom, high-end laptops, semiconductor

Source: Lee (2002), <https://doi.org/10.2307/41166135>

Matched Strategies in Lee's Model

		Demand Uncertainty	
		Low (Functional Product)	High (Innovative Product)
Supply Uncertainty	Low (Stable Process)	efficiency	responsiveness
	High (Evolving Process)	risk-hedging	agility

Source: Lee (2002), <https://doi.org/10.2307/41166135>

How Lee Defines The Strategies

Efficient Supply Chains

“For such efficiencies to be achieved, non-value-added activities should be eliminated, scale economies should be pursued, optimization techniques should be deployed [...], and information linkages should be established [...].”

Responsive Supply Chains

“These are supply chains that utilize strategies aimed at being responsive and flexible to the changing and diverse needs of the customers. To be responsive, companies use make-to-order and mass customization processes as a means to meet the specific requirements of customers.”

Risk-hedging Supply Chains

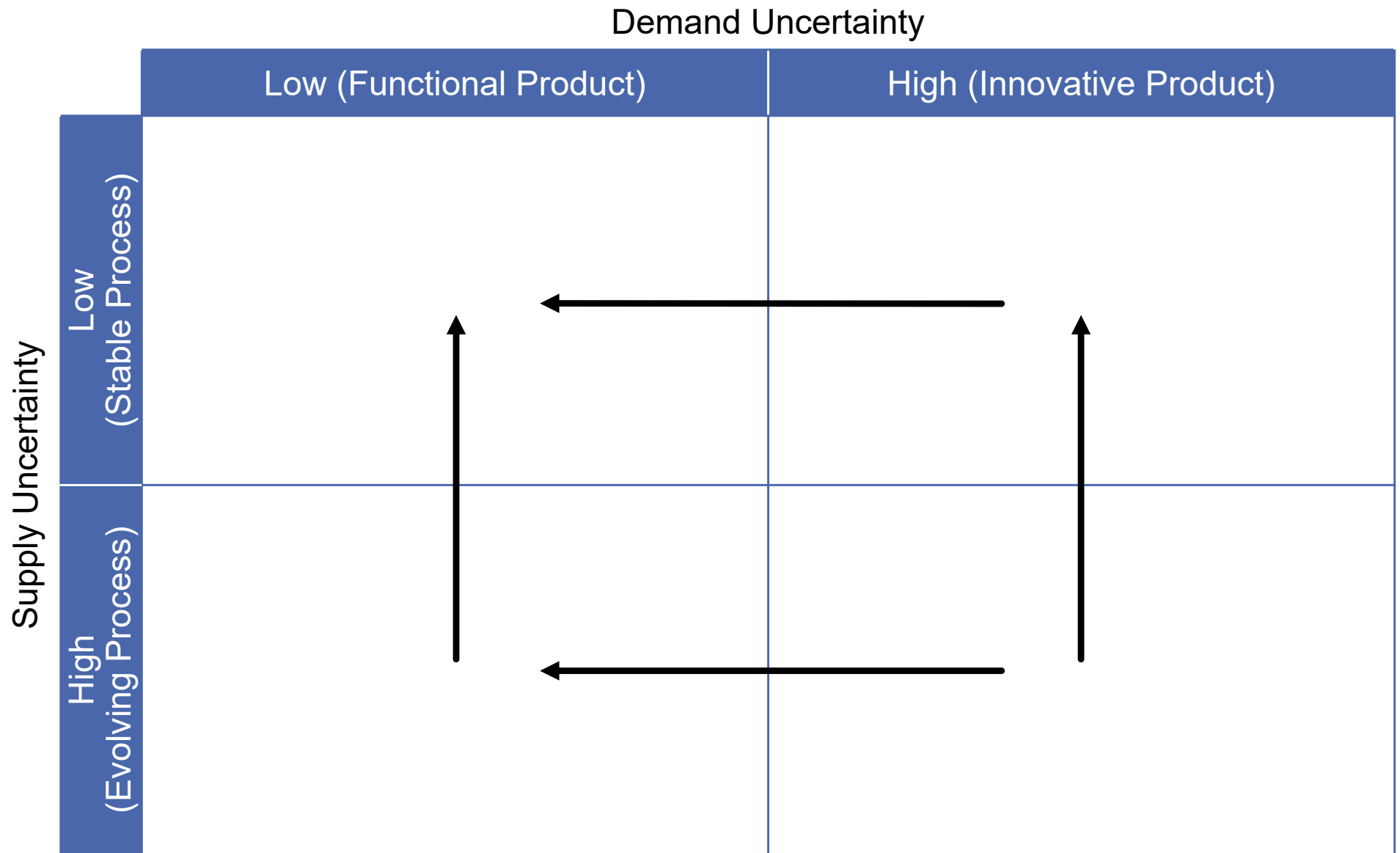
“These are supply chains that utilize strategies aimed at pooling and sharing resources in a supply chain so that the risks in supply disruption can also be shared. A company may want to increase the safety stock of its key component to hedge against the risk of supply disruption [...].”

