



Institute of
Management Technology
Hyderabad

...Harnessing Knowledge for Businesses

Key Supply Chain Challenges in Industries: A Deep dive

Global Supply Chain Excellence Summit

3rd Feb 2024 (10:30 AM ~ 19:30 PM, IST)

Quick Introduction



Industry Experience (1993~2013):

- 18+ years of professional experience in diverse business functions, processes, industries and geographies
- Core strength in supply chain management in Configure-To-Order, Build-To-Order and Build-To-Stock business environments
- Led and been part of global transformational programs aimed at organizational supply chain capabilities enhancement
- Few roles: Practice Head (SCM & Procurement BPO) at Dell, Account Manager (Retail SCM) at TCS, Lead Consultant (Manufacturing SCM) at HCL Technologies, Finance Controller (OWMS), and SCM Engineer at Tata Motors
- Marquee clients: General Motors, Target, CVS Caremark, Toshiba, Applied Materials, Tesco

Academic Experience (2014 ~):

- Assistant Professor in Operations Management at IMT, Hyderabad
- Mechanical Engineering (NIT, Jamshedpur), PGDBA & CFA (ICFAI), CIRM (APICS), PGPX (IIM-A), FPM (IIM-L)
- Research, teach and consult in the following areas:
 - Operations, Logistics & Supply Chain Management, Lean and Quality Management, Purchase and Supply Management, Business Process Management, Innovation Management, Supply Chain Finance, and Decision Making.

FOR WANT OF A NAIL
THE SHOE WAS LOST

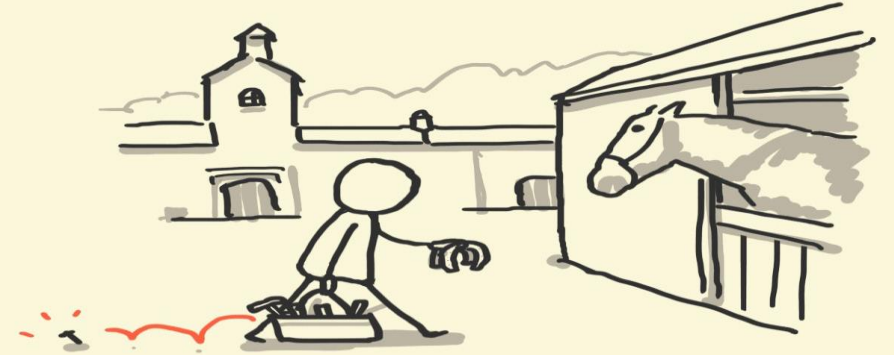
FOR WANT OF A SHOE
THE HORSE WAS LOST

FOR WANT OF A HORSE
THE RIDER WAS LOST

FOR WANT OF A RIDER
THE BATTLE WAS LOST

FOR WANT OF A BATTLE
THE KINGDOM WAS LOST

AND ALL FOR WANT OF A NAIL



sketchplanations

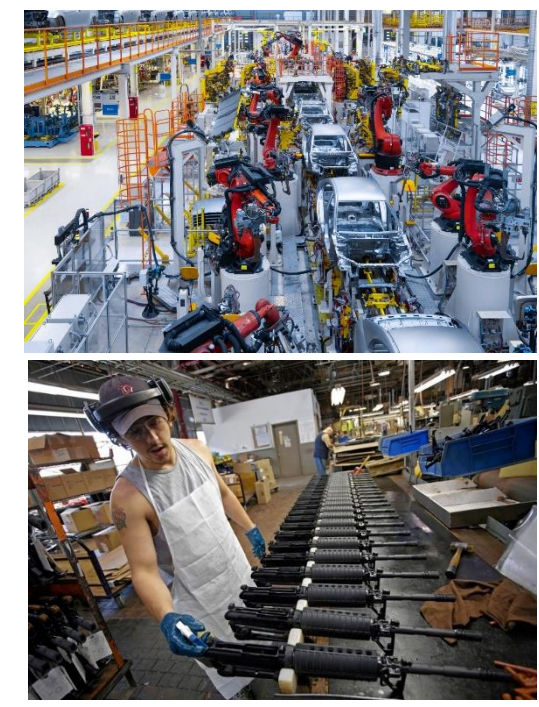
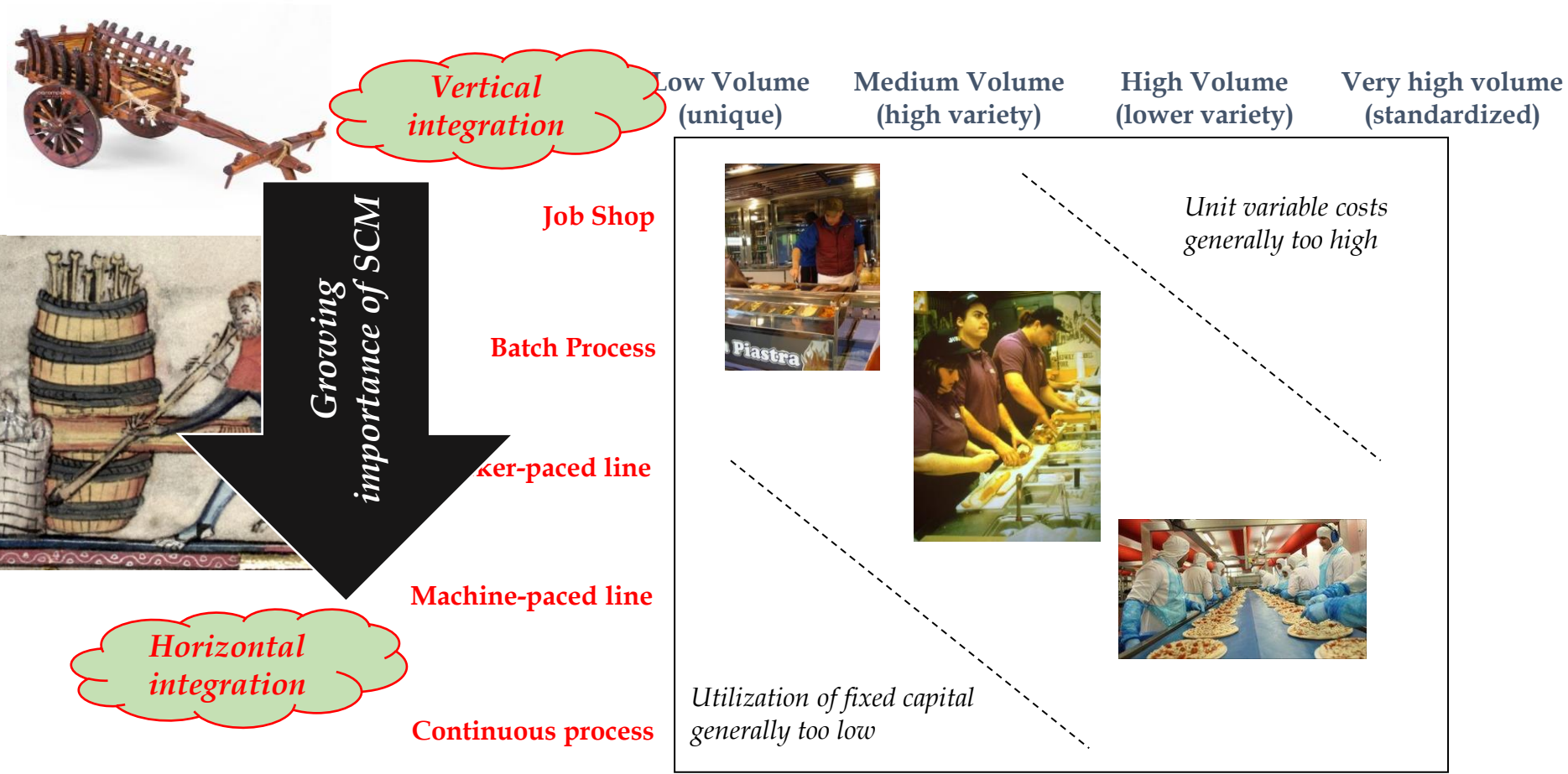
According to the Council of Supply Chain Management Professionals (CSCMP), SCM can be defined as encompassing *“the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities ...It also includes coordination and collaboration with channel partners, who can be suppliers, intermediaries, third-party service providers and customers. In essence, supply chain management integrates supply and demand management within and across companies.”*

What
Who

Agenda

1. Evolution of Supply Chain Management
2. Challenges in Supply Chain Management

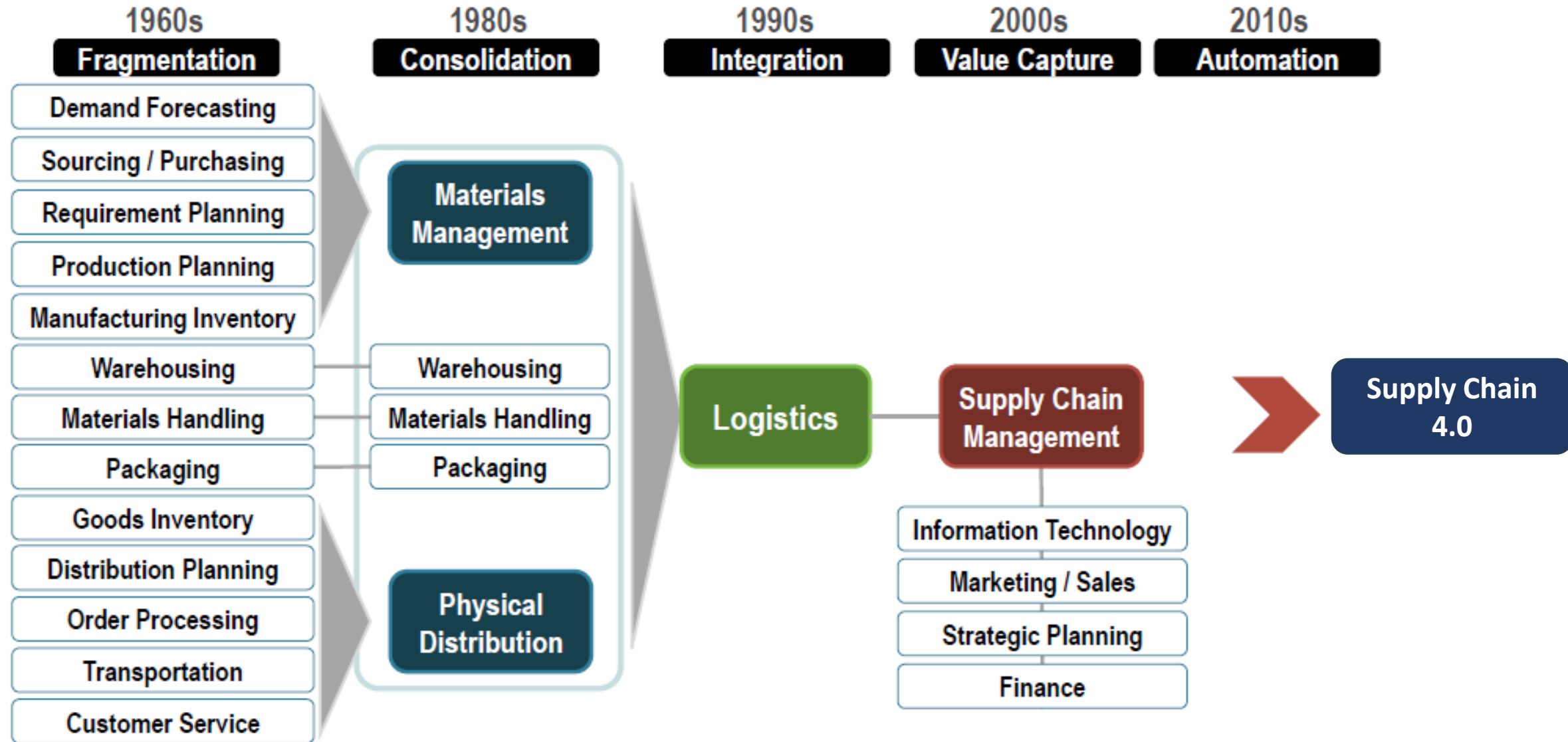
Industrialization of work



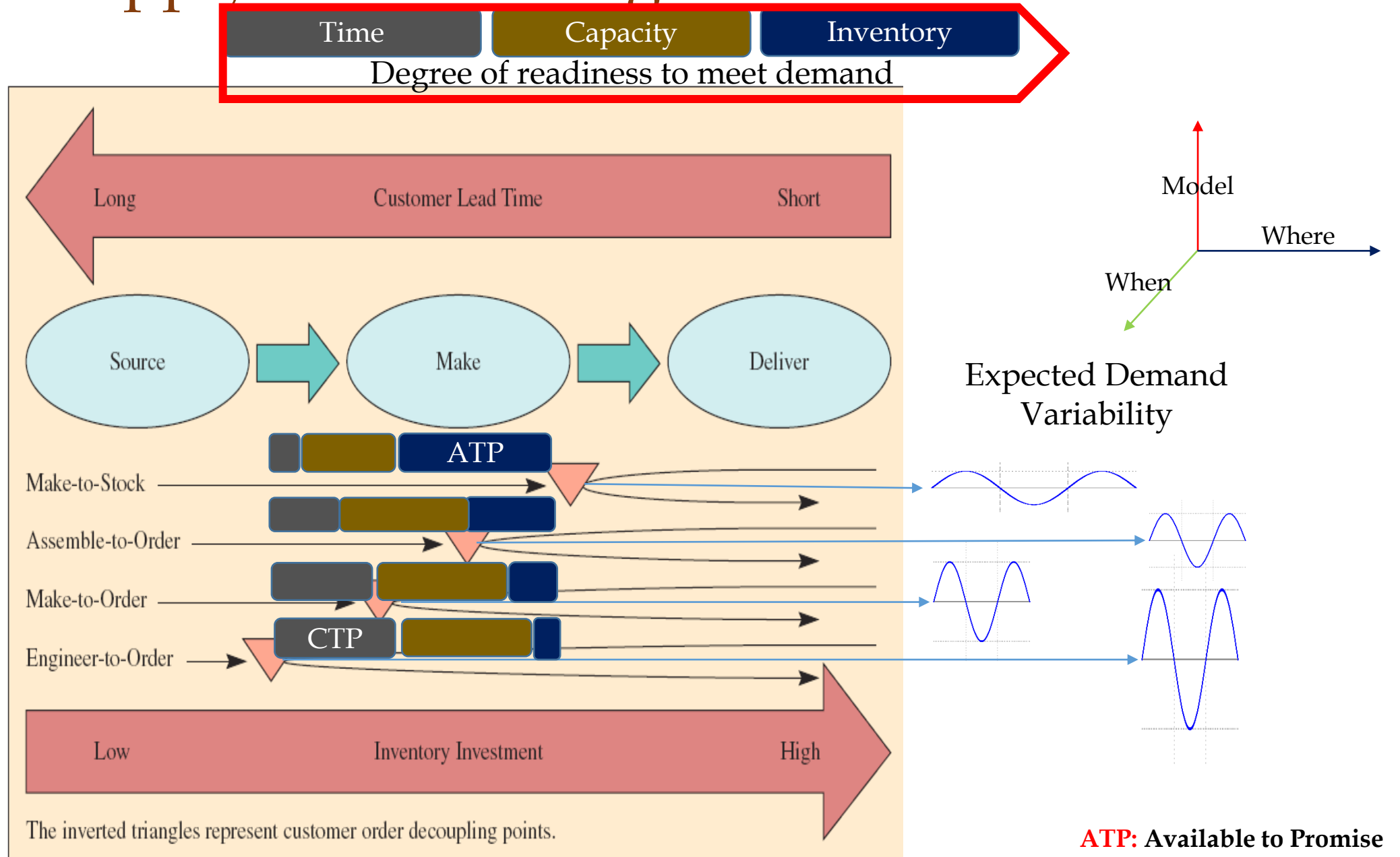
Examples from History:

- In the matrix above, history has forced all industries to go down the diagonal
- Examples: Eye Surgery, vehicle production, financial services

The Evolution of Supply Chain Management

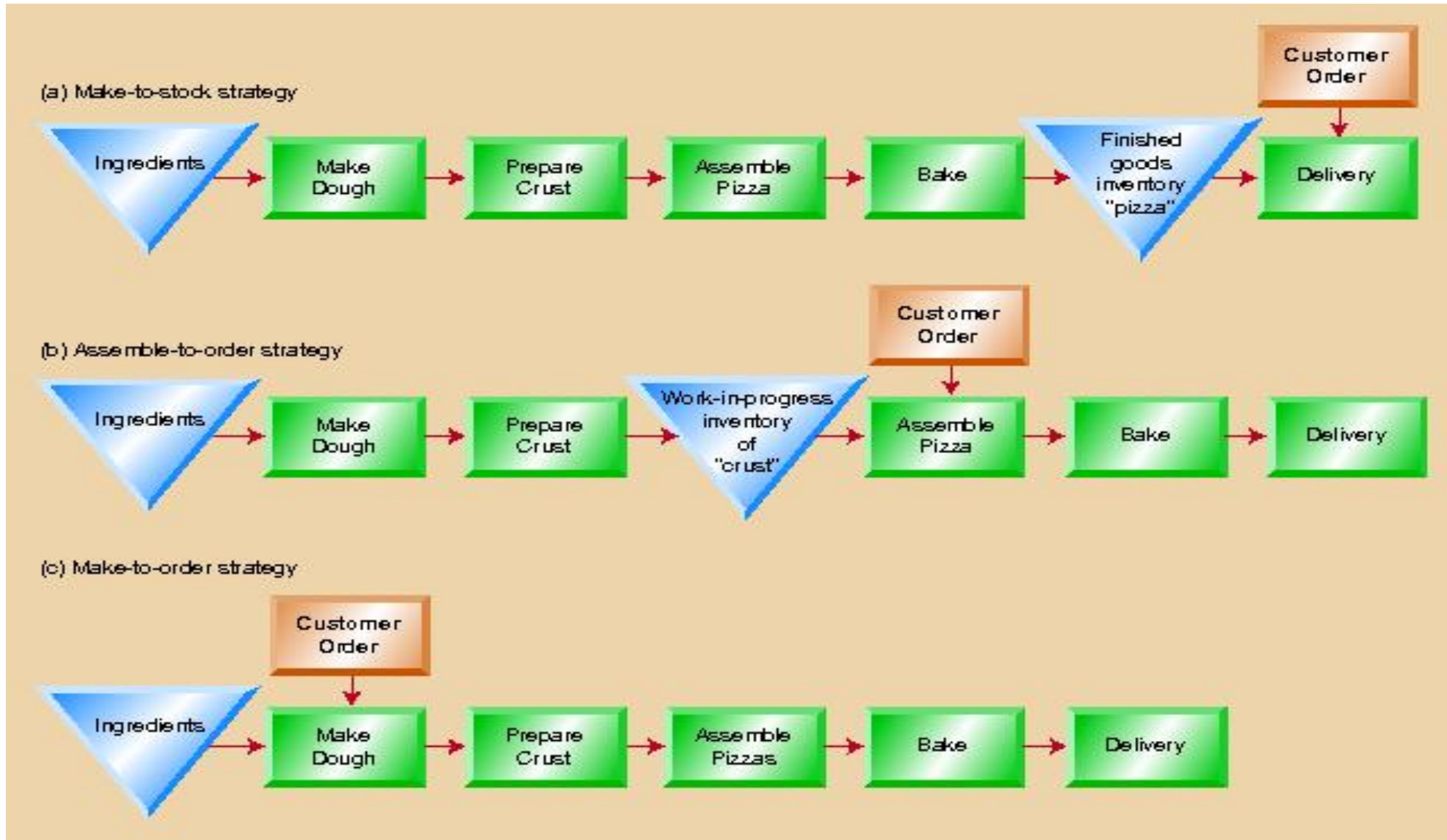


Four Supply Chain Strategies



ATP: Available to Promise
CTP: Capable to Promise

SC Strategy and Customer Order Decoupling



Can we get variety of ATO and the service levels of MTS together?