Agile Supply Chains

“These supply chains [...] have strategies in place that combine the strengths of ‘hedged’ and ‘responsive’ supply chains. [They] have the capability to be responsive to the changing, diverse, and unpredictable demands of customers on the front end, while minimizing the back-end risks of supply disruptions..”

Source: Lee (2002), <https://doi.org/10.2307/41166135>

Uncertainty Reduction Strategies in Lee's Model



Source: Lee (2002), <https://doi.org/10.2307/41166135>

Outline

1. Strategic Fit
2. Fisher's Model
3. Lee's Model
4. Leagility Models

Leagile Supply Chains

Lean Supply Chain

“developing a value stream to eliminate all waste, including time, and to ensure a level schedule”

(Fisher, Lee: efficient)

Agile Supply Chain

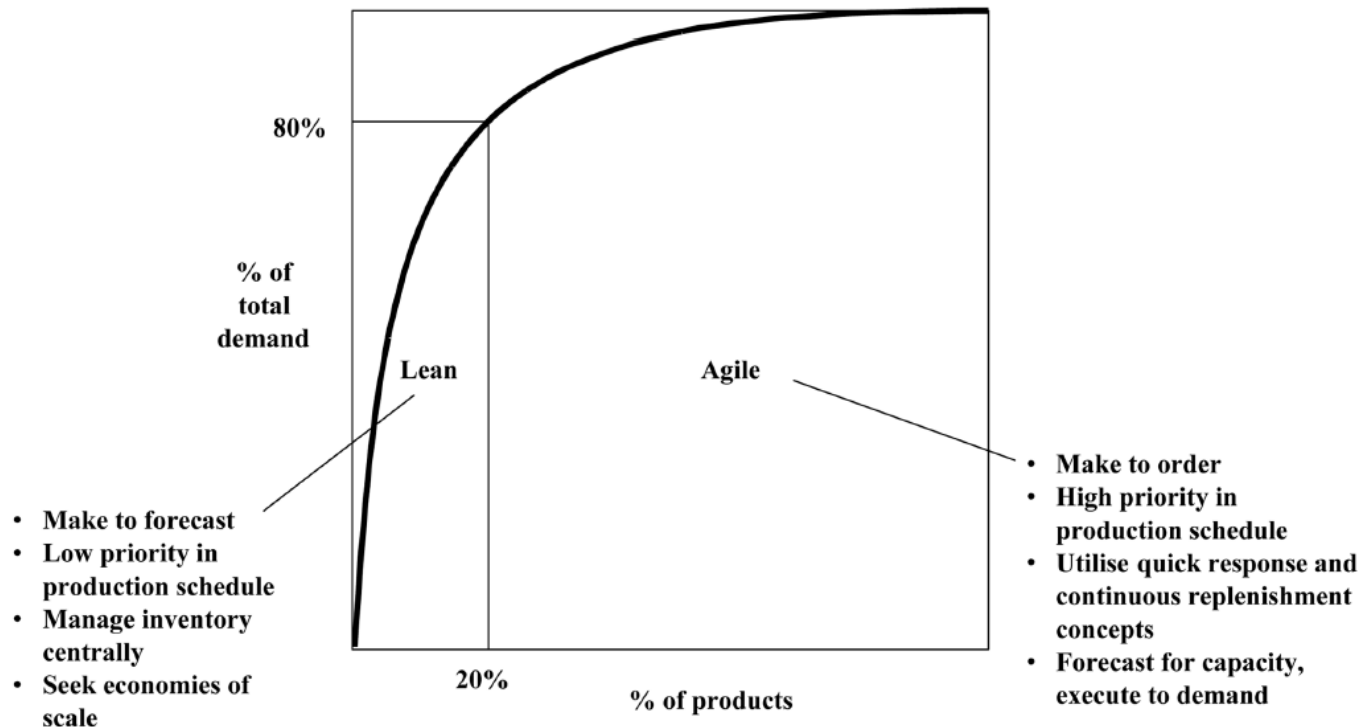
“using market knowledge and a virtual corporation to exploit opportunities in a volatile marketplace”