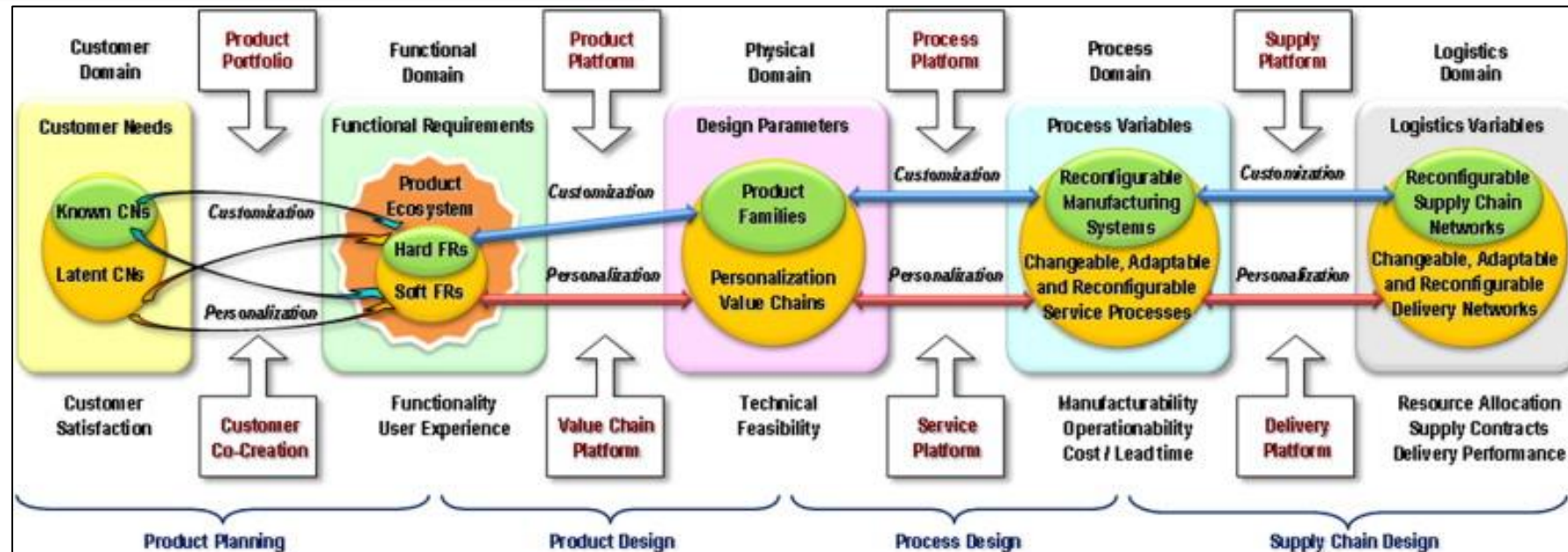


Can we personalize the entire value chain?

	<i>Mass Production</i>	<i>Mass Customization</i>	<i>Personalized Production</i>
<i>Production Goal</i>	<i>Scale</i>	Scale <i>Scope</i>	Scale Scope <i>Value</i>
<i>Desired Product Characteristics</i>	Quality <i>Cost</i>	Quality Cost <i>Variety</i>	Quality Cost Variety <i>Efficacy</i>
<i>Customer Role</i>	Buy	<i>Choose</i> Buy	<i>Design</i> Choose Buy
<i>Production System</i>	Dedicated Mfg Systems (DMS)	Reconfigurable Mfg Systems (RMS)	On-Demand Mfg Systems (OMS)

<https://uxdesign.cc/how-personalized-design-is-different-from-traditional-design-430e9f8df753>

Design for Mass Personalization (Tseng et al., 2010)



Deepening integration in Supply Chain Models

- All **stages** involved, directly or indirectly, in fulfilling a customer request.
 - Typical supply chain stages: customers, retailers, distributors, manufacturers, suppliers.

STRUCTURAL
VIEW

- Within each company, the supply chain includes **all functions** involved in fulfilling a customer request (product development, marketing, operations, distribution, finance, customer service).

CROSS-FUNCTIONAL
/ PROCESS VIEW

- Includes movement of products from **suppliers to manufacturers to distributors, and information, funds, and products in both directions.**

FLOW VIEW

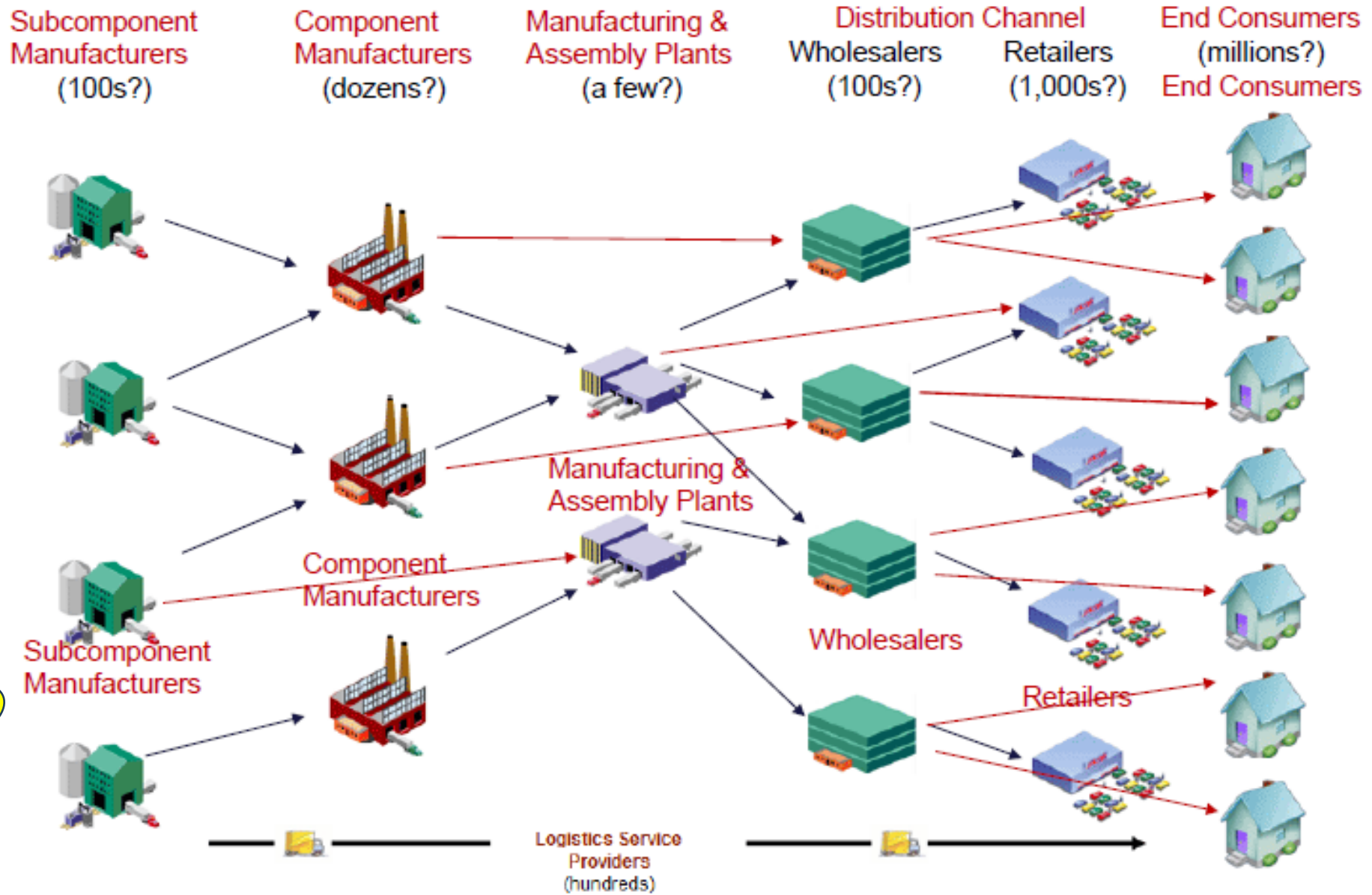
- Based on **various processes & information triggers between** different supply chain players

SYSTEM VIEW

- May be more accurate to use the term **“supply network” or “supply web” or even an “ecosystem”.**

EMERGING VIEWS

Supply Chain Model: A Structural View



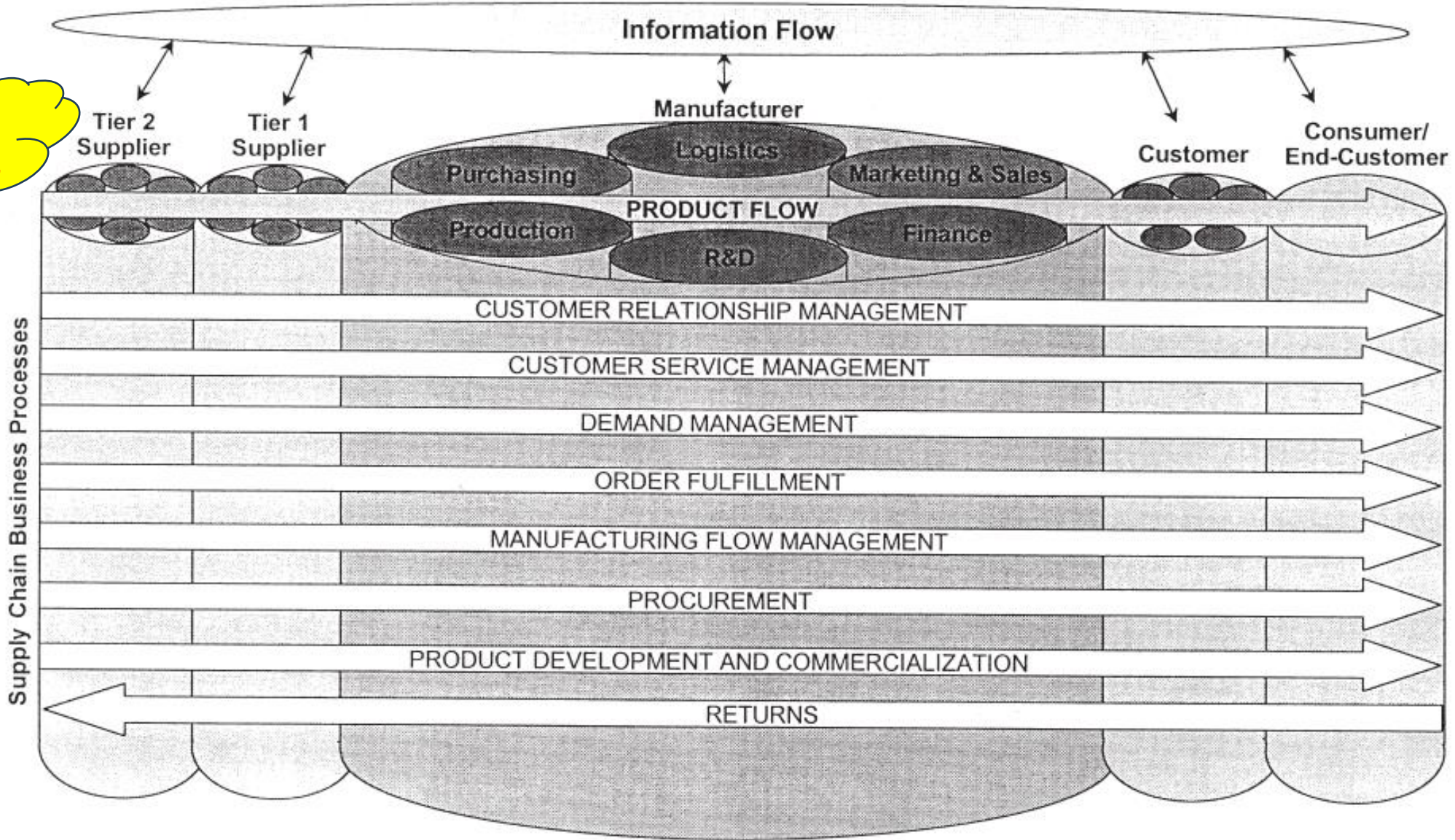
Master data

Adapted from careersinsupplychain.org

© Jayant Rajgopal, 2016

Supply Chain Model: A Cross-Functional / Process View

Workflows, exceptions



Supply Chain Model – A Flow View

A smooth flow 'rarely' happens!



Supply =
150 KG/Day

Flow = 150 KG/Day

Supplier Manufacturer Distributor Wholesalers Lulu Mall

Variability,
Optimization

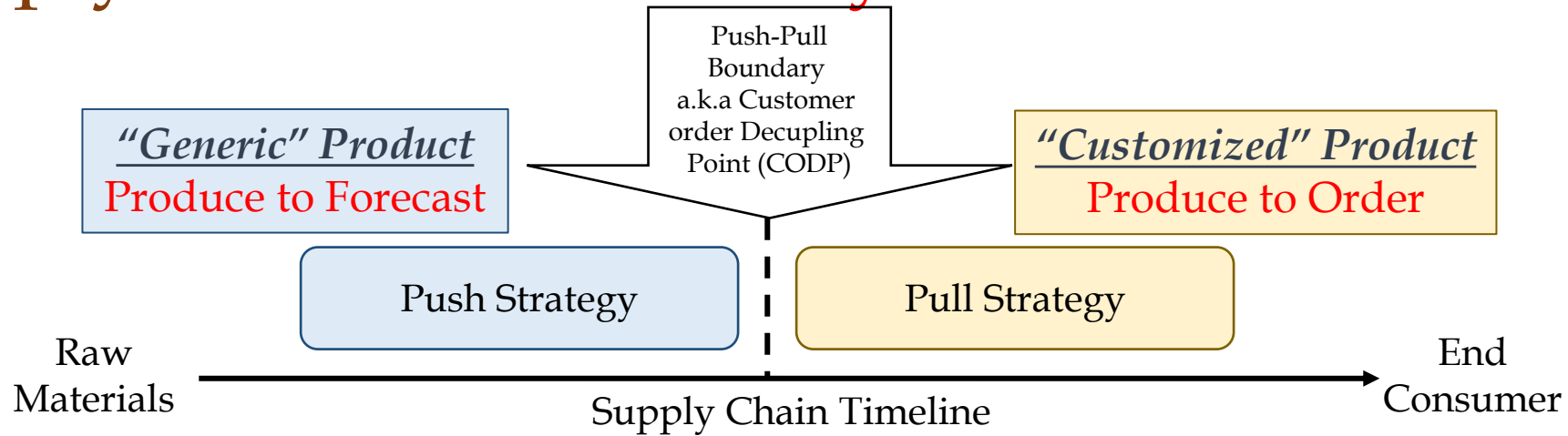


Demand =
150 KG/Day

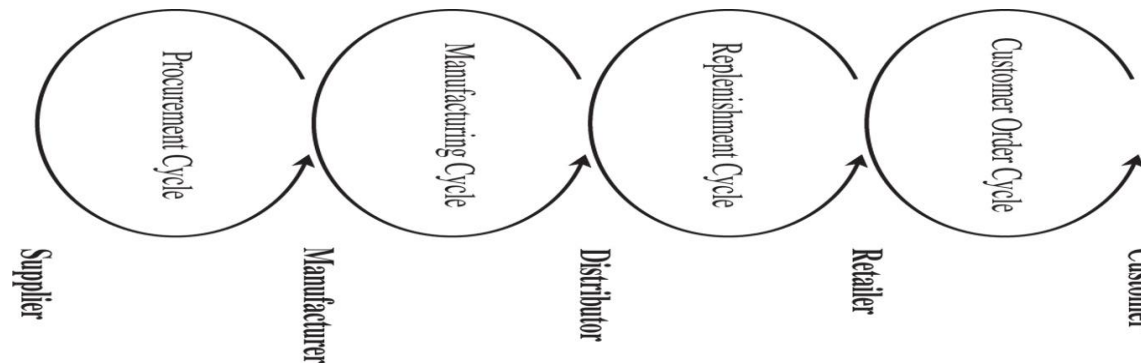
Customers

- Demand is never constant
- Supply lead time is rarely constant
- Transport is not always available
- Capacities are rarely same
- Production quantities are rarely constant
- Economics forces different production quantities and capacities for different stages

Supply Chain Model: A System View



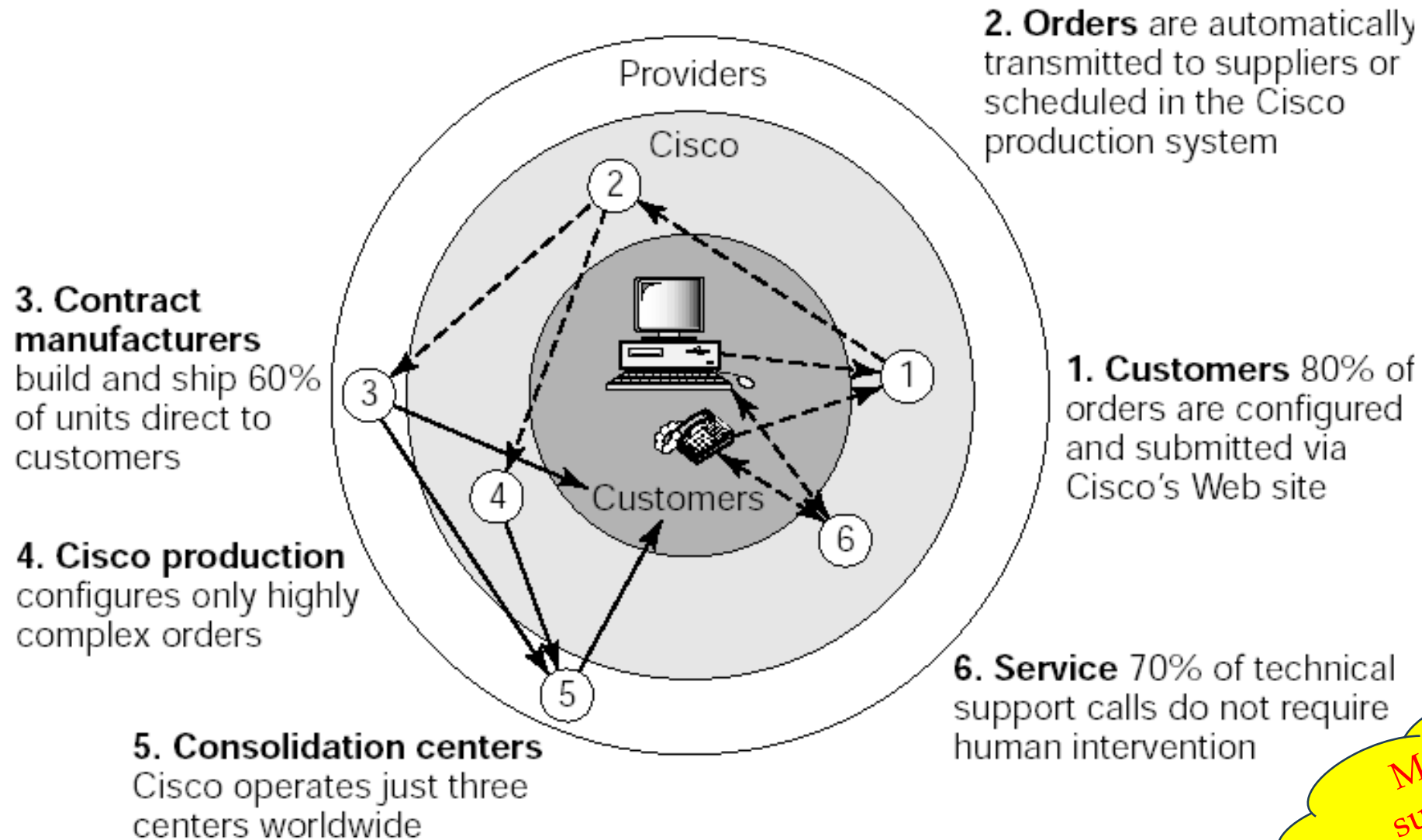
	PUSH	PULL
Objective	Minimize Cost	Maximize Service Level
Complexity	High	Low
Focus	Resource Allocation	Responsiveness
Lead Time	Long	Short
Processes	Supply Chain Planning	Order Fulfillment