(Fisher: responsive; Lee: agile)

“Leagile” Supply Chain

“the combination of the lean and agile paradigms”

1st Leagility Strategy: The Pareto Curve Approach



- 80/20 rule: “80% of volume will be generated from 20% of product line.”
- Top 20% of products by volume are likely to be more predictable and hence they lend themselves to lean principles.
- Slow moving 80% will typically be less predictable and will require a more agile mode of management.

2nd Leagility Strategy: The Decoupling Point Approach

Customer Order Decoupling Point (= Order Penetration Point)

“The decoupling point separates the part of the supply chain geared towards directly satisfying customer orders [= pull processes] from the part of the supply chain based on planning [= push processes].”

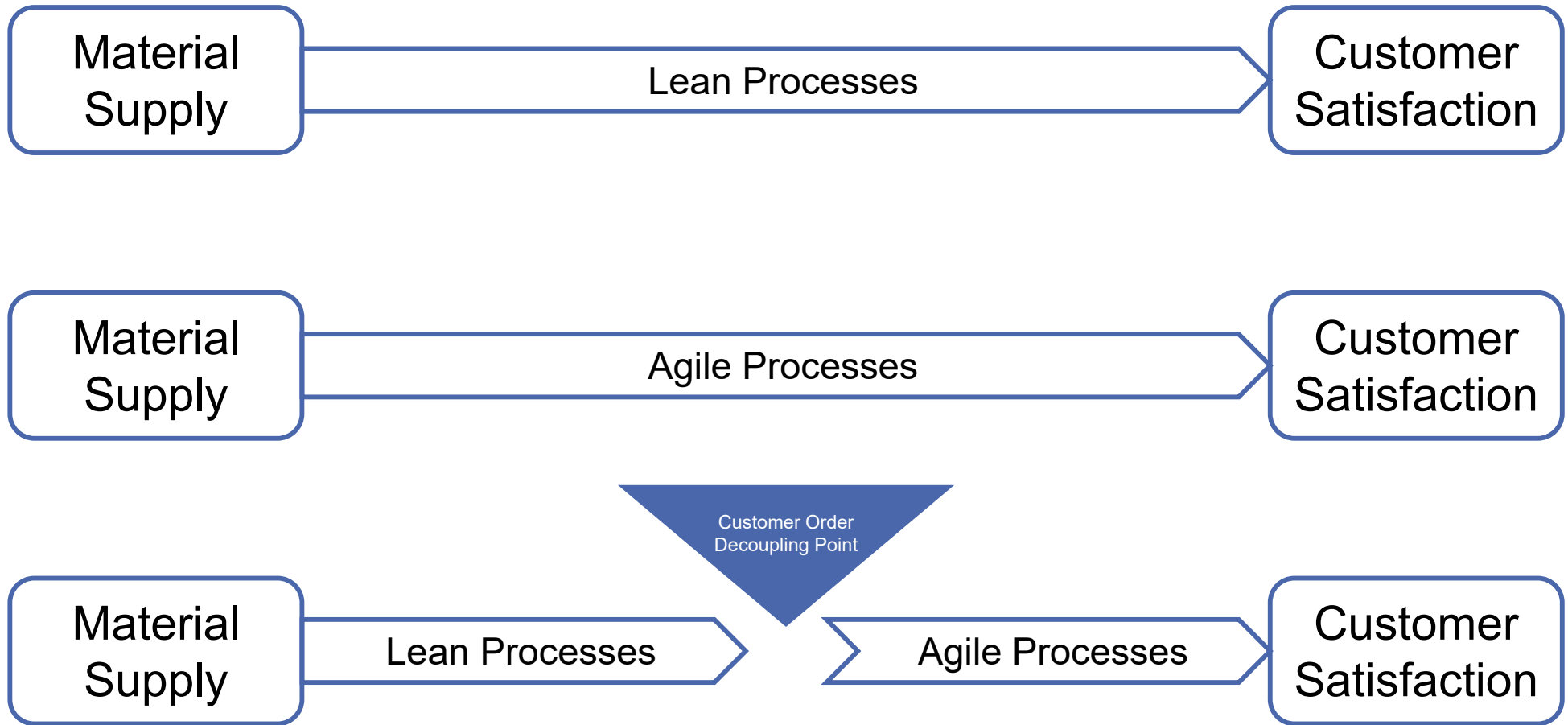
Mason-Jones et al. (2000), <https://doi.org/10.1108/14654650010312606>