Internet fulfilment, ATP, CTP, multi-speed supply chains

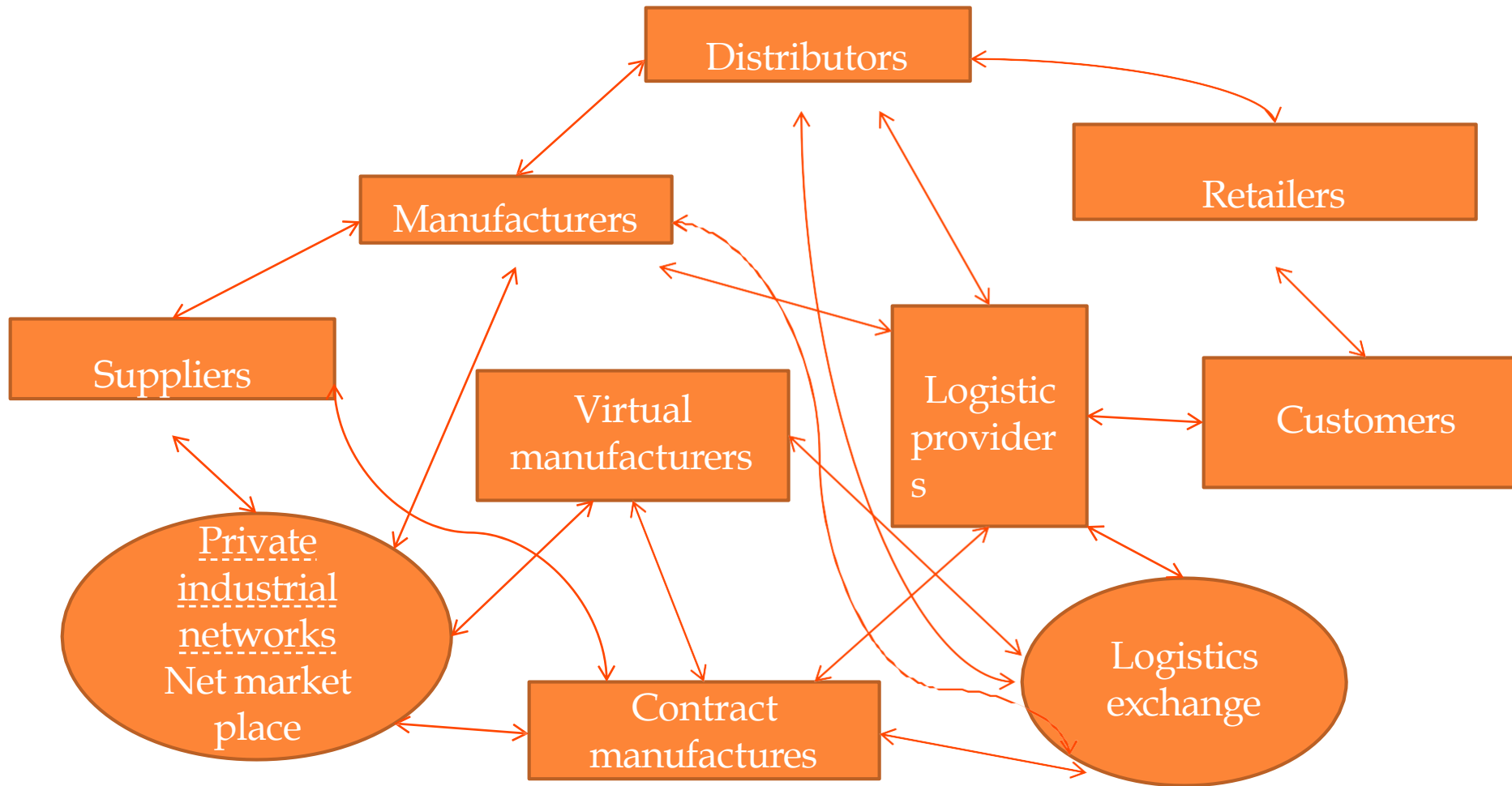
Supply Chain Model: A Networked view

Cisco's Value Network



Multi-sided supply chains

Future internet driven supply chain operates like a digital nervous system



Next era of SCM

1. Digital Supply Chains
2. Platforms
3. Web 3.0 and Blockchain
4. Robotics and Automation
5. Artificial Intelligence

Yet, the basics of SCM remains the same...

		Demand Uncertainty	
		Low (Functional Products)	High (Innovative Products)
Supply Uncertainty	Low (Stable Process)	Efficient supply chains	Responsive supply chains
	High (Evolving Process)	Risk hedging supply chains	Agile supply chains

Examples?

*Lee, Hau L., Aligning Supply Chain Strategies with Product Uncertainties, California Management Review, Volume 44, Number 3, Spring 2002, pages 105-119.

SC Challenges in Industries

Supply chain challenges

The screenshot shows a Google search results page for the query "supply chain challenges". The browser's address bar displays the search URL. The search results are organized into a grid of 24 items, each with a title and a downward-pointing arrow. The items are arranged in three columns and eight rows. At the bottom of the grid, there is a "Show less" button and a "Feedback" link. The Windows taskbar is visible at the bottom of the screen, showing the search bar, taskbar icons, and system tray information including the date and time.

Increasing freight prices	Difficult demand forecasting	Port congestion
Sustainability	Consumer expectations	Digitalization
Cybersecurity	Delays	Material scarcity
Supply chain digitization	Cost control	Supply chain fragmentation
Complex supply chains	Logistics disruption	Staffing shortages
Data dilemmas	Demand fluctuations and inventory...	Inventory management
Managing rising costs	Regulatory compliance	Supply chain diversification
Talent	Changing consumer attitudes	Commodity pricing

Managing Costs

Increasing freight prices

2. Increasing freight prices.

Contrary to initial expectations, the need for container shipping has increased considerably throughout the pandemic. With ...

<https://www.extensiv.com> › bl...

The 8 Biggest Supply Chain Challenges in 202...

Increasing freight prices.

The rise in energy prices and

Another impact of the pandemic, worldwide social

Increasing Freight Prices ...

The e-commerce industry has experienced unprecedented growth in the pandemic-ridden years. Besides, businesses are no longer ...

Managing rising costs

These **costs** come from many areas, and a lack of visibility

and accou...

them can...

operationa...

Rising pri...

<https://www...>

What Are...

Supply C...

Commodity pricing

Often category pricing is not

indexed to the

commodity pr...

led to categor...

out of in sync

pricing. For...

<https://kpmg.com>

Six key tren...

global suppl...

<https://www.li...>

KEY CHA...

SUPPLY C...

<https://www.onlinemanipal.c...>

Significant challenges in

Supply Chain Managem...

4. Rising supply chain costs

Energy and fuel **costs** – this is

Increasing **commodity** prices

Cost control

3. **Cost control** ... Rising costs of raw materials, energy, freight, and

impacted b...

To ensure s...

operations

continuous

<https://www.li...>

KEY CHA...

SUPPLY C...

<https://www.onlinemanipal.c...>

Significant challenges in

Supply Chain Managem...

Increasing operational **cost** is causing global supply chain

worsening due

businesses need

ased production

<https://www.li...>

Supply

/Challenge...

<https://www.onlinemanipal.c...>

Significant challenges in

Supply Chain Managem...

To ensure operations without production interruptions and continued delivery of quality goods at reasonable rates - businesses must tighten **cost control**. • ...

<https://www.gep.com> › BLO...

Challenges of Supply Chain Management and...

Moving the materials

Port congestion

Port congestion. The pandemic led to restricted freight loading/unloading operations, causing port congestion, leading to delays in dispatches and deliveries.

Port congestion happens

Port congestion. The

Global Port Congestion ...

Logistics disruption

Manufacturing and logistics workers may have first lost their jobs due to

Third-party logistics (3PL) companies have emerged as

A study by McKinsey identified that companies, on average,

Delays

induced factors include reductions in money or materials

Delays in product delivery will negatively impact customer experience. Hence, it would

Production delays during COVID-19 have become headline news. Manufacturers

Unforeseen Delays. Procurement of materials and products may be easy, but the

Unexpected delays. Global supply chains inevitably involve large distances and

Material scarcity

Global Supply Chain Challenge

Material scarcity is one of the challenges in supply chain management in India that occurs when there needs to be more raw materials available for a company's ...

1. Material scarcity ... Insufficient inputs have been a concern since the pandemic began, due to an abrupt rise in consumer demand like never before. Even now, ...

Material scarcity in the supply chain negatively affects a brand's ability to sustain itself. 4. Global Port Congestion. The pandemic exposed weaknesses in ...

Material shortages and scarcity ... Supply and demand are in prolonged imbalance, and will continue to rock out of equilibrium in 2022. As suppliers struggle ...

Navigating the Challenge

Significant challenges in Supply Chain Management...

The 8 Biggest Supply Chain Challenges in 2023

Challenges Facing the Supply Chain

Top 6 Challenges Facing Supply Chain Executives!

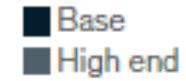
Trade shifts

Potential shift in trade flows

Feasibility of shifts



Value at play



	Feasibility of shifts		Total trade value, \$ billion	Value at play, \$ billion		
	Economic factors	Noneconomic factors		Base	High end	
Machinery and equipment	●	●	1,455	276	93	369
Automotive	●	●	1,730	265	89	354
Communication equipment	●	●	673	221	132	353
Electrical equipment	●	●	928	214	108	322
Semiconductors	●	●	995	112	111	223
Chemical	●	●	1,584	87	87	174
Aerospace	●	●	333	82	27	109
Transportation equipment	●	●	209	58	29	87
Total (including other)			18,000	Base 2,900		High end 4,600

Supply Chain Configuration

Supply chain fragmentation

Supply chain fragmentation

is when the supply chain is spread over multiple suppliers and manufacturers. This may allow for some quality ...

Global **supply** chains inevitably involve large distances and many steps,

This bottleneck is something **supply chain** managers and operational executives need to

Because navigating a business and ensuring product quality at every turn

Complex supply chains

In today's customer-centric

From factory workers to truck

Complex Supply Chains.

These problems in **supply**

market, efficient dis

Supply chain diversification

supply chains that

timely delivery is n

but a must! Howev

demand for ...

One emerging trend is **diversification**, involving the spreading of **supply chain** networks instead of relying on a single source or region. This approach helps ...

Among the most common **supply chain** challenges in 2021 and 2022 were things like port congestion, manufacturing delays, and extreme weather events (including ...

The disruptions caused by COVID-19 have made it painfully clear that **supply** chains need flexibility in order to operate efficiently. As such, **diversification** ...

Supply chain challenges are like speed bumps on the road that delay the delivery of products. They can be caused by unexpected events, communication hiccups, ...

<https://www.infosysbp.com>
Navigating Supply Chain Challenges 2023

<https://www.linkedin.com> › p...

<https://www.linkedin.com>
The State of the Global Supply Chain: Challeng...

<https://www.extensiv.com> › bl...