- Lean/Cost/Speed Oriented
- Forecast-driven Decisions
- Uncertain Environment
- Standardised Production

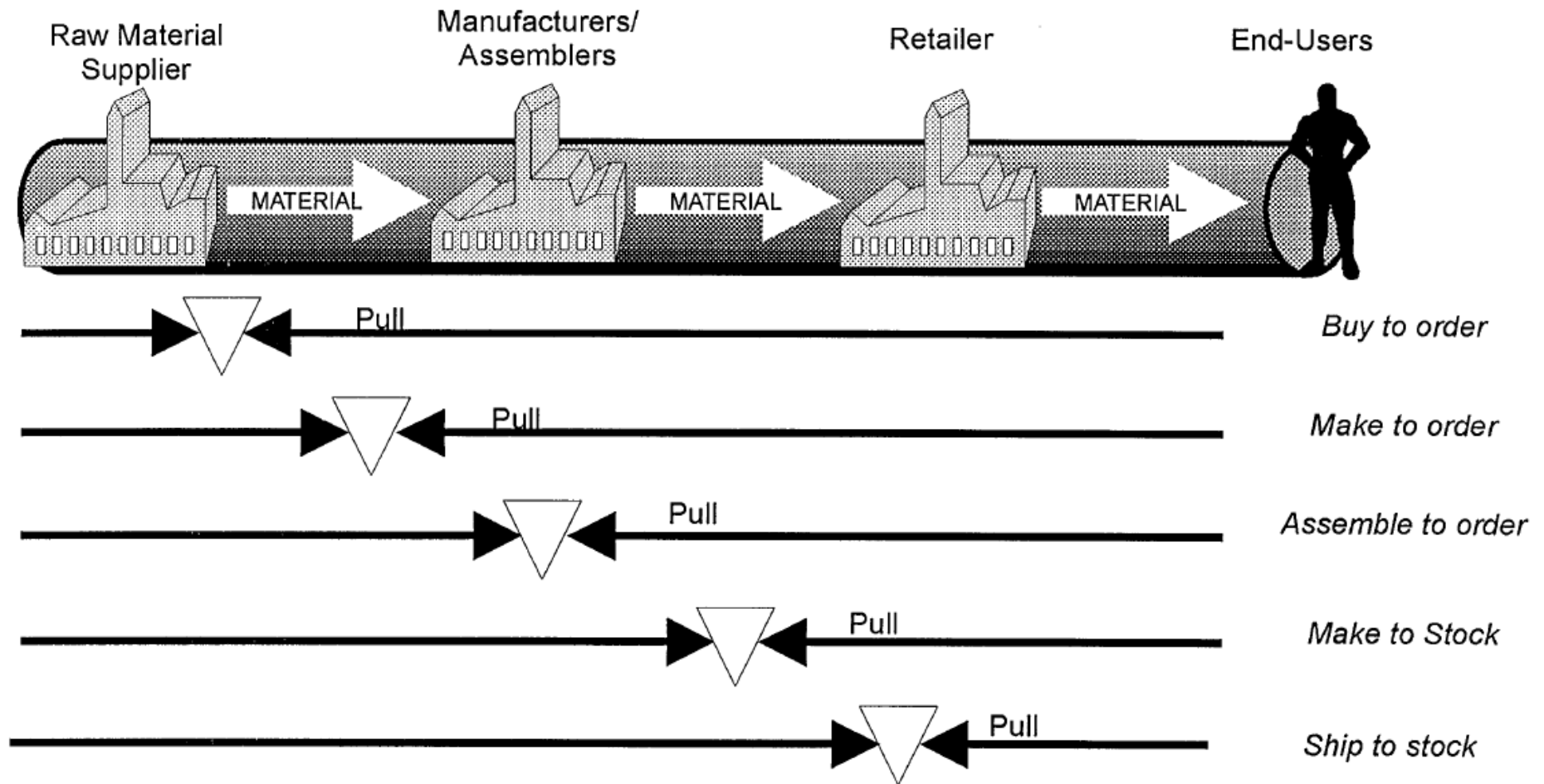
- Agility/Flexibility Oriented
- Demand-driven Decisions
- Lower Uncertainty
- Customised Production

Lean, Agile and “Leagile” Supply Chains and the Decoupling Point



Source: Mason-Jones et al. (2000), <https://doi.org/10.1108/14654650010312606>

Different Types of Supply Chains and the Customer Order Decoupling Point



Different Types of Supply Chains and the Customer Order Decoupling Point

Buy-to-Order

Supply chain that is suitable if all the products are unique and do not necessarily contain the same raw materials, where the end-user is prepared to accept long lead times and demand for products is highly variable. Holding stock would run the risk of them becoming obsolete.

Make-to-Order

Supply chain that is able to change to different products as long as they are made from the same raw materials. It will cope with varied locations, volumes and product mixes. The lead time will be reduced but the end-users might have to accept a considerable wait to get the product.

Assemble-to-Order

Customization is postponed until as late as possible. The supply chain is able to respond to a varied product mix from within a range of products. The lead time is reduced and will depend on where in the supply chain final assembly takes place (protection against risk of obsolescence).

Make-to-Stock

A standard product is provided from a defined range. The supply chain can cope with demands in varied locations but calls for a steady overall demand of a standard product. The members of the supply chain must be able to forecast demand accurately.

Ship-to-Stock

Again, a standard product is provided from a defined range. Here, a standard product is provided in fixed locations. Also here, the members of the supply chain must be able to forecast demand accurately.

Source: Naylor et al. (1999), [https://doi.org/10.1016/S0925-5273\(98\)00223-0](https://doi.org/10.1016/S0925-5273(98)00223-0)

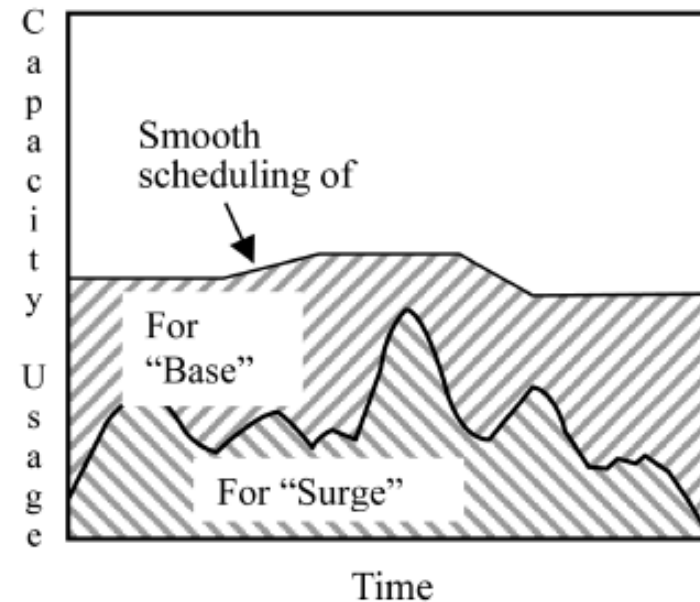
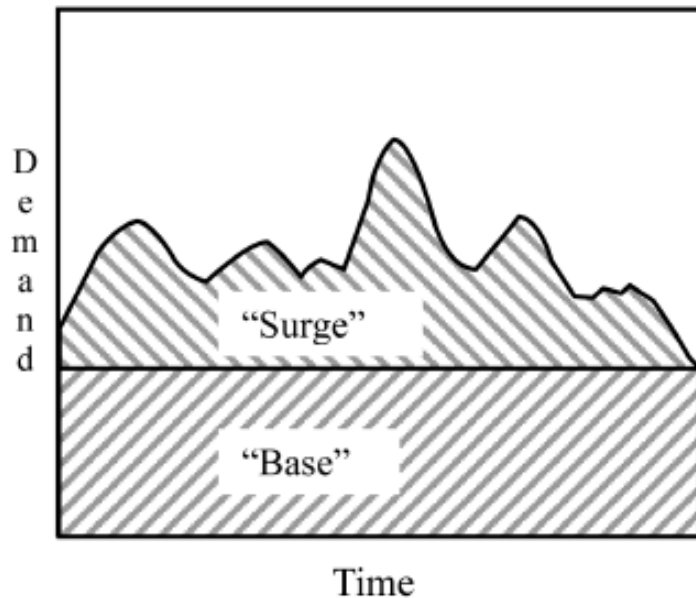
3rd Leagility Strategy: Separation of “Base” and “Surge” Demands

Base Demand

*Can be forecasted based on past data.
It can be met through lean processes to
achieve economies of scale.*

Surge Demand

*More difficult to predict. Surge demand
is provided for through agile, and
probably higher cost, processes.*



Example: Strategies such as these are increasingly being employed in the fashion industry where the base demand can be sourced in low cost countries and the surge demand “topped up” locally nearer to the market. Even though the unit cost of manufacture in local markets will be higher than sourcing in low cost locations, the advantage can be considerable.

A Contingency Approach to Supply Chain Strategy Choice

	Principle	Conditions
Pareto Curve Approach (80/20 Rule)	Using lean methods for the volume lines, agile methods for the slow movers	High levels of variety; demand is non-proportionate across the range
Decoupling Point Approach	The aim is to be lean up to the decoupling point and agile beyond it	Possibility of modular production or intermediate inventory; delayed final configuration or distribution
Separation of “Base” and “Surge” Demands	Managing the forecastable element of demand using lean principles; using agile principles for the less predictable element	Where base level can be predicted from past experience and where local manufacturing, small batch capacity is available

Source: Christopher & Towill (2001), <https://doi.org/10.1108/09600030110394914>

Contact



Andreas Wieland

DIS Copenhagen

✉ anwi.om@dis.dk

🔗 <http://scmresearch.org/>