<https://www.extensiv.com>
The 8 Biggest Supply Chain Challenges in 2023

<https://packhelp.com> › Our blog

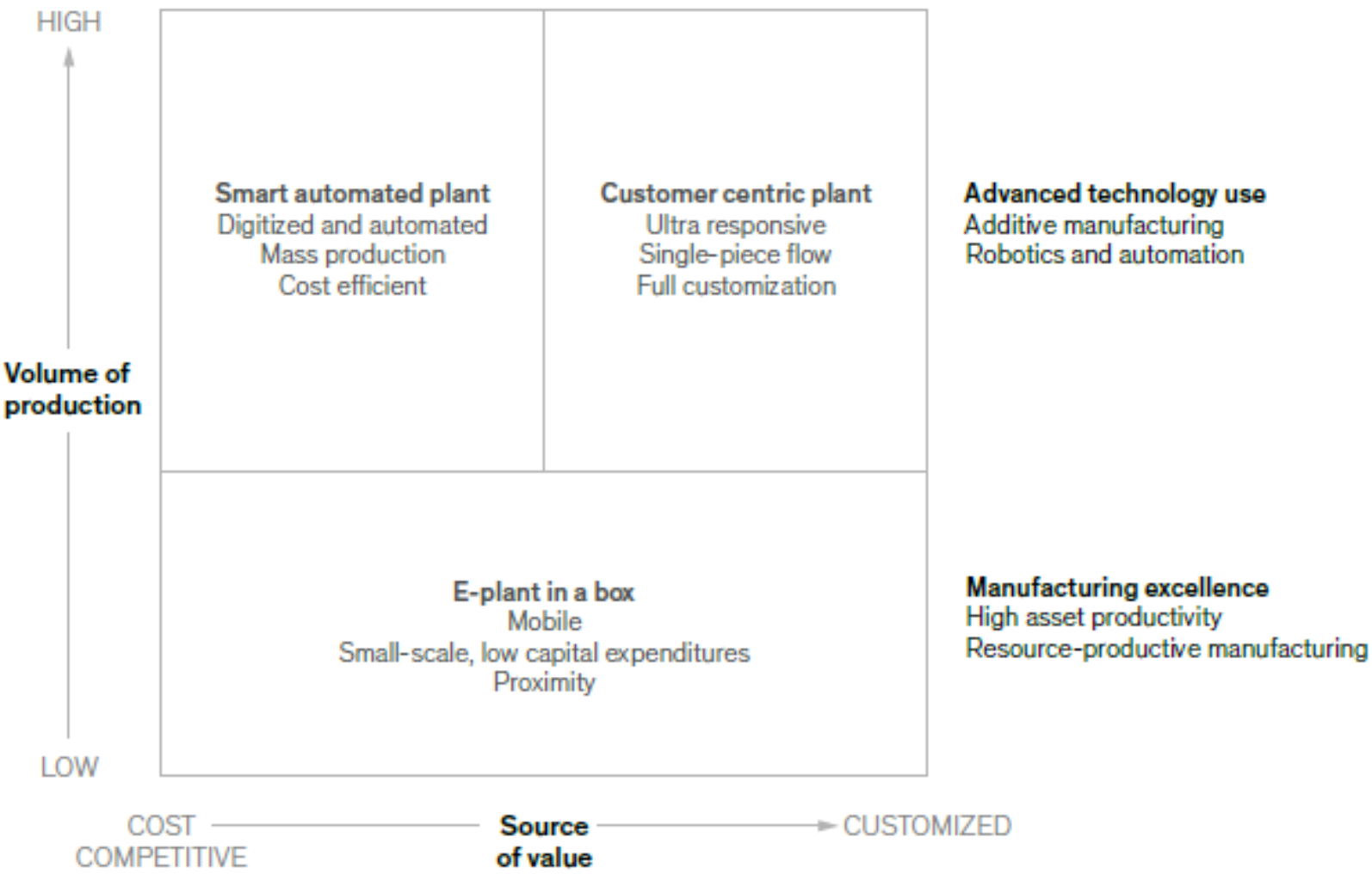
<https://packhelp.com>
The Main Challenges for Global Supply Chains

[https://procurementactics.co...](https://procurementactics.co)

[https://procurementactics.co...](https://procurementactics.co)
Supply Chain - Challenges & How to O...

Right SC Configuration (internal)

Plant-archetype matrix



Advanced technology use
 Additive manufacturing
 Robotics and automation

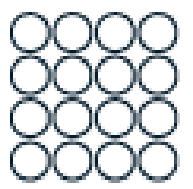
Manufacturing excellence
 High asset productivity
 Resource-productive manufacturing

Digital backbone
 Single-point visibility
 Real-time process self-adjustment
 Remote monitoring and management

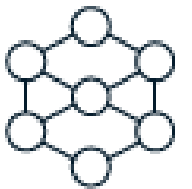
(Agile) Lean 2.0
 Increased agility/flexibility
 Increased productivity
 Increased collaboration

Right SC Configuration (external)

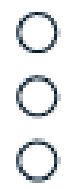
Supply-chain risk factors



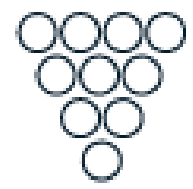
Concentration
Density of spend associated with particular suppliers or a concentrated geography



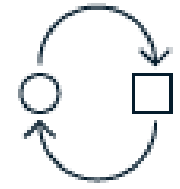
Supplier interconnectivity
Interconnectivity among suppliers



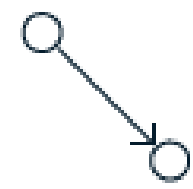
Supply-chain depth
Extent and level of depth of sub-tier suppliers



Dependency
Sub-tier, small-cap suppliers that are highly dependent on 1 customer or are small to medium-size enterprises

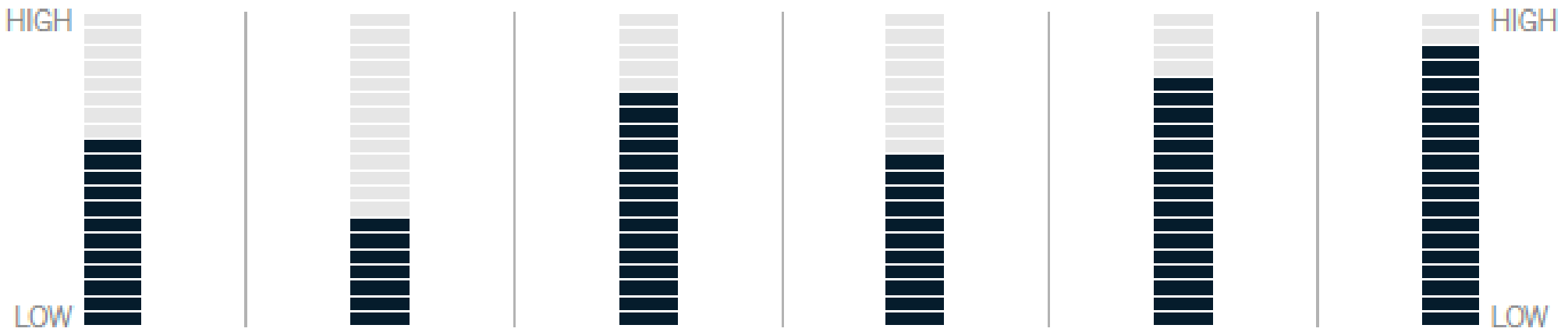


Substitutability
Extent to which suppliers are sole source



Visibility
Extent to which customer can trace spend distributed at sub-tier level

Typical industrial-company vulnerability



Demand side challenges

Difficult demand forecasting

The pandemic and the consequent supply chain disruption made demand forecasting nearly impossible. Numbers for demand and the ...

The absence of accurate demand forecasting impacts inventory management.

Difficult demand forecasting ... The pandemic-induced supply chain disruption made forecasting extremely challenging, making it nearly impossible to ...

Demand forecasting challenges ... Unpredictable consumer behavior and changing marketplace dynamics make it more challenging to map demand.

Demand fluctuations and inventory shortages

Fluctuations in transportation prices can get out of control for the industry.

Demand fluctuations and

Consumer expectations

Managing consumer satisfaction with changing customer expectations and behaviors while

#2 – Meeting customer expectations. The modern-

Aging Workforce: Younger workers have different

Read how UCBOS helped a consumer goods company improve supply chain ... Meeting these high expectations requires a flexible and customer-centric supply chain.

Challenges
Chain Man

Top 7 Supply
Management

Top 7 Supply
Management

Changing consumer attitudes

5. **Changing consumer attitudes** ... Consumer attitudes and behaviors have changed in some big ways during the pandemic, as well, like lowering the threshold for ...

At every turn, the supply chain is bottlenecked or obstructed entirely, affecting brands, manufacturers, suppliers, and the consumer. This article explores ...

<https://www.extensiv.com> > bl...

<https://1worldsync.com> > Blog

The 8 Biggest Supply Chain Challenges in 2023

Challenges Facing the Supply Chain

0 C...

<https://research.aimultiple.co...>
Navigating the Top 10 Supply Chain Challenge...

Sustainability

Sustainability

The climatic disasters in 2023 highlighted the requirement for environmental **sustainability** in every industry. Supply chains are constantly changing, and companies need to integrate sustainability into their operations. Finally, to address **sustainability** issues, companies need to integrate sustainability into their operations. **Sustainability** - Waste reduction: Supply chain managers should focus on reducing waste, optimizing resource usage, and reducing consumption in their operations.

Regulatory compliance

Meeting **regulatory compliance** ... With regulations becoming more stringent worldwide, maintaining compliance can be a significant challenge for global supply chains. ... **compliance**, operational inefficiencies, slim profit margins, and the changing dynamics of different types of retail establishments such as local corner stores. **Regulatory Compliance.** **Regulatory compliance** remains a crucial challenge for supply chain companies in 2023 and beyond. As governments impose stricter regulations, companies need to adapt their operations to meet these requirements.

<https://truein.com>
2023 Global Supply Chain Issues

<https://research.aimultiple.co...>
Navigating the Top 10 Supply Chain Challenge...

[https://www.spendedge.com ...](https://www.spendedge.com...)
Top 5 Challenges in the Retail Supply Chain

<https://www.rfgen.com> › Blog
Supply Chain Management: Top 10 C...

Digital Impact

Digitalization

Digitalization of the supply chain is an essential step to

enable growth in
What makes it c
the implementat
technologies ...

<https://stockarea.io>

Top 7 Supply Chain Management

Digitalization and Sustainability: Digitalization

Data dilemmas

10. Data Dilemmas ... Data overload is confusing. The

simple human m
be able to comp
data insights an
hard time turnin

<https://procurement>

Supply Chain Challenges &

Another challenge of the digital supply chain is data

Current challenges of supply chain management include

Cybersecurity

One of the biggest challenges of the digital supply chain is cybersecurity threats. As

supply chain interconnected digital ...

This bottleneck is something supply chain managers and operational executives need to coordinate on together.

https://www.c
Top 6 Supply Chain Challenge

<https://supplychaingamecha...>

Top 6 Challenges Facing Supply Chain Executives!

5. Cybersecurity ... The increased digitization of supply chains in 2023 makes

Increased Costs Throughout the Supply Chain - Supply Chain Complexity Due to Multiple Channels to Market - Consumer Demands Drive Need for Improved Speed, Quality ...

<https://www.blumeglobal.co...>

What Are the Main Supply Chain Challenge...

Avoiding cybersecurity threats ... As supply chains become more digital, they are

These problems in supply chain management range from technological integration, demand forecasting, and risk management, to sustainability and ethical ...

<https://corporate.nvisionglob...>

Navigating the 2023 Supply Chain Challenge...

Cybersecurity. Cybersecurity is becoming an ever-more important

One of the most extensive inventory management issues in healthcare supply chains faced by supply chain managers today is the difficult demand to forecast - ...

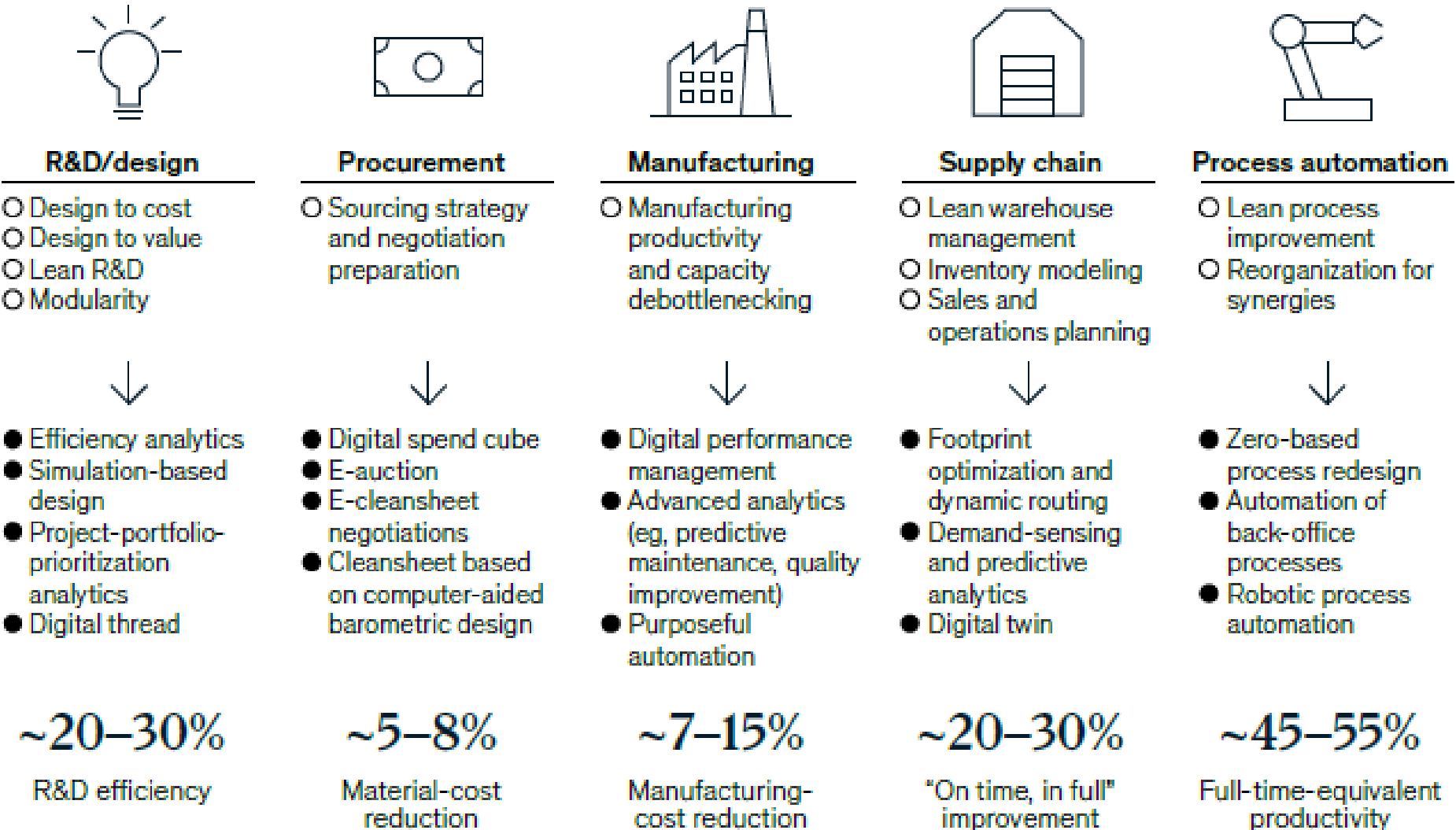
<https://www.onlinemanipal.c...>

Significant challenges in Supply Chain Managem...

Digital Impact +ve

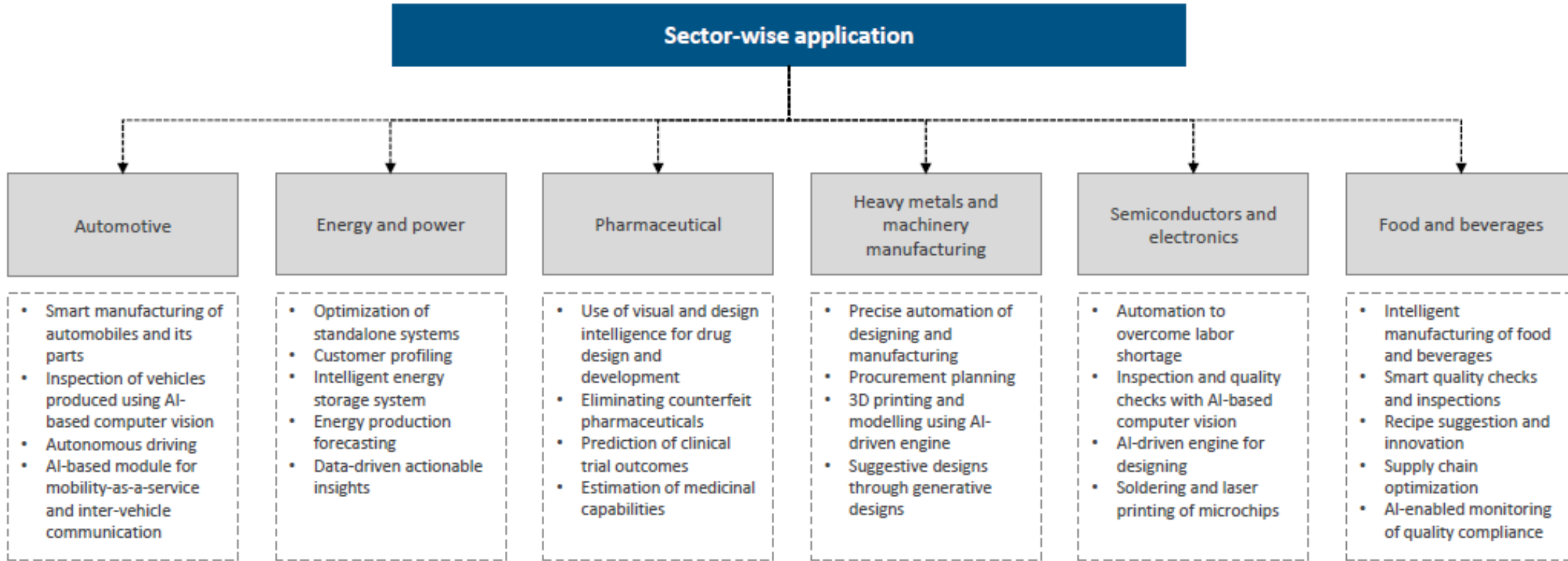
All areas of supply-chain operations are benefiting from digital technologies.

Example shifts from digital technologies ○ Classic operations capabilities ● Digital Internet of Things capabilities

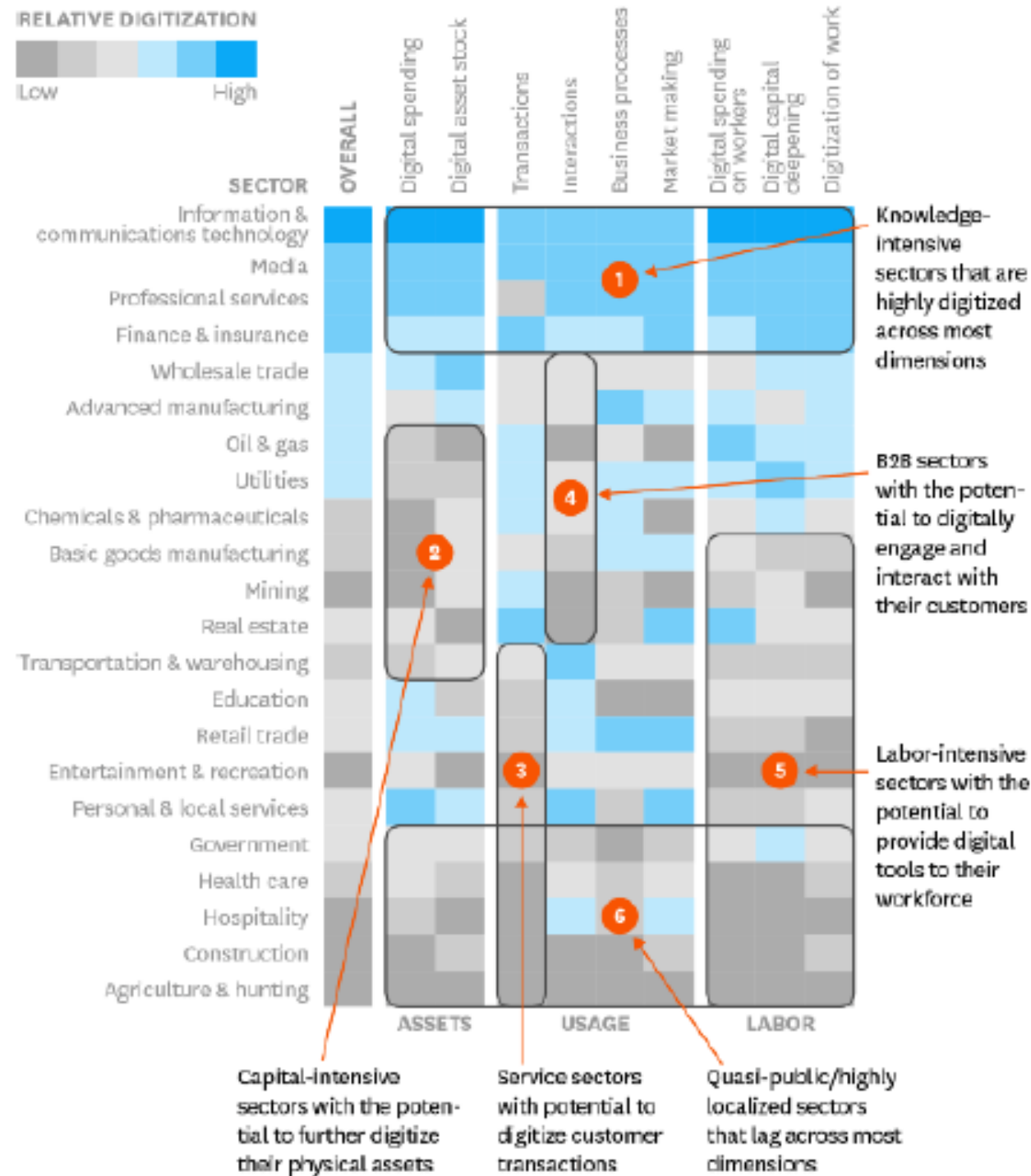


Digital Impact +ve Cont'd

- Artificial intelligence (AI) offers enormous potential to improve industrial operations in a variety of industries, including automobiles, energy, pharmaceuticals, heavy metal and machinery, semiconductors and electronics, and food and drinks.



How Digitized is your sector?



People

Staffing shortages

There is no one factor for the supply chain shortages

businesses

issues can be

geopolitical

globalization

<https://truein.com>

2023 Global

Chain Issues

Labor Shortages Add to the Supply Backlog

Mitigating labor shortages. From factory workers to truck

Talent

However, there is a shortage of such **talent** in the job market. Companies need to invest in **talent** acquisition and development to ensure that they have the ...

[https://www.qad.com > blog > ...](https://www.qad.com/blog)

Top 6 Supply Chain Challenges for 2023

However, finding and retaining **talent** with these skills can be challenging. Supply chain managers should invest in training and development programs to overcome ...

[https://www.intellinum.com > ...](https://www.intellinum.com)

Six Top Challenges In Supply Chain Managem...

Talent Trouble. Finding skilled workers can be tough. Usually, you'll find fresh graduates with zero to no little work experience. Although they can be ...

[https://procurementtactics.com...](https://procurementtactics.com)

Supply Chain - Challenges & How to O...

SC Resilience – My research

Supply Chain Resilience

FOCUS

LEA'R'N with continuous 'R'ESILIENCE

In the wake of ever bubbling geo-political risks, legislation & regulation ambiguity, cyberattacks, natural disasters, climate and global health events, supply chain resilience is perhaps one of the top-of-the-mind concerns faced by senior leaders of every organization, country, or an institution. Internet is abuzz with a whole lot of articles, frameworks, survey results and the like – enough to make a hapless supply chain manager's mind spin. A supply chain manager is today faced with a blizzard of terminologies, viz., disruption, uncertainty, fragility, risk, resilience, and many more. Amidst the pressure of real changes, and a surfeit of here-is-one-more frameworks, the environment is ripe for the supply chain manager to get back to first principles. To build resilience from ground-up, it is important to clarify terms relating to supply chain uncertainties. With this as the backdrop, **Prof (Dr) Kalyana C Chejarla and Ganesh Mahadevan** trace a few relevant resilience strategies, using the basic lean management principles.



Ganesh Mahadevan is Partner and Lead Consultant at the Konosm Institute. He has helped more than 50 organizations across industry sectors improve performance through Lean. A Fellow from IIT, Mumbai and MBA from IIT, Triruv, he has worked earlier with organizations such as Hindalco and Deloitte.



Dr. Kalyana C Chejarla teaches and writes on operations, digitalization and decision making at IIT, Hyderabad. He is an alumnus of IIM (U), IIM (A), IIS, and IIT (Guwahati). Prior to moving to academia, he worked with organizations such as Tata Motors, TCS, Dell etc., and was part of SCM transformation projects for clients worldwide.

UNCERTAINTY is when reality differs from what we expect. Strategies to address uncertainty therefore belong to both sides of the coin viz., shape reality (demand management, redundant capacities, multiple suppliers etc.) and update expectations (change model parameters, (re)negotiate service levels, invest in training, etc.). Supply chain uncertainties can be grouped into following four categories. This grouping is loosely in the order of: (a) decreasing order of ability to know or quantify, (b) increasing order of magnitude of impact and (c) increasing spatial and temporal system boundaries.

RANDOMNESS

Randomness refers to the unpredictable component of variation in behaviour of every process, equipment, or system from mean/expected behaviour. Randomness (also called white noise) is when the deviation does not exhibit specific patterns. Control limits are defined based on the extent of randomness, that prescribe the buffer needed to run the adjoining processes smoothly. Technically this is called Aleatory uncertainty. When the system under study is zoomed into a unitary process level, randomness is observed. Good techniques to address randomness are statistical process controls, six sigma

Sources of Uncertainty

- Randomness
- Variability
- Biases
- Disruptions

Inbuilding Resilience

- Reliability
- Robust
- Responsive
- Flexible / Agile
- Resilient / Antifragile
- Purpose-driven

Management for Professionals

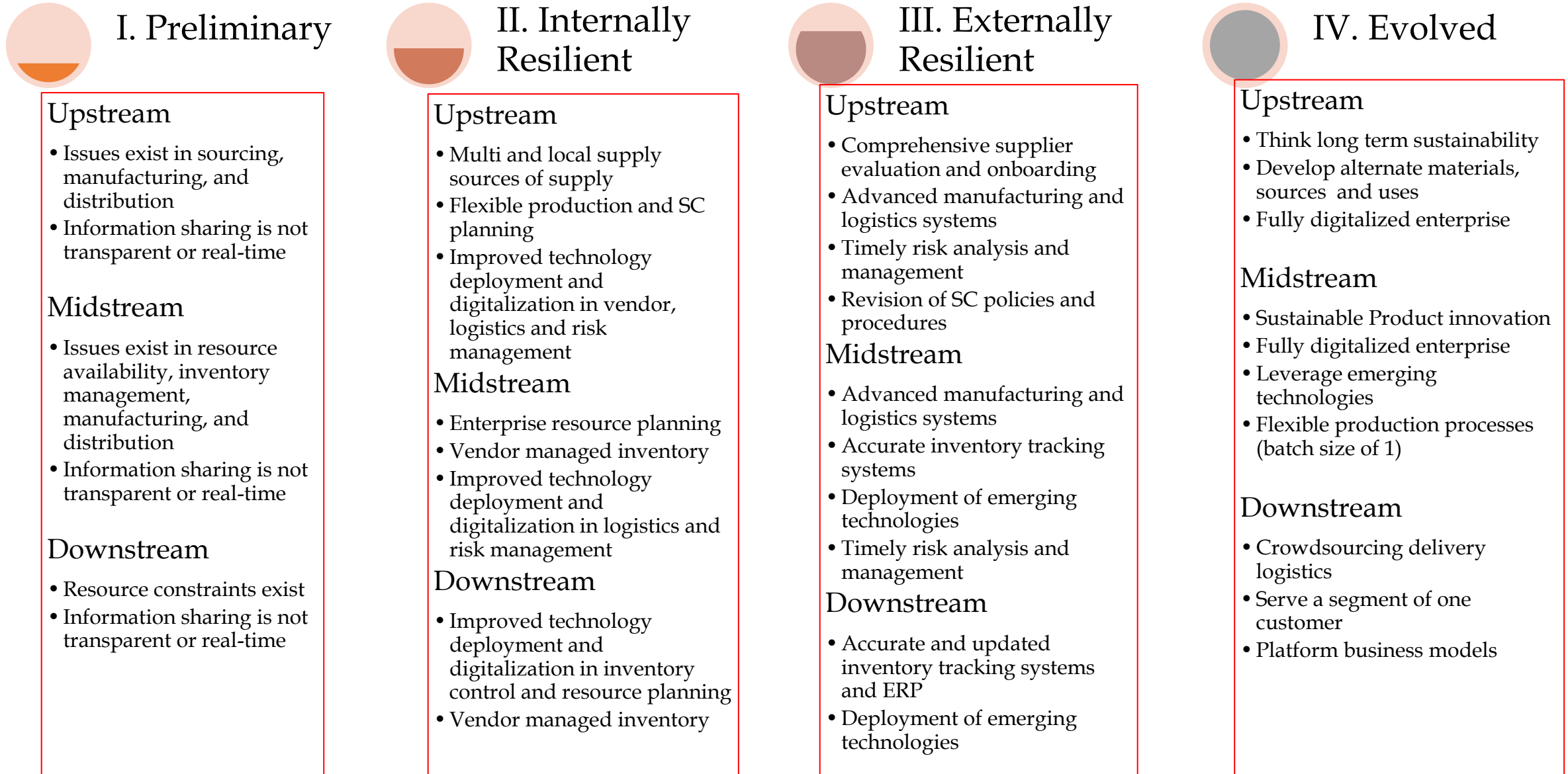
Ganesh Mahadevan
Kalyana C. Chejarla

Lean Management for Small and Medium Sized Enterprises

Adapting Operations to Changing
Business Environment

Supply Chain Resilience Maturity

A Conceptual Framework



Thank you!!